MS 103

Managerial Economics

Volume I

Block I: Introduction to Managerial Economics

Block II: Supply Side Economics

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SYLLABUS

Course Name: Managerial Economics

Course Code: MS 103

Course Objective:

The objective is to give students grounding in the basic understanding of economic environment and tools for better analysis of economic situations and thus helping in decision making.

BLOCK I: Introduction to Managerial Economics

Unit I **Basics of Managerial Economics**

Meaning, Scope and Nature of Managerial Economics.

Unit II **The Economy and its Basic Problems: Scarcity and Choices**

Economy and its Working, Kinds of Economic System, Production Possibility of an Economy, How Market Mechanism Works?, Efficiency and Reasons for Failure of Market System, Role of Government in an Economy.

Unit III **Law of Demand and Supply**

Law of Demand, Demand Function, Law of Supply, Supply Function, Equilibrium of Demand and Supply, Determination of Equilibrium Price and Quantity.

Unit IV **Elasticity of Demand and Supply**

Price Elasticity of Demand and its Determination, Price Elasticity and Marginal Revenue, Price Elasticity and Consumption Expenditure, Income Elasticity of Demand, Cross Elasticity of Demand, Elasticity of Price Expectation, Use of Elasticity, Price Elasticity of Supply.

Unit V **Failure of the Market Economy and Role of the Government**

Imperfect Market Information and Market Failure, Growth of Monopolies and Market Failure, Market Failure in Case of Public Goods, Public Provision of Public Goods, Externalities and Government Intervention.

Unit VI **Cardinal Utility Theory**

Cardinal Utility Theory, Law of Diminishing Marginal Utility, Consumer's Equilibrium, Derivation of Demand Curve, Drawbacks of Cardinal Approach.

Unit VII **Ordinal Utility Approach**

Indifference Curve Analysis, Diminishing Marginal Rate of Substitution, Properties of Indifference Curves, Indifference Curve Map, Budget Line, Consumer's Equilibrium, Effect of Income and Price Change in Consumer's Equilibrium, Income Effect and Substitution Effect of Inferior Goods, Complementarity and Substitutability, the Extreme Choices, Derivation of Individual Demand Curve, Comparison of Ordinal and Cardinal Utility Approach, Applications of Indifference Curve Analysis.

Unit VIII **Consumer's Surplus**

The Marshallian Consumer's Surplus, Hicsian Method of Measuring Consumer Surplus, Application of Consumer's Surplus Concept.

BLOCK II: Supply Side Economics

Unit IX **Theory of Production**

Production with One Variable Input

Meaning of Production, Production Related Concepts, Production Function, and Law of Production.

Production with Two Variable Input

Iso-quants, Marginal Rate of Technical Substitution, Properties of Iso-quants, Isoquant Map and Economic Region, Other Forms of Iso-quants, Elasticity of Substitution, Law of Returns to Scale.

Unit X **Optimum Combination of Inputs**

Isocost Line, Optimum Combination of Inputs, Choice of Optimum Expansion Path, Changes in Input Prices and Input Combinations.

Unit XI **Theory of Production Cost**

Cost Concepts, Short-run Cost-Output Relation, Long-run Cost-Output Relation, Economies of Scale, Diseconomies of Scale, Cost Function and Cost Curves.

BLOCK III: Market System

Unit XII **Business Firms and Market Structure**

Objectives of Business Firms, Profit Maximization, Alternative Objectives of Business Firms, the Market Structure.

Unit XIII **Perfect Competition Market**

Perfect Competition Market and its Features, Perfect v/s Pure Competition, Equilibrium of the Firm, Derivation of the Supply Curve of the Firm, Derivation of the Supply Curve of the Industry, Price and Output Determination under Perfect Competition, Price and Output Determination in Long Run, Long Run Supply Curve of a Competitive Industry.

Unit XIV **Monopoly Market**

Monopoly Market, its Source and Features, Demand and Revenue Curve under Monopoly, Cost and Supply Curves under Monopoly, Profit Maximization under Monopoly, Absence of Supply Curve under Monopoly, Monopoly v/s Perfect Competition: Comparison of Long-run Price and Output, Equilibrium of Multiplant Monopoly, Price Determination by Monopoly, Measures of Monopoly Power.

Unit XV **Monopolistic Competition Market**

Monopolistic Competition Market and its Features, Foundation of Monopolistic Competition Model, Price and Output Determination under Monopolistic Competition, Analysis of Selling Cost and Firm's Equilibrium, Critical Appraisal of Chamberlin's Theory of Monopolistic Competition.

Unit XVI **Oligopoly Market**

Oligopoly Market – its Meaning and Characteristics, Duopoly Model, Oligopoly Models, Game Theory Approach to Oligopoly.

BLOCK IV: Basics of Macro Economics

Unit XVII **The Circular Flow Model of the Economy**

Circular Flow in a Simple Economy Model, Circular Flow of Goods and Money in a Three Sector Economy, Circular Flows in a Four Sector Model: A Model with Foreign Sector.

Unit XVIII **National Income: Concept and Measurement**

Measure of National Income, Methods of Measuring National Income, Choice of Methods, Measurement of National Income in India, Growth and Composition of India's National Income.

Unit XIX **Theory of National Income Determination**

Determination of National Income: Two Sector Model, The Consumption Function, Derivation of Saving Function, A Formal Model of National Income Determination, Shifts in Aggregate Demand Function and Multiplier.

Unit XX **Income Determination with Government and Foreign Trade**

Income Determination Model with Government: The Three Sector Model, Income Determination with Foreign Trade: A Four Sector Model.

Unit XXI **Theories of Aggregate Consumption**

The Absolute Income Hypothesis, The Relative Income Hypothesis, The Permanent Income Hypothesis, The Life Cycle Hypothesis.

Unit XXII **Keynesian Theory of Interest**

Money Demand and Supply: The Keynesian Approach, The Keynesian Theory of Interest, Drawbacks of the Keynesian Theory of Interest.

Unit XXIII **Investment Theory and Acceleration Principle**

Basic Concepts, Investment Decisions, Change in Interest Rates, MFC and Capital Accumulation, The Acceleration Principle.

Unit XXIV **Money and Banking**

Money: Definitions and Functions, Types of Money, M1, M2, M3 and M4, High Powered Money.

Banks: Banking in India, Reserve Bank of India and its Functions, Repo, Reverse Repo, CRR, SLR, MSF, Credit Creation by Banks.

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BLOCK I: Introduction to Managerial Economics

BLOCK II: Supply Side Economics

BLOCK I: Introduction to Managerial Economics

UNIT 1 BASICS OF MANAGERIAL ECONOMICS

Structure:

Objectives

After reading this unit you will be able to understand:

- Meaning of Managerial Economics
- Scope of Managerial Economics
- Nature of Managerial Economics

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1.1 INTRODUCTION

Managerial economics is the integration of economic theory with business prac-tice. Economics provides tools managerial economics applies these tools to the management of busi-ness. In simple terms, managerial economics means the application of economic theory to the problem of management. Managerial economics may be viewed as economics applied to problem solving at the level of the firm. It enables the business executive to assume and analyze things. Every firm tries to get satisfactory profit even though economics emphasizes maximizing of profit. Hence, it becomes neces-sary to redesign economic ideas to the practical world. This function is being done by managerial economics.

1.2 INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial economics is a branch of economics that applies microeconomic analysis to decision methods of businesses or other management units. It bridges economic theory and economics in practice. If there is a unifying theme that runs through most of managerial economics it is the attempt to optimize business decisions given the firm's objectives and given constraints imposed by scarcity, for example through the use of operations research and programming. Managerial economics is an evolutionary science; it is a journey with continuing understanding and application of economic knowledge theories, models, concepts and categories in dealing with the emerging business/managerial situations and problems in a dynamic economy.

1.3 MEANING OF MANAGERIAL ECONOMICS

Managerial economics is the study of allocation of resources available to a business firm or an organisation. This is fundamentally concerned with the art of economizing, i.e., making rational choices to yield maximum return out of minimum resources and efforts, by making the best selection among alternative courses of action.

1.4 SCOPE OF MANAGERIAL ECONOMICS

The scope of business economics is usually restricted to the understanding of the business behaviour and problems of a firm at a micro level in the context of the prevailing business environment.

The scope of managerial economics includes following subjects:

1. Theory of demand
2. Theory of production

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3. Theory of exchange or price theory
4. Theory of profit
5. Theory of capital and investment
6. Environmental issues, which are enumerated as follows:

1. Theory of Demand

According to Spencer and Siegelman, "A business firm is an economic organisation which transforms productivity sources into goods that are to be sold in a market".

(a) Demand analysis: Analysis of demand is undertaken to forecast demand, which is a fundamental component in managerial decision-making. Demand forecasting is of 8 Managerial Economics importance because an estimate of future sales is a primer for preparing production schedule and employing productive resources. Demand analysis helps the management in identifying factors that influence the demand for the products of a firm. Thus, demand analysis and forecasting is of prime importance to business planning.

(b) Demand theory: Demand theory relates to the study of consumer behaviour. It addresses questions such as what incites a consumer to buy a particular product, at what price does he/she purchase the product, why do consumers cease consuming a commodity and so on. It also seeks to determine the effect of the income, habit and taste of consumers on the demand of a commodity and analyses other factors that influence this demand.

2. Theory of Production

Production and cost analysis is central for the unhampered functioning of the production process and for project planning. Production is an economic activity that makes goods available for consumption. Production is also defined as a sum of all economic activities besides consumption. It is the process of creating goods or services by utilising various available resources. Achieving a certain profit requires the production of a certain amount of goods. To obtain such production levels, some costs have to be incurred. At this point, the management is faced with the task of determining an optimal level of production where the average cost of production would be minimum. Production function shows the relationship between the quantity of a good/service produced (output) and the factors or resources (inputs) used. The inputs employed for producing these goods and services are called factors of production.

3. Theory of Exchange or Price Theory

Theory of Exchange is popularly known as Price Theory. Price determination under different types of market conditions comes under the wingspan of this theory. It

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helps in determining the level to which an advertisement can be used to boost market sales of a firm. Price theory is pivotal in determining the price policy of a firm. Pricing is an important area in managerial economics. The accuracy of pricing decisions is vital in shaping the success of an enterprise. Price policy impresses upon the demand of products. It involves the determination of prices under different market conditions, pricing methods, pricing policies, differential pricing, product line pricing and price forecasting.

4. Theory of Profit

Every business and industrial enterprise aims at maximising profit. Profit is the difference between total revenue and total economic cost. Profitability of an organisation is greatly influenced by the following factors:

- Demand of the product
- Prices of the factors of production
- Nature and degree of competition in the market
- Price behaviour under changing conditions

Hence, profit planning and profit management are important requisites for improving profit earning efficiency of the firm. Profit management involves the use of most efficient technique for predicting the future. The probability of risks should be minimised as far as possible.

5. Theory of Capital and Investment

Theory of Capital and Investment evinces the following important issues:

- Selection of a viable investment project
- Efficient allocation of capital 10 Managerial Economics
- Assessment of the efficiency of capital
- Minimising the possibility of under capitalisation or overcapitalisation. Capital is the building block of a business. Like other factors of production, it is also scarce and expensive. It should be allocated in most efficient manner.

6. Environmental Issues

Managerial economics also encompasses some aspects of macroeconomics. These relate to social and political environment in which a business and industrial firm has to operate. This is governed by the following factors:

- The type of economic system of the country
- Business cycles

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- Industrial policy of the country
- Trade and fiscal policy of the country
- Taxation policy of the country
- Price and labour policy
- General trends in economy concerning the production, employment, income, prices, saving and investment etc.
- General trends in the working of financial institutions in the country
- General trends in foreign trade of the country
- Social factors like value system of the society
- General attitude and significance of social organisations like trade unions, producers' unions and consumers' cooperative societies etc.
- Social structure and class character of various social groups
- Political system of the country

The management of a firm cannot exercise control over these factors. Therefore, it should fashion the plans, policies and programmes of the firm according to these factors in order to offset their adverse effects on the firm.

1.5 NATURE OF MANAGERIAL ECONOMICS

Managerial economics is the integration of economic principles with business management practices. The subject matter of business economics apparently pertains to economic analysis that can be helpful in solving business problems, policy and planning. But, one cannot make good use of economic theory in business practices unless one masters the basic contents, principles and logic of economics.

Economics in essence pertains to an understanding of life's principal preoccupation. It is a religion of the day-in living for the want satisfying activity. Economics, as a social science, studies human behaviour as a relationship between numerous wants and scarce means having alternative uses.

Managerial economics is essentially applied economics in the field of business management. It is the economics of business or managerial decisions. It pertains to all economic aspects of managerial decision making.

Managerial economics is confined only to a part of business management. It is primarily addressed to the analysis of economizing aspects of business problems and decision making by a business firm or an organisation. It is not directly concerned with the managerial problems and actions involving implementation, control, conflict resolution and other management strategies in day-to-day operations of the business. It draws heavily on traditional economics, as well as decision science in

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analyzing the business problems and the impact of alternative courses of action on the efficient allocation of resources or optimization.

1.6 THE USES OF MANAGERIAL ECONOMICS

The Uses of managerial economics are in the following areas:

(i) Demand Function and Estimation

(ii) Demand Elasticity

(iii) Demand Forecasting

(iv) Production Function and Laws

(v) Cost Analysis

(vi) Pricing and Output Determination in different market structures.

(vii) Pricing Policies and Practices in Real Business

(viii) Profit Planning and Management

(ix) Project-Planning and Management

(x) Capital Budgeting and Management

1.7 CHARACTERISTICS OF MANAGERIAL ECONOMICS

The main characteristics of Managerial Economics are as follows:

(i) Managerial Economics involves an application of economic theory especially, microeconomic analysis to practical problem solving in real business life. It is essentially applied microeconomics.

(ii) A managerial economist determines how the competition and market structure affect the product's sales level and price.

(iii) In a perfectly competitive market, the managerial economist realizes companies accept market pricing based on supply and demand.

(iv) If the firm is part of an oligopoly, i.e., the company and just a handful of others control the majority of the market; an economist uses principles from Nash's equilibrium which states that the firm must engage in pricing strategy to undercut its competitors.

(v) It is concerned with firm's behaviour in optimal allocation of resources. It provides tools to help in identifying the best course among the alternatives and competing activities in any productive sector whether private or public.

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(vi) Managerial economics incorporates elements of both micro and macroeconomics dealing with management problems in arriving at optimal decisions.

(vii) It uses analytical tools of mathematical economics and econometrics with two main approaches to economic methodology involving 'descriptive' as well as 'prescriptive' models.

(viii) Descriptive models are data based in describing and exploring economic relationships of reality in simplified abstract sense. Prescriptive models are the optimizing models to guide the decision makers about the most efficient way of realizing the set goal.

(ix) It may serve as a Managerial Insight. Managers have to acquire the insight of both micro-economics and macroeconomics as the former analyses the behaviour of individual economic entities such as consumer and producers, while the later exposes issues pertaining to their behaviour in the economy as a whole.

(x) Managerial Economics is the base for constructing an optimizing model for profit maximisation goal of the firm. In a prescriptive model, the set of alternative strategies towards attainment of the objective function in operation terms within specified constraints may be derived with the help of descriptive models in background.

(xi) It differs from traditional economics in one important respect that it is directly concerned in dealing with real people in real business situations.

(xii) Managerial economics becomes more meaningful when coordinated with other discipline of management with a broader knowledge, techniques/ methods, dogmas and theories involved using sharp common sense in practical decision making.

(xiii) Managerial economics has a pivotal place in allied business disciplines concerned into the arena of decision making.

(xiv) Managerial economics as an applied economic science deals/helps in analyzing the firm's markets, industry trends and macro forces which are directly relevant to the concerned business activity.

(xv) Managerial economics helps the manager to understand the intricacies of the business problems which make the problem solving easier and quicker, arrive at correct and appropriate decisions, improve the quality of such decisions, and so on.

(xvi) Most managerial decisions are made under conditions of varying degrees of uncertainty about the future. To reduce this element of uncertainty, it is

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essential to have homework of research/investigation on the problem solving before the action is undertaken.

(xvii) Managerial economics deals with practical business-problems relating to production, pricing and sale. These problems are theoretically analyzed by traditional economics.

1.8 MANAGERIAL ECONOMICS: NORMATIVE OR POSITIVE

Economic activities may be good or bad but as long as they involve the use of limited resources to satisfy many wants, they constitute a part and parcel of economics. This raises a further question, viz., does economics study activities, as they ought to? It involves saying whether economics is a positive science, which studies things as they are. For example, Physics, Chemistry and other positive sciences do not suggest how things should work, but study things as they actually work or behave.

Normative sciences study things, as they ought to. Ethics, for example, is a normative science. It tells us how we should behave.

As a matter of fact, the positive sciences simply describe, while the normative sciences simply prescribe. Positive Economics explains the economic phenomenon as: What is, what was and what will be.

Normative Economics stipulates what it ought to be.

Normative economics is a sub discipline of economics which explains how economics "ought to be" against positive economics which shows how economics practically is. Many normative judgments are condition based working on certain situations where change of values is scientific. Basic or normative judgments do not depend on such knowledge while non basic judgments depend on them. Normative economics is completely theory based and opposite of positive economics. Normative statements are generally found in the information media where people come up with proposals. A better way to understand would be through the instance where a same idea is told as the normative statement "we should cut tax to improve income" and positive statement which would put it as "Reducing tax helps the public and the government".

Examples of Normative Statements

The decision to sanction money to xyz is unwise.

The national minimum wage is undesirable as it does not help poor.

The policy of protection is the only proper way to help workers.

Benefits of Positive and Normative Distinctions

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The distinction between positive and normative statements has been very useful because economists find it easier to communicate with each other in a desirable way. This distinction helps us understand why they disagree. When people disagree in their views, they could learn whether their difference stems from varying normative ideas or varying positive ideas. If the dispute is on normative grounds, even evidences would not make them agree each other. On the other hand differences in positive ground would make them agreeable to each other. While making policies however, normative and positive ideas should be combined.

Value judgments are used to measure the validity of economic suggestions and policies. Normative statements cannot be tested, confirmed or refused. Predictions and individual hopes form the base of normative economics. They have a capability to influence one's attitude towards an economic proposal. When a statement does not agree universally and benefits some while it harms others, it becomes a normative statement since its validity cannot be proved as true or false. This perspective of economics would help one to understand things better.

Economics in general keeps one educated about probable economic perils and have people armed in precaution to meet them. Origins of economic problems are studied so that they are nipped at bud in future. Normative economics is very important for anyone who desires a future in law or politics. With thorough knowledge, economics is easy to be followed.

According to economists like Professors Marshall and Pigou, the ultimate object of the study of any science is to contribute to human welfare. According to these economists, economics should be a normative science. It should be able to suggest policy measure to the politicians. It should be able to prescribe guidelines for the conduct of economic activities. Economists have to be both tool makers and tool users. It means that not only economists should build up the economic theory but also, at the same time, they should provide policy measures.

Normative approach in managerial economics has ethical considerations and involves value judgements based on philosophical, cultural and religious positions of the community. One cannot disregard the normative functions of managerial economics, though the discipline may be treated primarily as a positive science. If managerial economic studies are completely detached from all normative significance, the significance of managerial economics itself will not be more than a purely formal technique of reasoning, algebra of choice. Essentially, managerial economics is logic of rational choice and a science for the betterment of business management, which cannot and should not refrain from essential value judgements.

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The value judgements and normative aspect and counseling in managerial economics studies can never be dispensed with altogether. As an applied social science, managerial economics is firmly rooted in the realm of social values and problems; hence, it cannot be and should not be made a pure value free science. Managerial economics is something more than a science, a science calling not only for systematic thinking but for human sympathy, imagination and in an unusual degree for the saving grace of commonsense in business culture. Cultural values and religious sentiments of the people coin the business ethics, which governs the managerial decision making in designing the production pattern and planning of the business in a country. Islamic culture, for instance, approves only the 'Halal' products prescribed in the light of Hadith and Sunnah. Similarly, the Hinduism or Buddhism followers may not approve products originating from the killings of animals. A modern multinational business firm has to abide by such norms in determining its business policy and expansion in different regions. Likewise, in entertainment business, a film producer needs to judge the social impact of the movie. So, the publishers must see that their publications should not cause damage to the social values or degrade morality. Media managers also bear similar responsibilities and so on. Furthermore, in industrial pursuit, environmental abuses need to be minimized and ecological balance has to be maintained.

Positive Economics explains the economic phenomenon as: What is, what was and what will be.

According to Prof. Robbins, however, economics is a positive science. Science is, after all, a search for truth and, therefore, economics should study the truth as it is and not as it ought to be. This is because when we say that this ought to be like this, we presume that our point of view is correct. When we express opinions, our own value enters into our consideration. In the study of a problem at a given point of time, not only economic considerations but also many other considerations, such as ethical, political, etc., must be considered. It is after weighing the relative importance of these various factors that a policy decision is to be taken. There are, therefore, bound to be differences in respect of policy prescription and it is, therefore, better to keep away from areas which are controversial and study the facts as they are.

Obviously, Prof. Robbins's point of view is not accepted by many. His critics say that the view that science is for science's sake should be discarded, as we discard the view that art is for art's sake. Science is, no doubt, a search for truth but it is equally important to determine which is a significant truth, i.e., significant from the point of view of the betterment of life.

The main function of economics, as Lord Keynes has said, is not to provide a body of settled conclusions immediately applicable in policy. It provides a method,

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or a technique of thinking, which enables its possessor to draw correct conclusions. This might provide them some guidelines for the conduct of economic affairs. Thus, economists can give directional advice and then leave the decision taking function to the supreme bosses. The main task of an economist is not to stand in the forefront of attack (i.e., to provide policy) but to stand behind the lines, in order to provide the armory of knowledge, i.e., to indicate the implications of the various policy measures.

Managerial economics is positive when it is confined to statements about causes and effects and to functional relations of economic variables.

1.9 IMPORTANCE OF MANAGERIAL ECONOMICS

(i) Managerial economics is pragmatic. It is concerned with analytical tools that are useful for decision-making in business.

(ii) Managerial economics essentially implies the application of economic principles and methodologies to the decision-making process within the firm under the conditions of uncertainty.

(iii) Managerial economics is a selection from the tool box of economic principles, methods and analysis applied to business management and decision-making.

(iv) It follows that economic theories are very useful in business analysis and practice for decision-making and forward planning by management.

(v) It makes problem-solving easy in business.

(vi) It improves the quality and preciseness of decisions.

(vii) It helps in arriving at quick and appropriate decisions.

(viii) It is applicable to several areas of business and management in practice, such as production management, inventory management, marketing management, finance management, human resource and knowledge management.

1.10 SUMMARY

Managerial economics is an evolutionary science; it is a journey with continuing understanding and application of economic knowledge theories, models, concepts and categories in dealing with the emerging business/managerial situations and problems in a dynamic economy.

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Managerial economics is pragmatic. It is concerned with analytical tools and techniques of economics that are useful for decision making in business. Managerial economics is, however, not a branch of economic theory but a separate discipline by itself, having its own selection of economic principles and methods.

Decision-making is the crucial aspect of dealing with business problems. A course in managerial economics thus provides an understanding of the framework and economic tools needed by managers/ businessmen as an aid to better business decision-making.

Orientation of business economics lies in helping the process of rational decision making for solving business problems which arise on account of scarcity of means or resources. Business activity is essentially concerned with the use of scarce productive means in this context. Managerial or business economics, therefore, heavily leans on economics in drawing the techniques to deal with the problem of scarcity.

The absolute command-based economy is the ideal of pure socialism. A socialist economy is a planned economy. Since, under authoritarian or pure socialism, all the resources are under the complete control of the government, economic activities are guided as per the State command and planning.

The market-oriented economy is the fundamental feature of capitalism. Market mechanism is pivotal in a capitalist economy. In short, capitalism and socialism are the pure categories of market mechanism and command mechanism respectively. The mixed economy is a mixed category of economic systems. A mixed economy is the blending of capitalism and socialism. India has adopted a mixed economy. In actual practice, however, there is no pure capitalism pure socialism in any country. All economic systems are built with the same bricks.

Managerial economics is pragmatic. It is concerned with analytical tools that are useful for decision-making in business. In short, business economics essentially implies the application of economic principles and methodologies to the decision-making process within the firm under the conditions of uncertainty. Managerial economics is a selection from the tool box of economic principles, methods and analysis applied to business management and decision-making.

The starting point of business economic investigation/research and analysis is the statement of the problem to be solved in the concerned business. The problem needs to be clearly defined by isolating the exact business phenomenon of economic interest and application. It involves framing the relevant questions to be explored in specific terms. In general, the defining of problem helps the manager/analyst in shaping the nature, course and direction of the business research.

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1.11 GLOSSARY

(a) Managerial Economics: Managerial economics is pragmatic. It is concerned with analytical tools and techniques of economics that are useful for decision making in business.

(b) Economic Theory: Economic Theory is a system of inter-relationships. Among the social sciences, economics is the most advanced in terms of theoretical orientations.

(c) Managerial Theory: Managerial theory refers to those aspects of economic theory and application which are directly relevant to the practice of management and the decision making process.

(d) Market-oriented Economy: The market-oriented economy is the fundamental feature of capitalism. Market mechanism is pivotal in a capitalist economy.

1.12 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. Define managerial economics.
2. What is Managerial theory?
3. What is Market-oriented economy?
4. What is Economic Analysis?

(B) Extended Answer Questions

1. Discuss the concept managerial economics.
2. State the nature of Managerial economics.
3. Discuss the scope of managerial economics.
4. Is managerial economics a positive or normative science? Discuss.
6. Explain the Methods of Economic Analysis.

(C) True or False

1. Managerial economics is pragmatic. It is concerned with analytical tools and techniques of economics that are useful for decision making in business.
2. Economic Theory is a system of inter-relationships. Among the social sciences, economics is the most advanced in terms of theoretical orientations.

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3. Business economics refers to those aspects of economic theory and application which are directly relevant to the practice of management and the decision making process.
4. The market-oriented economy is the fundamental feature of capitalism. Market mechanism is pivotal in a capitalist economy.

(D) Multiple Choice Questions

1. The fundamental economic problem faced by all societies is:
   (i) unemployment
   (ii) inequality
   (iii) poverty
   (iv) scarcity
2. "Capitalism" refers to:
   (i) the use of markets
   (ii) government ownership of capital goods
   (iii) private ownership of capital goods
   (iv) private ownership of homes & cars
3. There are three fundamental questions every society must answer. Which of the following is/are one of these questions?
   (i) What goods and services are to be produced?
   (ii) How are the goods and services to be produced?
   (iii) Who will get the goods and services that are produced?
   (iv) All of the above
4. Skills that embodied in a person are called
   (i) Human capital
   (ii) Embodied skills
   (iii) Physical capital
   (iv) Experience skills
5. "Treating an individual as typical of a group" is the definition of
   (i) Pure discrimination
   (ii) Statistical discrimination
   (iii) Human capital
   (iv) Specific skills

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(E) Match the Following

1.	Managerial economics	(a)	It is a system of inter-relationships.
2.	Economic Theory	(b)	It is concerned with analytical tools and techniques of economics that are useful for decision making in business.
3.	Market-oriented economy	(c)	It is the fudamental feature of capitalism. Market mechanism is pivotal in a capitalist economy.

(F) Fill in the Blanks

1. In a market system of an economy, producers are guided by _____ motive.
2. Managerial economics is _____.
3. The market-oriented economy is the fundamental feature of _____.
4. A mixed economy is the blending of _____.
5. The financing of _____ goods is done through public expenditure.

1.13 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. False, 4. True, 5. True

(D) 1. (iv), 2. (iii), 3. (iv), 4. (i), 5. (ii).

(E) 1. (b), 2. (a), 3. (c)

(F) 1. Profit, 2. Pragmatic, 3. Capitalism, 4. Capitalism and socialism, 5. Public

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8. James O. Berger (2008)."statistical decision theory," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
9. Keisuke Hirano (2008). "decision theory in econometrics," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
10. Vassilis A. Hajivassiliou (2008). "computational methods in econometrics," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
11. Trefor Jones (2004). Business Economics and Managerial Decision Making, Wiley. Description and chapter-preview links.
12. Nick Wilkinson (2005). Managerial Economics: A Problem-Solving Approach, Cambridge University Press. Description and preview.
13. Maria Moschandreas (2000). Business Economics, 2nd Edition, Thompson Learning. Description and chapter-preview links.
14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

1.15 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

1.16 TERMINAL QUESTIONS

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1. Why managerial economics is importance for business operations? Discuss.

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2. What are the uses of managerial economics? Is managerial economics a positive or normative science? Discuss.

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UNIT 2 THE ECONOMY AND ITS BASIC PROBLEMS: SCARCITY AND CHOICES

Structure:

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Objectives

After reading this unit you will be able to understand:

- Economy and its working
- Kinds of economic system
- Production Possibility of an Economy
- How market mechanism works?
- Efficiency and reasons for failure of market system
- Role of government in an economy

2.1 INTRODUCTION

Economic problem is the theory that scarcity exists in the sense that only finite and insufficient resources are available to satisfy the needs and desires of all human beings. The fundamental economic problem then faced by human society and business operators is how to allocate scarce resources to the provision of various goods and services within the economy.

2.2 THE PROBLEM OF SCARCITY

People want and need variety of goods and services. This applies equally to the poor and the rich people. It implies that human wants are unlimited but the means to fulfill them are limited. At any one time, only a limited amount of goods and services can be produced. This is because the existing supplies of resources are extremely inadequate. These resources are land, labour, capital and entrepreneurship.

These factors of production or inputs are used in producing goods and services that are called economic goods which have a piece. These facts explain scarcity as the principal problem of every society and suggest the Law of Scarcity, The law states that human wants are virtually unlimited and the resources available to satisfy these wants are limited.

2.3 THE PROBLEM OF CHOICE

Since are live in a world of scarcity, a society can produce only a small portion of goods and services that its people want. Therefore, scarcity of resources gives rise to the fundamental economic problem of choice. As a society cannot produce enough goods and services to satisfy all the wants of its people, it has to make choices.

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A decision to produce one good requires a decision to produce less of some other good. So choice involves sacrifice. Thus every society is faced with the basic problem of deciding what it is willing to sacrifice to produce the goods it wants the most.

For instance, the more roads a country decided to construct the fever resources will there be for building schools. So the problem of choice arises when there are alternative ways of producing other goods. The sacrifice of the alternative (school buildings) in the production of a good (roads) is called the opportunity cost.

There are a number of problems that can arise from choices that are made by people, whether they are individuals, firms or government. Choices or alternatives (or opportunity cost) are illustrated in terms of a production possibility curve.

A production possibility curve shows all possible combinations of two goods that a society can produce within a specified time period whose resources are fully and efficiently employed.

PP_1 is the production possibility curve in Fig. 1 which shows the problem of choice between two goods X and Y in a country. Good X is measured on the horizontal axis and Good Y on the vertical axis. PP cue shows all combinations of X and Y good that can be produced by the country with all its resources fully and efficiently employed.

If the country chooses to produces more of X good, it would have to sacrifice the production of some quantity of Y good. The sacrifice of some quantity of Y good is the opportunity cost of producing some extra quantity of good X.

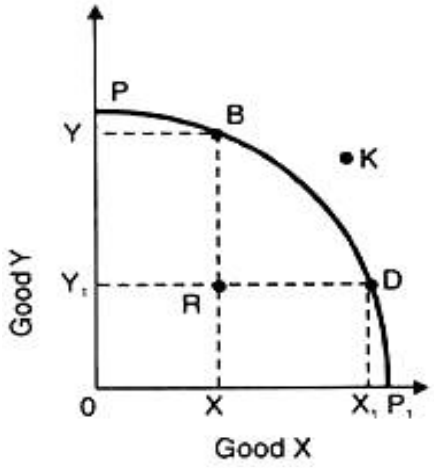

Fig. 1

The PP_1 curve is downward sloping because to produce more of good X involves producing less of Y good in a fully employed economy. Moving from point Â to D on the $PP_{\{}$ curve means that for producing XX, more quantity of good X, YY quantity of good Y has to be sacrificed.

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Both point's B and D represent efficient use of country's resources. Point R which is inside the bounder of PP curve implies inefficient use of resources. Point Ê which is outside the boundary of PP_X curve is an unattainable combination because the country does not possess sufficient resources to produce two combination of X and Y goods.

2.4 ECONOMY AND ITS WORKING

An economy is an area of the production, distribution, or trade, and consumption of goods and services by different agents in a given geographical location. Understood in its broadest sense, 'The economic is defined as a social domain that emphasizes the practices, discourses, and material expressions associated with the production, use and management of resources'. Economic agents can be individuals, businesses, organizations, or governments. Economic transactions occur when two parties agree to the value or price of the transacted good or service, commonly expressed in a certain currency, but monetary transactions are only a small part of the economic domain.

Economic activity is spurred by production which uses natural resources, labor, and capital. It has changed over time due to technology (automation, accelerator of process, reduction of cost functions), innovation (new products, services, processes, new markets, expands markets, diversification of markets, niche markets, increases revenue functions) such as that which produces intellectual property and changes in industrial relations (for example, child labor being replaced in some parts of the world with universal access to education).

A given economy is the result of a set of processes that involves its culture, values, education, technological evolution, history, social organization, political structure and legal systems, as well as its geography, natural resource endowment, and ecology, as main factors. These factors give context, content, and set the conditions and parameters in which an economy functions. In other words, the economic domain is a social domain of human practices and transactions. It does not stand alone.

A market-based economy is where goods and services are produced and exchanged according to demand and supply between participants (economic agents) by barter or a medium of exchange with a credit or debit value accepted within the network, such as a unit of currency.

2.5 ECONOMIC SYSTEM

Economic systems are the means by which countries and governments distribute resources and trade goods and services. They are used to control the five factors

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of production, including: labor, capital, entrepreneurs, physical resources and information resources.

2.6 DEFINITION OF ECONOMIC SYSTEMS

According to Loucks definition of economic system is that it consist of those institutions which a given people or nation or group of nations has chosen or accepted as the means through which resources are utilized for the satisfaction of human wants.

According to Gruchy, It is an evolving pattern or complex of human relations which is concerned with the disposal of scarce resources for the purchase of satisfying various private and public needs for goods and services.

2.7 KINDS OF ECONOMIC SYSTEM

Various kinds of Economic Systems are:

1. Capitalism or Private Enterprise Economy
2. Socialism
3. Communism
4. Mixed Economy or Government and Private Sector

1. Capitalism

Capitalism is one of economic systems in which means of production are owned and managed by private individuals and institutions. They are at liberty to use any technique of production and produce anything they like. State is to take care of only internal and external security of the country. Normally the activities related to Defence, Police, administration and Courts of Justice are controlled by the Government.

2. Socialism

Socialism is that part of economic systems which the means of production are owned and managed by the State. Private ownership of means of production is not allowed. People can have personal property which is transferable and inheritable. The anti-social activities like smuggling and hoarding find no place in socialism. Economic activities are planned with the motive of social benefit by a central planning authority.

3. Communism

Communism is a part of economic systems, where means of production are controlled and managed by a Central State authority, and there is also a restriction

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on the ownership of personal property communism. Individuals are assigned work by the State and they are given a bit remuneration of their services. People get ration from Government department. People do not have choice of their own.

4. Mixed Economy

Mixed economy is a part of economic systems which combines in itself the features of Capitalism and that of the Socialism. Unlike a pure capitalistic economy, it has an important public sector i.e. a number of industries are owned and managed by the state. Private enterprise is allowed and even encouraged to operate a large number of industries and to own the various means of production. Thus in a mixed economy, the public and private sectors exists side by side.

2.8 PRODUCTION POSSIBILITY OF AN ECONOMY

The production possibility curves are a hypothetical representation of the amount of two different goods that can be obtained by shifting resources from the production of one, to the production of the other. The curve is used to describe a society's choice between two different goods.

Under the field of macroeconomics, the production possibility frontier (PPF) represents the point at which an economy is most efficiently producing its goods and services and, therefore, allocating its resources in the best way possible. If the economy is not producing the quantities indicated by the PPF, resources are being managed inefficiently and the production of society will dwindle. The production possibility frontier shows there are limits to production, so an economy, to achieve efficiency, must decide what combination of goods and services can be produced.

When the PPF shifts outwards, we know there is growth in an economy. Alternatively, when the PPF shifts inwards it indicates that the economy is shrinking as a result of a decline in its most efficient allocation of resources and optimal production capability. A shrinking economy could be a result of a decrease in supplies or a deficiency in technology.

An economy can be producing on the PPF curve only in theory. In reality, economies constantly struggle to reach an optimal production capacity. And because scarcity forces an economy to forgo one choice for another, the slope of the PPF will always be negative; if production of product A increases then production of product B will have to decrease accordingly.

Opportunity Cost

Opportunity cost is the value of what is foregone in order to have something else. This value is unique for each individual. You may, for instance, forgo ice cream in

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order to have an extra helping of mashed potatoes. For you, the mashed potatoes have a greater value than dessert. But you can always change your mind in the future because there may be some instances when the mashed potatoes are just not as attractive as the ice cream. The opportunity cost of an individual's decisions, therefore, is determined by his or her needs, wants, time and resources (income).

This is important to the PPF because a country will decide how to best allocate its resources according to its opportunity cost. Therefore, the previous wine/cotton example shows that if the country chooses to produce more wine than cotton, the opportunity cost is equivalent to the cost of giving up the required cotton production.

For example, assume that an individual has a choice between two telephone services. If he or she were to buy the most expensive service, that individual may have to reduce the number of times he or she goes to the movies each month. Giving up these opportunities to go to the movies may be a cost that is too high for this person, leading him or her to choose the less expensive service.

Remember that opportunity cost is different for each individual and nation. Thus, what is valued more than something else will vary among people and countries when decisions are made about how to allocate resources.

An economy can focus on producing all of the goods and services it needs to function, but this may lead to an inefficient allocation of resources and hinder future growth. By using specialization, a country can concentrate on the production of one thing that it can do best, rather than dividing up its resources.

Determining how countries exchange goods produced by a comparative advantage ("the best for the best") is the backbone of international trade theory. This method of exchange is considered an optimal allocation of resources, whereby economies, in theory, will no longer be lacking anything that they need. Like opportunity cost, specialization and comparative advantage also apply to the way in which individuals interact within an economy.

Sometimes a country or an individual can produce more than another country, even though countries both have the same amount of inputs. For example, Country A may have a technological advantage that, with the same amount of inputs (arable land, steel, labor), enables the country to manufacture more of both cars and cotton than Country B. A country that can produce more of both goods is said to have an absolute advantage. Better quality resources can give a country an absolute advantage as can a higher level of education and overall technological advancement. It is not possible, however, for a country to have a comparative advantage in everything that it produces, so it will always be able to benefit from trade.

2.9 HOW MARKET MECHANISM WORKS?

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All societies necessarily make economic choices. Society needs to make choices about, what should be produced, how those goods and services should be produced, and who is allowed to consume those goods and services. For conventional economics the market by way of the operation of supply and demand answers these questions. Under conditions of competition, where no one has the power to influence or set price, the market (everyone, producers and consumers together) determines the price of a product, and the price determines what is produced, and who can afford to consume it.

Price provides the incentive to both the consumer and producer. High prices encouraged more production by the producers, but less consumption by the consumers. Low prices discourage production by the producer, and encouraged consumption by the consumers. Both incentives push the price to balance the forces of consumption (demand) and production (supply). Economists call this balance: equilibrium. This natural mechanism requires no external institution for direction (or only a minimum amount), or any altruists' motivation by either the consumers or the producers.

The supply and demand mechanism (the economic model) besides being the natural consequences of economic forces provides the most efficient economic outcomes possible. Satisfaction for society is maximized, at minimum cost. The market mechanism's efficiency outcome is always located on the production possibility curves frontier, where all resources are fully utilized (points within the production possibility curves are inefficient by definition, since resources are not being utilized). This core model of supply and demand explains why economists usually favor market results, and seldom wishes to interfere with price. Setting minimum wages, for instance, or interfering with trade, violate the spirit of the model, and lead to inefficient outcomes.

There are alternative viewpoints, however, that question just how efficient and natural the market mechanism is. They argue that actual markets in any society are embedded within a set of institutional rules, laws, and customs that determine how well the market works. Only by looking at actual markets and their institutional rules can efficiency be determined. They see a market as a game where the underlying rules as well as the approaches of its participants determine the outcome. The variables that matter are institutions and not only prices. Some markets work better, than others, even within the same society, but certainly they differ between countries with different rules and values.

This disagreement among economist is a matter of degree. Even Adam Smith, the father of economic saw a role for government in the economy. Lassize faire

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(government stay out) was never seen as absolute. The Government was needed to provide some elements of the following; law and order, enforcement of private contracts and property rights, public goods such as roads and other public infrastructure, and defense from external military threats. Most economists believe these roles continue. Most economists also believe that the market is a useful tool and has a place in the economy. The real difference is the degree of faith in the efficiency of the market, and whether society should take direction from the market, or society should control and direct the market.

If no single seller or buyer can set prices and neither does government or any other institution; how are goods and services allocated in competitive markets, and how are resources allocated in the competitive factor markets? The answer is that there are two independent factors that determine price in competitive markets (demand and supply). If markets were not competitive by definition a single seller or buyer could control and set price. Competition then needs flexible impersonal pricing. Suppliers must not work together to influence prices, and each supplier must be able to enter or exit a market at will. There are a number of other conditions necessary for full competition, but let's look, first at the two principle components of the model, starting with demand.

The investigation of the market mechanism starts with a single consumer. A consumer will respond to price. Demand is a set of relationships that show the quantity of a good the consumer will buy at each price within a specific time period. To have an effective demand a consumer must both desire the product and be able to afford the good or service. Desire without the ability to afford a good or service is not demand. Therefore not everyone can equally participate as consumers in all markets (it depends on their wealth).

When the price of some item that is normally purchased increases or decreases, the consumer will buy less or more of it. There are two reasons for this:

First, an increase in the price of something that the consumer wants to buy makes the consumer poorer. It will now require a larger portion of income to purchase the same amount that the consumer uses to buy at the lower price. This affect is referred to as income effect. Price changes always affect one's real income (price increases decrease real income while price decreases increase real income). Its importance, however, varies with how large the cost of the item is relative to the consumer's total budget. The change in price of salt will have a minimal affect on real income, while a change in the price of a car can be significant.

Second, you respond to the price of an item in relationship to other items. This effect is called the substitution effect. As the price of a good falls (other prices remaining unchanged), the good becomes relatively cheaper than other goods and you substitute the good for others goods that are now relatively more expensive.

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As the price of a good rises, you substitute other now less expensive goods for the one in question.

In general these two effects reinforce each other, with higher prices reducing the quantity of demand, and lower prices increasing the quantity of demand. But there can be exceptions. Veblen good appeals to customers because of its high price (and status). Russian caviar, large diamonds and large luxury cars or yachts may be examples. Raising the price for these goods may not decrease quantity demanded.

There are of course other factors, besides price changes that influences an individual's quantity demanded. These other factors are usually within the model of demand and supply given less weight than price. These other factors are held constant (Ceteris Paribus) to arrive at an equilibrium price level.

These factors include; first, prices of other products, both complements and substitutes. Complements our products used in conjunction with the good in question (in the United States movie going, and popcorn consumption are complements). If the price of a complement goes up, the demand for the good in question will decrease (as well as the complement itself). Substitutes are goods that replace each other in consumption (chicken, beef, and pork are substitutes). If the price of a substitute goes up, the demand for the good in question will go up (while the demand for the substitute declines). Second, changes in consumers' income will affect the consumer's ability to buy, and thus their demand. Third, is a catch all categories, which includes the preferences of the consumers? Changes in preferences will affect demand. These changes in desire and taste are usually not addressed by economist as part of the economic model of demand and supply. Economists usually refer to sociologist, psychologist and other social sciences to model these changes. This category is nonetheless important for the efficiency arguments of the model. If economists really want to argue that the market produces just the right goods and services then they have to implicitly believe that demand is innate to humans (not easily influence by producers and our general environment). How preferences are really formed help determine who is, in fact, in charge of the markets. The critics (alternative models) believe that preferences are not innate, but preferences are learned and influenced by producers (by using marketing strategies).

2.10 EFFICIENCY OF MARKET SYSTEM

When money is put into the stock market, the goal is to generate a return on the capital invested. Many investors try not only to make a profitable return, but also to outperform, or beat, the market.

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However, market efficiency - championed in the efficient market hypothesis (EMH) formulated by Eugene Fama in 1970, suggests that at any given time, prices fully reflect all available information on a particular stock and/or market. Fama was awarded the Nobel Memorial Prize in Economic Sciences jointly with Robert Shiller and Lars Peter Hansen in 2013. According to the EMH, no investor has an advantage in predicting a return on a stock price because no one has access to information not already available to everyone else.

The Effect of Efficiency: Non-Predictability

The nature of information does not have to be limited to financial news and research alone; indeed, information about political, economic and social events, combined with how investors perceive such information, whether true or rumored, will be reflected in the stock price. According to the EMH, as prices respond only to information available in the market, and because all market participants are privy to the same information, no one will have the ability to out-profit anyone else.

In efficient markets, prices become not predictable but random, so no investment pattern can be discerned. A planned approach to investment, therefore, cannot be successful.

This "random walk" of prices, commonly spoken about in the EMH school of thought, results in the failure of any investment strategy that aims to beat the market consistently. In fact, the EMH suggests that given the transaction costs involved in portfolio management, it would be more profitable for an investor to put his or her money into an index fund.

2.11 REASONS FOR FAILURE OF MARKET SYSTEM

Various reasons for failure of Market System are:

1. Incomplete Markets

Markets for certain things are incomplete or missing under perfect competition. The absence of markets for such things as public goods and common property resources is a cause of market failure. There is no way to equate their social and private benefits and costs either in the present or in the future because their markets are incomplete or missing.

2. Indivisibilities

The Paretian optimality is based on the assumption of complete divisibility of products and factors used in consumption and production. In reality, goods and factors are not infinitely divisible. Rather, they are indivisible. The problem of

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divisibility arises in the production of those goods and services that are used jointly by more than one person.

An important example is of road in a locality. It is used by a number of persons in the locality. But the problem is how to share the costs of repairs and maintenance of the road. In fact, very few persons will be interested in its maintenance. Thus marginal social costs and marginal social benefits will diverge from each other and Pareto optimality will not be achieved.

3. Common Property Resources

Another cause of market failure is a common property resource. Common ownership when coupled with open access, would also lead to wasteful exploitation in which a user ignores the effects of his action on others. Open access to the commonly owned resources is a crucial ingredient of waste and inefficiency.

Its most common example is fish in a lake. Anyone can catch and eat it but no one has an exclusive property right over it. It means that a common property resource is non-excludable (anyone can use it) and non-rivalrous (no one has an exclusive right over it). The lake is a common property for all fishermen.

When a fisherman catches more fish, he reduces the catch of other fishermen. But he does count this as a cost, yet it is a cost to society. Because the lake is a common property resource where there is no mechanism to restrict entry and to catch fish. The fisherman who catches more fish imposes a negative externality on other fishermen so that the lake is overexploited.

This is called the tragedy of the commons which leads to the elimination of social gains due to the overuse of common property. Thus when property rights are common, indefinite or non-existent, social costs will be more than private costs and there will not be Pareto Optimality.

4. Imperfect Markets

Pareto efficiency increases under perfect competition. But it declines under market distortions or imperfections. Let us consider a case of monopoly.

5. Asymmetric Information

Pareto optimality assumes that producers and consumers have perfect information regarding market behaviour. But according to Joseph Stiglitz, "In the real world, there is asymmetric (incomplete) information due to ignorance and uncertainty on the part of buyers and sellers. Thus they are unable to equate social and private benefits and costs."

Suppose a producer introduces a new antipollution device in the market. But it is very difficult for him to predict the current demand of his product. On the other

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hand, consumers may be ignorant about quality and utility of this anti-pollution device. In some cases, information about market behaviour in the future may be available but that may be insufficient or incomplete. Thus market asymmetries, fail to allocate efficiently.

6. Externalities

The presence of externalities in consumption and production also lead to market failure. Externalities are market imperfections where the market offers no price for service or disservice. These externalities lead to malallocation of resources and cause consumption or production to fall short of Pareto optimality.

2.12 ROLE OF GOVERNMENT IN AN ECONOMY

The government enhances growth and stability of the economy. It provides the infrastructure and systems that facilitate economic activity while formulating regulations and controls to ensure order and fairness in businesses operations. The government may directly chip in to prop up the economy.

The government supports the economy when it facilitates transport and communication via the postal service and highways and establishes the police and military to safeguard life and property. Local or state governments support the economy by funding education and building roads.

Governments devise rules that ensure businesses operate in the best interests of the public. For instance, the government may allow a monopoly to operate in a market or industry with little competition, such as in utility services, but limit the company's freedom to increase prices to avoid hurting consumers who would have no recourse.

A government devises monetary policies to keep the economy growing at the desired pace. By controlling circulation of money, adjusting interest rates and tax rates, and controlling access to credit, the government can control the inflation or the decline of the economy. Likewise, the economy is affected when the government gives certain businesses preferential treatment, such as by limiting foreign competition in a specific market or imposing higher taxes on imports to boost domestic production.

2.13 CENTRAL PROBLEMS OF AN ECONOMY

The problem of choice arises on account of the pressure of three interrelated facts, viz, human wants are unlimited, means required to satisfy these wants are limited and means are capable of being put to alternative uses. There would be no problem

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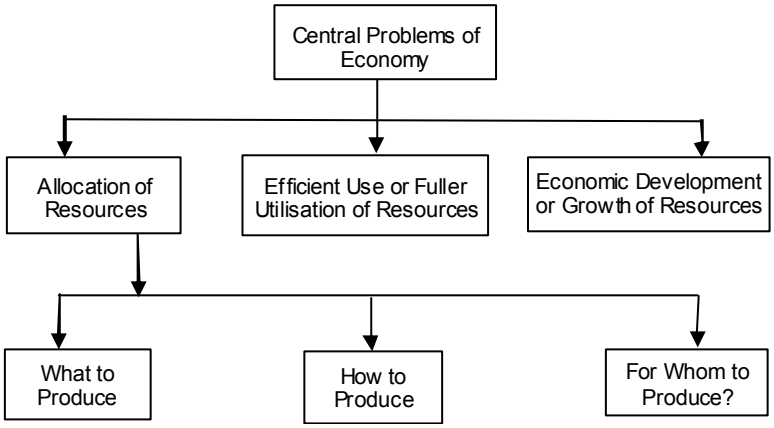
if the scarce means had only a single use. However, in reality, these scarce means have alternative uses.

Thus, whenever the problems of choice and scarcity arise, economics is said to be emerged, this is why, every economy has to face and solve the following basic problems:



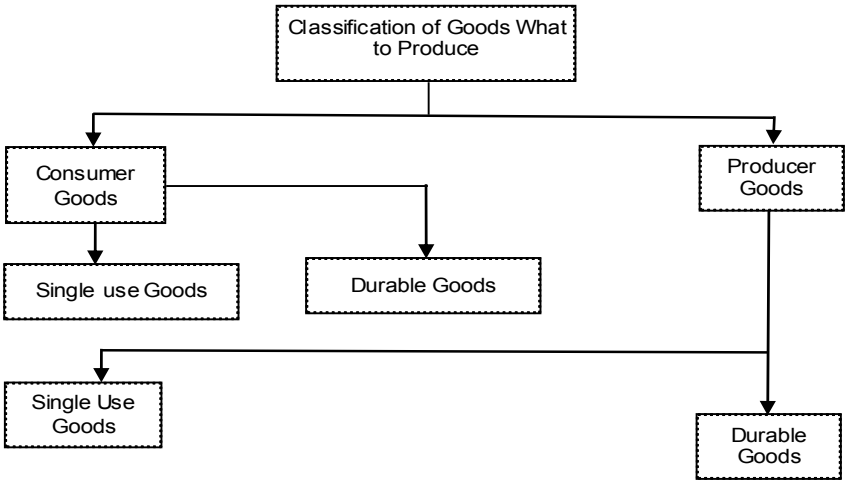
Allocation of Resources

The available resources of the society may be used to produce various commodities for different groups and in different manner.

It requires that decisions regarding the following should be made:

What to produce? (Types and amount of commodities to be produced):

Land, labour, capital, machines, tools, equipment's and natural means are limited. Every demand of every individual in the economy cannot be satisfied, so the society has to decide what commodities are to be produced and to what extent. Goods produced in an economy can be classified as consumer goods and producer goods. These goods may be further classified as single use goods and durable goods.



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It is undoubtedly the basic problem of the economy. If we produce one commodity, it will mean that we are neglecting the production of the other commodity. We assume that all the factors of production in the economy are fully absorbed, so if we want to increase the production of one commodity, we will have to withdraw resources from the production of the other commodity.

On the basis of our requirements goods are further classified as goods- for necessaries, comforts and luxuries. The economy is also faced with the problem, how much goods should be produced for necessaries, comforts and luxuries.

How to produce? (Problem of the se-lection of the technique of production – choice between labour-intensive and capital-intensive techniques)

After the decision regarding the goods to be produced is taken, next problem arises as to what techniques should be adopted to produce commodity. Goods can be produced in large-scale industries or in small-scale village and cottage industries.

The economy has to decide between automatic machines and handicrafts. Hence two main options are-either capital- intensive technology (more capital and less labour) or labour-intensive technology (more labour and less capital). The economy has to decide about the technique of production on the basis of labour and capital.

For whom to produce? (Problem of distribution of income)

Goods and services produced in the economy are consumed by its citizens. The individuals may belong to economically weaker sectioned or rich class of people. Actually this is the problem of distribution. In case of capitalism the decision is taken on the basis of the purchasing powers of the consumers. Socialistic economy takes decision regarding goods and services to be produced on the basis of requirements of the individuals.

2.14 MAJOR PROBLEMS OF INDIAN ECONOMY AND THEIR SOLUTIONS

1. India Suffers from Over Population

At present, the population of India is around 1.2 billion. Population is increasing at an explosive rate. Thanks to the advances in medical science and other public health measures, the death rate has been greatly reduced.

The growth of population in relation to the growth of economy is much faster resulting in the incidence of malnutrition, unhealthy conditions of living and so on.

A high birth rate accompanied by a low death rate cannot adjust population to the means of living. The population growth rate in India is still quite high compared to

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developed countries. For this, the rapidly growing population swallows up the increased output and our country remains economically backward.

Solution

This necessitates rapid economic development to meet the requirements of increased population.

Create awareness among the people of India regarding the demerits of population explosion.

Encourage people to adopt birth control methods.

Educate people. Educated people are more likely to take steps to control population.

2. There is deficiency of capital equipment

The varied natural resources of India remain underutilized due to deficiency of capital equipment. It may be said that the vast resources like land, water, power and natural resources should be fully and at the same time properly utilized for the economic, benefit of the people at large. Under-utilization of natural resources is yet another major problem for Indian Economy.

Solution

Steps should be taken to modernize capital equipment.

Private investment should be encouraged to make investment in capital intensive sector.

Easy finance should be made available to businesses engaged in large-scale industries.

3. Inadequate revenue through taxation despite high rate.

India a large country. In India there is a great problem of securing adequate revenues through taxation and public borrowing. A large number of people live below the subsistence level. Again, a high rate of taxation discourages private incentive as well as the free flow of foreign capital.

Solution

Encourage people to opt for higher education and professional courses. This would enable them to come out of poverty trap. An increase in their earning would result in increased collection in the form of direct and indirect taxation.

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4. Unemployment

The Indian economy is characterized by huge unemployment, both in rural and urban areas. Unemployment is a major problem for Indian Economy. India is basically an agricultural country. Most people are engaged in agriculture due to want of alternative occupation. A large part of the population engaged in agriculture can be removed without reducing agricultural output. This is called disguised unemployment. They should be withdrawn from agriculture with a view to increasing their marginal productivity.

Solution

Educated people are more likely to secure a respectable occupation.

Cottage industries should be promoted in rural areas.

Industries that employ a large number of people should be encouraged.

The problem of disguised unemployment can be tackled by creating better opportunities of employment.

5. Deficiency of Per capita Capital

Indian economy suffers from the problem of deficiency of per capital. People are too poor to save and invest to make for rapid economic development. As a result the per capita availability of capital like steel and energy is extremely low in India compared to developed countries.

Solution

Check on excessive population growth.

The natural resources of the country should be appropriately utilized, so that every section of the society can get its benefit.

6. Low per capita purchasing power

In India, the per capita real income is very low resulting into low per capital purchasing power. This is due to the poor income of the people. For this the purchasing power of the people is extremely low.

Solution

The purchasing power of the people can be increased increasing the income opportunities for them. A check on the increasing trend of inflation may help to tackle the situation.

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7. Lack of Technical knowledge in Comparison to Other Countries

India has to depend on foreign countries for the supply of machinery, capital goods and technical knowledge. She export raw-materials and imports manufactured goods. The import of capital goods involves heavy cost due to higher prices. India depends too much on import which makes her economy dependable on others and affects the terms of trade.

Solution

Indian industries should either set-up their own research and development centers. They can also enter into technical collaboration with foreign partner and manufacture the finished products in India.

8. Lack of Industrialization

India is very backward in industry. A large portion of the working people is engaged in agriculture. India imports a large quantity of fighter planes and defense equipment. Many of the electrical equipment of daily use are imported from other countries.

Solution

Both Indian and foreign investors should be encouraged to make products in India.

Industries should be encouraged to manufacture defense equipment, fighter planes, etc in India.

9. Defective Economic Infrastructure

India has defective economic infrastructure. It means that in India, there are inadequacy of the means of transport and communication, irrigation and power. They retard the economic progress of India.

Initiatives taken and Solutions

However, attempts have been made to improve the transport and power systems. Agencies like Industrial Finance Corporation, National Industrial Development Corporation, Industrial Development Bank, Re-finance Corporation, Industrial Credit and Investment Corporation have been set up for the supply of long-term finance to the large-scale industries in India. Companies engaged in building infrastructure such as road, dams, bridges, etc. should get easy finance. Foreign financial institutions can be encouraged to invest in building the infrastructure of India.

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2.15 SUMMARY

Economic problem is the theory that scarcity exists in the sense that only finite and insufficient resources are available to satisfy the needs and desires of all human beings. The fundamental economic problem then faced by human society and business operators is how to allocate scarce resources to the provision of various goods and services within the economy.

People want and need variety of goods and services. This applies equally to the poor and the rich people. It implies that human wants are unlimited but the means to fulfill them are limited. At any one time, only a limited amount of goods and services can be produced. This is because the existing supplies of resources are extremely inadequate. These resources are land, labour, capital and entrepreneurship.

These factors of production or inputs are used in producing goods and services that are called economic goods which have a piece. These facts explain scarcity as the principal problem of every society and suggest the Law of Scarcity, The law states that human wants are virtually unlimited and the resources available to satisfy these wants are limited.

Since are live in a world of scarcity, a society can produce only a small portion of goods and services that its people want. Therefore, scarcity of resources gives rise to the fundamental economic problem of choice. As a society cannot produce enough goods and services to satisfy all the wants of its people, it has to make choices.

A decision to produce one good requires a decision to produce less of some other good. So choice involves sacrifice. Thus every society is faced with the basic problem of deciding what it is willing to sacrifice to produce the goods it wants the most.

An economy is an area of the production, distribution, or trade, and consumption of goods and services by different agents in a given geographical location. Understood in its broadest sense, 'The economic is defined as a social domain that emphasizes the practices, discourses, and material expressions associated with the production, use and management of resources'. Economic agents can be individuals, businesses, organizations, or governments. Economic transactions occur when two parties agree to the value or price of the transacted good or service, commonly expressed in a certain currency, but monetary transactions are only a small part of the economic domain.

Economic activity is spurred by production which uses natural resources, labor, and capital. It has changed over time due to technology (automation, accelerator

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of process, reduction of cost functions), innovation (new products, services, processes, new markets, expands markets, diversification of markets, niche markets, increases revenue functions) such as that which produces intellectual property and changes in industrial relations (for example, child labor being replaced in some parts of the world with universal access to education).

Economic systems are the means by which countries and governments distribute resources and trade goods and services. They are used to control the five factors of production, including: labor, capital, entrepreneurs, physical resources and information resources.

Capitalism is one of economic systems in which means of production are owned and managed by private individuals and institutions. They are at liberty to use any technique of production and produce anything they like. State is to take care of only internal and external security of the country. Normally the activities related to Defence, Police, administration and Courts of Justice are controlled by the Government.

Socialism is that part of economic systems which the means of production are owned and managed by the State. Private ownership of means of production is not allowed. People can have personal property which is transferable and inheritable. The anti-social activities like smuggling and hoarding find no place in socialism. Economic activities are planned with the motive of social benefit by a central planning authority.

Communism is a part of economic systems, where means of production are controlled and managed by a Central State authority, and there is also a restriction on the ownership of personal property communism. Individuals are assigned work by the State and they are given a bit remuneration of their services. People get ration from Government department. People do not have choice of their own.

Mixed economy is a part of economic systems which combines in itself the features of Capitalism and that of the Socialism. Unlike a pure capitalistic economy, it has an important public sector i.e. a number of industries are owned and managed by the state. Private enterprise is allowed and even encouraged to operate a large number of industries and to own the various means of production. Thus in a mixed economy, the public and private sectors exists side by side.

The production possibility curves are a hypothetical representation of the amount of two different goods that can be obtained by shifting resources from the production of one, to the production of the other. The curve is used to describe a society's choice between two different goods.

The Indian economy is characterized by huge unemployment, both in rural and urban areas. Unemployment is a major problem for Indian Economy. India is

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basically an agricultural country. Most people are engaged in agriculture due to want of alternative occupation. A large part of the population engaged in agriculture can be removed without reducing agricultural output. This is called disguised unemployment. They should be withdrawn from agriculture with a view to increasing their marginal productivity.

2.16 GLOSSARY

(a) Economic Problem: Economic problem is the theory that scarcity exists in the sense that only finite and insufficient resources are available to satisfy the needs and desires of all human beings. The fundamental economic problem then faced by human society and business operators is how to allocate scarce resources to the provision of various goods and services within the economy.

(b) Economic Activity: Economic activity is spurred by production which uses natural resources, labor, and capital. It has changed over time due to technology (automation, accelerator of process, reduction of cost functions), innovation (new products, services, processes, new markets, expands markets, diversification of markets, niche markets, increases revenue functions) such as that which produces intellectual property and changes in industrial relations (for example, child labor being replaced in some parts of the world with universal access to education).

(c) Economic Systems: Economic systems are the means by which countries and governments distribute resources and trade goods and services. They are used to control the five factors of production, including: labor, capital, entrepreneurs, physical resources and information resources.

(d) Capitalism: Capitalism is one of economic systems in which means of production are owned and managed by private individuals and institutions. They are at liberty to use any technique of production and produce anything they like. State is to take care of only internal and external security of the country. Normally the activities related to Defence, Police, administration and Courts of Justice are controlled by the Government.

(e) Socialism: Socialism is that part of economic systems which the means of production are owned and managed by the State. Private ownership of means of production is not allowed. People can have personal property which is transferable and inheritable. The anti-social activities like smuggling and hoarding find no place in socialism. Economic activities are planned with the motive of social benefit by a central planning authority.

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2.17 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Economic problem?
2. What is Economic activity?
3. What are Economic systems?
4. Give the meaning of Capitalism.
5. What is Socialism?

(B) Extended Answer Questions

1. Discuss about Economy and its working.
2. Discuss various kinds of economic system.
3. Explain Production Possibility of an Economy.
4. How market mechanism works? Discuss.
5. Discuss efficiency and reasons for failure of market system.
6. Explain various roles of government in an economy.

(C) True or False

1. Economic problem is the theory that scarcity exists in the sense that only finite and insufficient resources are available to satisfy the needs and desires of all human beings.
2. Management activity is spurred by production which uses natural resources, labor, and capital.
3. Economic systems are the means by which countries and governments distribute resources and trade goods and services.
4. Capitalism is one of economic systems in which means of production are owned and managed by private individuals and institutions.
5. Mixed economy is a part of economic systems which combines in itself the features of Capitalism and that of the Socialism.

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(D) Multiple Choice Questions

1. What is the theory that scarcity exists in the sense that only finite and insufficient resources are available to satisfy the needs and desires of all human beings?
   (a) Business Problems (b) Economic problem
   (c) Management activity (d) All the above
2. What is spurred by production which uses natural resources, labor, and capital?
   (a) Economic activity (b) Economic problem
   (c) Management activity (d) All the above
3. What is the means by which countries and governments distribute resources and trade goods and services?
   (a) Economic systems (b) Economic problem
   (c) Management activity (d) All the above

(E) Fill in the Blanks

1. _____ is the theory that scarcity exists in the sense that only finite and insufficient resources are available to satisfy the needs and desires of all human beings.
2. _____ is spurred by production which uses natural resources, labor, and capital.
3. Economic systems are the means by which countries and governments distribute resources and trade_____.
4. _____ is one of economic systems in which means of production are owned and managed by private individuals and institutions.

2.18 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. False, 3. True, 4. True, 5. True

(D) 1. (b), 2. (a), 3. (a)

(E) 1. Economic problem, 2. Economic activity, 3. goods and services, 4. Capitalism

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14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

2.20 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can

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come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

2.21 TERMINAL QUESTIONS

1. How economic problems in Indian are different from rest of the world? Discuss.

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2. Explain Production Possibility of an Economy. How market mechanism works? Discuss.

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3. Discuss efficiency and reasons for failure of market system. Explain various roles of government in an economy.

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UNIT 3 LAW OF DEMAND AND SUPPLY

Structure:

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Objectives

After reading this unit you will be able to understand:

- Law of Demand
- Demand Function
- Law of Supply
- Supply Function
- Equilibrium of Demand and Supply
- Determination of equilibrium price and quantity

3.1 INTRODUCTION

Demand refers to how much (quantity) of a product or service is desired by buyers. The quantity demanded is the amount of a product people are willing to buy at a certain price; the relationship between price and quantity demanded is known as the demand relationship. Supply represents how much the market can offer. The law of supply and demand is the theory explaining the interaction between the supply of a resource and the demand for that resource. The law of supply and demand defines the effect the availability of a particular product and the desire (or demand) for that product has on price. Generally, a low supply and a high demand increases price, and in contrast, the greater the supply and the lower the demand, the lower the price tends to fall.

3.2 CONCEPT OF DEMAND

Demand is the desire or want for something. The economics meaning of demand is the effective demand, i.e., the amount the buyers are willing to purchase at a given price and over a given period of time. Demand is the desire to own anything, the ability to pay for it, and the willingness to pay. The term demand signifies the ability or the willingness to buy a particular commodity at a given point of time.

Economists record demand on a demand schedule and plot it on a graph as a demand curve that is usually downward sloping. The downward slope reflects the relationship between price and quantity demanded: as price decreases, quantity demanded increases. In principle, each consumer has a demand curve for any product that he or she would consider buying, and the consumer's demand curve is equal to the marginal utility curve. When the demand curves of all consumers are added up, the result is the market demand curve for that product. If there are no externalities, the market demand curve is also equal to the social utility curve.

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Elements of the Law of Demand as Melvin and Boyes note the law of demand is defined as:

(i) The quantity of a well-defined good or service that:

(ii) People are willing and able to buy.

(iii) During a particular period of time.

(iv) Decreases or increases as the price of that good or service rises/falls.

(v) All other factors remain constant.

3.3 MEANING OF DEMAND

The demand refers to the amount of which will be bought per unit of time at a particular price. Demand is the amount of a particular economic good or service that a consumer or group of consumers will want to purchase at a given price.

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

The demand curve is usually downward sloping, since consumers will want to buy more as price decreases. Demand for a good or service is determined by many different factors other than price, such as the price of substitute goods and complementary goods. In extreme cases, demand may be completely unrelated to price, or nearly infinite at a given price. Along with supply, demand is one of the two key determinants of the market price.

3.4 DEMAND ANALYSIS

Demand analysis is a foundation topic in managerial economics. It seeks to search out and measures the determinants of demand, thus, forces governing sales of a product. Demand analysis serves the following managerial purposes:

(i) It is an important technique for sales forecasting with a sound base and greater accuracy.

(ii) It provides a guideline for demand manipulation through advertising and sales promotion programmes.

(iii) It shows direction to product planning and product improvement.

(iv) It is useful in determining the sales quotas and appraisal of performance of the personnel in sales department.

(v) It is an anchor for the pricing policy.

(vi) It indicates the size of the market for given product and the market share of the concerned firm.

(vii) It reflects the scope of business expansion and competitive position of the firm in market trend.

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(viii) Demand analysis is essential for successful production planning and business expansion in managerial decision making.

3.5 DETERMINANTS OF DEMAND

The several factors influencing individual and market demand for different goods and services are as follows:

A. Determinants of Individual Demand

1. **Price:** Price is the basic factor. A consumer usually decides to buy with consideration of price. More quantity is demanded at low prices and less is purchased at high prices.
2. **Income:** A buyer's income determines his/her purchasing capacity. Income is, therefore, an important determinant of demand. Obviously, with the increase in income one can buy more goods. Rich consumers usually demand more and more goods than poor customers. Demand for luxuries and expensive goods are related to income.
3. **Tastes, Habits and Preferences:** Demand for many goods depends on the person's tastes, habits and preferences. Demand for several products like ice-cream, chocolates, beverages and so on depends on individual's tastes. Demand for tea, betel, cigarettes, tobacco, etc. is a matter of habits.
4. **People with different tastes and habits have different preferences for different goods:** A strict vegetarian will have no demand for meat at any price, whereas a non-vegetarian who has liking for chicken may demand it even at a high price. Similar is the case with demand for cigarettes by non-smokers and smokers.
5. **Relative prices of other goods substitute 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 substitute or complementary goods to a commodity.
6. **Consumer's Expectation:** A consumer's expectation about the future changes in the prices 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 low price. Similarly, if he expects its price to rise in future, he will tend to buy more at present.
7. **Advertisement Effect:** In modern times, the preferences of a consumer can be altered by advertisement and sales propaganda, albeit to a certain extent only. In fact, demand for many products like toothpaste, toilet

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soap, washing powder, processed foods, etc., is partially caused by the advertisement effect in a modern man's life.

B. Determinants of Market Demand

1. **Scale of preferences:** The market demand for a product is greatly influenced by the scale of preferences of the buyers in general. For example, when a large section of population shifts its preferences from vegetarian foods to non-vegetarian foods, the demand for the former will tend to decrease and that for the latter will increase.
2. **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.
3. **Price of the product:** At a low market price, market demand for the product tends to be high and vice versa.
4. **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.
5. **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 usually constitute a large demand and vice versa. As such, growth of population over a period of time tends to imply a rising demand for essential goods and services in general.
6. **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 large proportion of juvenile population, then the market demand for toys, school bags etc., i.e., 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.
7. **Future expectations:** If buyers in general expect that prices of a commodity will rise in future, then 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 are expected.

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8. **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.
9. **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.
10. **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.
11. **Climate 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 are seasonal.
12. **Culture:** Demand for certain goods is determined by social customs, festivals, etc. For example, during Dipawali days, there is a greater demand for sweets and crackers, and during Christmas, cakes are more in demand.

3.6 DEMAND FUNCTION

In demand analysis, one should recognize that at any point in time the quantity of a given product that will be purchased by the consumers depends on a number of key variables or determinants. In technical jargon, it is stated in terms of demand function for the given product.

A demand function in mathematical terms expresses the functional relationship between the demand for the product and its various determining variables.

$Dx = f(Px, Ps, Pc, Yd, T, A, N, u)$

Where,

The '*own price*' of the product itself (P)

The price of the substitute and complementary goods (Ps or Pc)

The level of disposable income (Yd) with the buyers (i.e., income left after direct taxes)

Change in the buyers' taste and preferences (T)

The advertisement effect measured through the level of advertising expenditure (A)

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Changes in population number or the number of the buyers (*N*)

Using the symbolic notations, we may express the demand function, as follows:

Here, we assumed commodity *X*; hence, *Dx* represents the amount demanded for the commodity *X* and *Px* refers to the price of *X*. Further, *u* is incorporated to recognize 'other' unspecified/unknown determinants of the demand for commodity *X*.

3.7 DEMAND SCHEDULE

A tabular statement of price/quantity relationship is called the demand schedule. It relates the amount the consumer is willing to buy corresponding to each conceivable price for that given commodity, per unit of time. There are, thus, two types of demand schedule:

(i) The individual's demand schedule and

(ii) The market demand schedule.

A demand schedule is a table that lists the quantity of a good a person will buy at each different price. The demand curve is a graphical depiction of the relationship between the price of a good and the quantity of the good that a consumer would demand under certain time, place and circumstances. The demand relationship can also be expressed mathematically: Q = f(P; Y, Prg, Pop, X) where Q is quantity demanded, P is the price of the good, Prg is the price of a related good, Y is income, Pop is population and X is the expectation of some relevant future variable such as the future price of the product. The semi-colon means that the arguments to its right are held constant when the relationship is plotted two-dimensionally in (price, quantity) space. If one of these other variables changes the demand curve will shift. For example, if the population increased then there would be an outward (rightward) shift of the demand curve, since more consumers would mean higher demand. This shift is referred to as a change in demand and results from a change in the constant term. Movements along the demand curve occur only when quantity demanded changes in response to a change in price.

Individual Demand Schedule

A tabular list showing the quantities of a commodity that will be purchased by an individual at each alternative conceivable price in a given period of time (say per day, per week, per month or per annum) is referred to as an individual demand schedule.

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Price of Apples (Rs. Per kg)	Amount Demanded per Week (Quantities in kg.)
80	2
70	4
60	6
50	10
40	16

The individual demand schedule has following characteristics:

(i) The demand schedule does not indicate any changes 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.

Market Demand Schedule

The demand side of the market is represented by the demand schedule. It is tabular statement narrating the quantities of a commodity demanded in aggregate by all the buyers in the market at different prices over a given period of time. A market demand schedule, thus, represents the total market demand at various prices. Theoretically, the demand schedule of all individual consumers of a commodity can be complied and combined to form a composite demand schedule, representing the total demand for the commodity at various alternative prices.

3.8 DEMAND CURVE

The demand curve is the graph depicting the relationship between the price of a certain commodity, and the amount of it that consumers are willing and able to purchase at that given price. It is a graphic representation of a demand schedule. The demand curve for all consumers together follows from the demand curve of every individual consumer. Demand curves are used to estimate behaviours in competitive markets, and are often combined with supply curves to estimate the equilibrium price and the equilibrium quantity of that market. In a monopolistic market, the demand curve facing the monopolist is simply the market demand curve.

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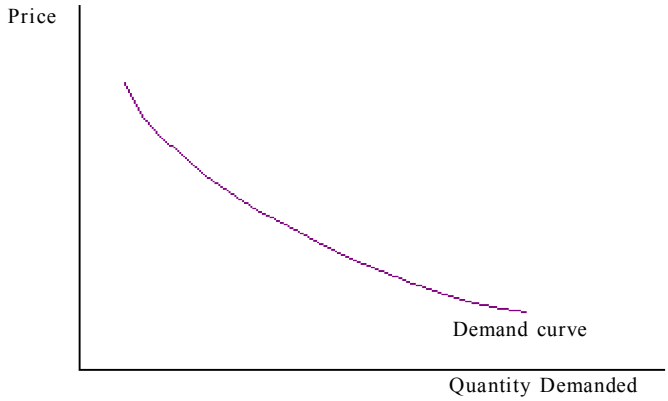

3.9 THE LAW OF DEMAND

The law of demand describes the general tendency of consumers' behavior in demanding a commodity in relation to the changes in its price. 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 which forms one of the best known and most significant laws in economics.

"The higher the price of a commodity, the smaller is the quantity demanded and lower the price, larger the quantity demanded".

The demand for a commodity extends as the price falls and contracts as the price rises. Or briefly stated, the 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 smaller quantity demanded at a higher price.

3.10 ASSUMPTIONS UNDERLYING THE LAW OF DEMAND

1. **No expectation 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.

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That is to say, the buyers do not expect any shortages in the supply of the commodity in the market and consequent future changes in the prices. The given price change is assumed to be final at a time.

2. **No change in consumer's preferences:** The consumer's taste, habits and preferences should remain constant.
3. **No change in the fashion**: If the commodity concerned goes out the fashion the buyer may not buy more of it even at a substantial price is reduced.
4. **No change in the price of related goods:** Prices of other goods like substitutes and supportive, i.e., complementary or jointly demanded products remain unchanged. If the prices of other related goods change, the consumer's preferences would change which may invalidate the law of demand.
5. **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 changes, he may buy more even at a higher price, invalidating the law of demand.
6. **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.
7. **No change in the range of goods available to the consumers:** This implies that there is no innovation and arrival of new varieties of product in the market which may distort consumer's preferences.
8. **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 and may lead to distortion in consumer's preferences.

3.11 EXCEPTIONS TO THE LAW OF DEMAND

The law of demand does not apply in every case and situation. The circumstances when the law of demand becomes ineffective are known as exceptions of the law. Some of these important exceptions are as under.

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1. Giffen Goods

Sir Robert Giffen or Ireland first observed that people used to spend more their income on inferior goods like potato and less of their income on meat. But potatoes constitute their staple food. When the price of potato increased, after purchasing potato they did not have so many surpluses to buy meat.

So the rise in price of potato compelled people to buy more potato and thus raised the demand for potato. This is against the law of demand. This is also known as Giffen paradox. Some special varieties of inferior goods are termed as Giffen goods. Cheaper varieties of this category like bajra, cheaper vegetable like potato come under this category.

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.

2. Conspicuous Consumption

This exception to the law of demand is associated with the doctrine propounded by Thorsten Veblen. A few goods like diamonds etc are purchased by the rich and wealthy sections of the society. The prices of these goods are so high that they are beyond the reach of the common man. The higher the price of the diamond the higher the prestige value of it. So when price of these goods falls, the consumers think that the prestige value of these goods comes down. So quantity demanded of these goods falls with fall in their price. So the law of demand does not hold good here.

3. Conspicuous Necessities

Certain things become the necessities of modern life. So we have to purchase them despite their high price. The demand for T.V. sets, automobiles and refrigerators etc. has not gone down in spite of the increase in their price. These things have become the symbol of status. So they are purchased despite their rising price. These can be termed as "U" sector goods.

4. Ignorance

A consumer's ignorance is another factor that at times induces him to purchase more of the commodity at a higher price. This is especially so when the consumer

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is haunted by the phobia that a high-priced commodity is better in quality than a low-priced one.

5. Emergencies

Emergencies like war, famine etc. negate the operation of the law of demand. At such times, households behave in an abnormal way. Households accentuate scarcities and induce further price rises by making increased purchases even at higher prices during such periods. During depression, on the other hand, no fall in price is a sufficient inducement for consumers to demand more.

6. Future Changes in Prices

Households also act speculators. When the prices are rising households tend to purchase large quantities of the commodity out of the apprehension that prices may still go up. When prices are expected to fall further, they wait to buy goods in future at still lower prices. So quantity demanded falls when prices are falling.

7. Change in Fashion

A change in fashion and tastes affects the market for a commodity. When a broad toe shoe replaces a narrow toe, no amount of reduction in the price of the latter is sufficient to clear the stocks. Broad toe on the other hand, will have more customers even though its price may be going up. The law of demand becomes ineffective.

8. 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, raise their demand also rises. Similarly, Rolls-Royce cars are another outstanding illustration.

9. 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.

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10. Consumer's Psychological bias or Illusion

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.

3.12 CHANGES IN QUANTITY DEMANDED VERSUS 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.

Inferior Goods

Low priced good of cheaper qualities in comparison to the high priced goods of superior quality, satisfying the similar type of wants.

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

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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.

3.13 TYPES 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.

1. Demand for Consumers' Goods and Producers' Goods

Commodities may be divided into two sub-groups:

(i) Consumer goods and

(ii) Producer goods.

(i) Consumer 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. Demand for consumer goods is direct or autonomous. Demand for customer goods depend on its marginal utility.

(ii) Producer Goods: 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 producer goods is derived. It is based on the demand for the output. Demand for producer goods depends on its marginal productivity or the marginal revenue products.

2. Demand for Perishable Goods and Durable Goods

From durability point of view, goods in general may be sub-divided into:

(i) Perishable goods and

(ii) Durable goods.

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(i) **Perishable 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.

(ii) **Durable Goods:** 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 onetime 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.

3. Autonomous Demand and Derived Demand

(i) **Autonomous 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. It is a direct demand.

(ii) **Derived 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. 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.

4. Industry Demand and Firm or Company Demand

(i) **Industry Demand:** 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.

(ii) **Firm or Company Demand:** Firm or company demands relate to the market demand for the firm's output. In demand analysis, thus, it should

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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.

5. Price Demand, Income Demand and Cross Demand

(i) **Price 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. 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.

(ii) **Income Demand:** Income demand refers to the various quantities of a commodity demanded by the consumer at alternative levels of his changing money income.

(iii) **Cross Demand:** 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.

3.14 NETWORK EXTERNALITIES IN MARKET DEMAND

Economists have identified two such network externalities:

1. Bandwagon Effect
2. Snob Effect or Veblen Effect.

1. The Bandwagon Effect

In today's life, demand for certain goods seems to be determined basically not by their usefulness or utility but mostly on account of bandwagon effect or demonstration effect. Thus, demand in such cases is influenced by the consumption of pace setters or trend setters in the community.

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1. Bandwagon Effect: The Demand Curve Shifts to the Right

For selling the clothes, therefore, marketing approach is to create a bandwagon effect. Likewise, for selling the clothes, therefore, marketing approach is to create a bandwagon effect. Likewise, in the case of children's toys such as Barbie dolls demand arises on account of the bandwagon effect. In advertising and marketing of many products, therefore, the object is to build up a bandwagon effect. Bandwagon effect leads to the manipulation of the market demand. Use of modern media such as TV, Movies, Fashion Shows and so on in advertising strategies are meant to produce such bandwagon or demonstration effect to manipulate market demand.

The bandwagon effect is essentially associated with stylishness, craze or fads of the people as greater and greater number of people want to use a product due to demonstration effect influencing on their desire through advertising media. The craze for compact disc (CD) songs albums of pop music is a good example of bandwagon effect that implies a positive network externality on market demand for the product. The bandwagon effect will be stronger when the intrinsic value of the product is also high. In the case of personal computer (PC), for instance, when more and more people tend to own it because of its usefulness, more software will be written and supplied at cheaper rates, then the PCs worth tends to rise further and so its demand too will shift. A price reduction due to large-scale production of PC's may further include more buyers to buy the computer. In this way, the bandwagon effect may have its significance in determining the pricing strategy of the business firm in such products.

2. The Snob Effect: Veblen Effect

The snob effect refers to the desire of a person to own exclusive or unique product called snob good or 'Veblen good.' It serves as a status symbol. When only a few people could own a snob good, its demand tends to be high among the affluent group. Designer clothes and other products such as Rolls Royce cars, Ray Ban goggles, a fancy restaurant, an antique, a rare painting, etc. are prestige goods and because of their snob value, the seller has to restrict the supply of such snob appeal goods. In marketing and advertising strategies of such exclusive type of goods, demand has to be made effective by creating a snob effect.

Veblen Effect Paradox

In certain branded goods such as Ray Ban or Levis products, i.e., exclusive or designer products there exists an inherent paradox. At high prices there is a limited but high demand from the richer section of the buyers. When these goods are produced in a large quantity, their prices will fall. It will carry a mass appeal to

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upper middle income groups. So their demand will expand. But a further increase in output will lead to further price reduction.

At this price, however, the demand will tend to fall on account of the loss of exclusivity.

The brand would lose its significance below this price and the product would be purchased on account of its functional utility.

The Market Demand Curve for Veblen Effect Product

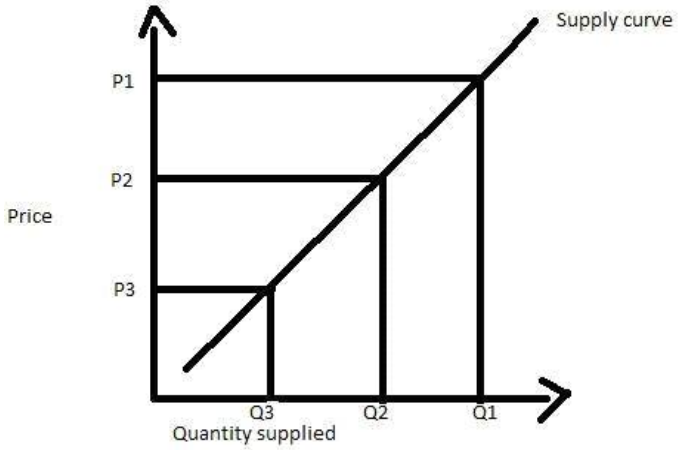
The network externalities play a significant role in influencing the market demand for certain products such as computers, CD players, fax machines, hand phones, etc. A positive network externality causes an upward shift in the market demand curve. The producers may experience a rapid growth in demand for such products; because of the bandwagon effect a positive network externality for quite a long-time till the saturation point is reached.

3.15 LAW OF SUPPLY

The law of supply is a fundamental principle of economic theory which states that, all else equal, an increase in price results in an increase in quantity supplied. In other words, there is a direct relationship between price and quantity: quantities respond in the same direction as price changes.

Law of supply states that other factors remaining constant, price and quantity supplied of a good are directly related to each other. In other words, when the price paid by buyers for a good rises, then suppliers increase the supply of that good in the market.

Description: Law of supply depicts the producer behavior at the time of changes in the prices of goods and services. When the price of a good rises, the supplier increases the supply in order to earn a profit because of higher prices.



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The above diagram shows the supply curve that is upward sloping (positive relation between the price and the quantity supplied). When the price of the good was at P3, suppliers were supplying Q3 quantity. As the price starts rising, the quantity supplied also starts rising.

3.16 SUPPLY FUNCTION

Supply function shows the functional relationship between quantity supplied for a particular commodity and the factors influencing it. It can be either with respect to one producer (individual supply function) or to all the producers in the market (market supply function).

Individual Supply Function

Individual supply function refers to the functional relationship between supply and factors affecting the supply of a commodity. It is expressed as: $S_x = f(P_x, P_o, P_f, S_t, T, G)$ Where,

S_x = Supply of the given commodity x;

P_x = Price of given commodity x;

P_o = Price of other goods;

P_f = Prices of factors of production;

S_t = State of technology; T = Taxation policy;

G = Goals of the firm.

Market Supply Function

Market supply function refers to the functional relationship between market supply and factors affecting the market supply of a commodity.

As discussed before, market supply is affected by all the factors affecting individual supply. In addition, it is also affected by some other factors like number of firms, future expectations regarding price and means of transportation and communication.

Market supply function is expressed as:

$S_x = f(P_x, P_o, P_f, S_t, T, G, T, G, N, F, M)$

Where,

S_x = Market supply of given commodity x;

P_x = Price of the given commodity x;

P_0 = Price of other goods;

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P_f = Prices of factors of production;

S_t = State of technology;

T = Taxation policy;

G = Goals of the market;

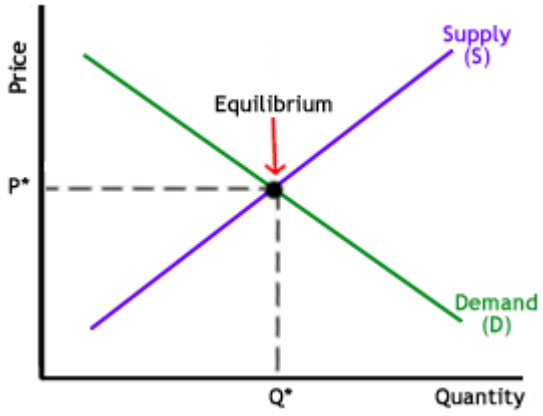
N = Number of firms;

F = Future expectation regarding P_x;

M = Means of transportation and communication.

3.17 EQUILIBRIUM OF DEMAND AND SUPPLY

When supply and demand are equal (i.e. when the supply function and demand function intersect) the economy is said to be at equilibrium. At this point, the allocation of goods is at its most efficient because the amount of goods being supplied is exactly the same as the amount of goods being demanded. Thus, everyone (individuals, firms, or countries) is satisfied with the current economic condition. At the given price, suppliers are selling all the goods that they have produced and consumers are getting all the goods that they are demanding.



As you can see on the chart, equilibrium occurs at the intersection of the demand and supply curve, which indicates no allocative inefficiency. At this point, the price of the goods will be P* and the quantity will be Q*. These figures are referred to as equilibrium price and quantity.

In the real market place equilibrium can only ever be reached in theory, so the prices of goods and services are constantly changing in relation to fluctuations in demand and supply.

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3.18 DETERMINATION OF EQUILIBRIUM PRICE AND QUANTITY

A. Market Period Price Determination:

In order to determine prices under market period, Dr. Marshall divided commodities into two categories:

1. Perishable Goods

2. Durable Goods

1. Perishable Goods

Perishable goods refer to those goods which perish very quickly. In simple terms, goods which cannot be stored for some time are called the perishable goods. Fresh vegetables, milk etc. are included in this category. Supply of such goods at any given time is fixed. If demand increases supply cannot be increased so quickly. Therefore, it is demand that plays a dominant role in the determination of price.

In figure 1 quantities of perishable goods is measured on horizontal axis, price on vertical axis. SS is the supply curve. It signifies the fact that supply of perishable goods remains fixed. DD is the original demand curve which shows the equilibrium at paint E. Thus, OP is the equilibrium price. Now, suppose, if in the very short period demand increases and assumes the form of D_2D_2.

The equilibrium will also shift to E_2. It depicts that with the increase in demand the price increases to OP_2. On the contrary, if the demand falls from DD to D_1D_1, the equilibrium will shift to E_1 from E side by side price will fall from OP to OP_1.

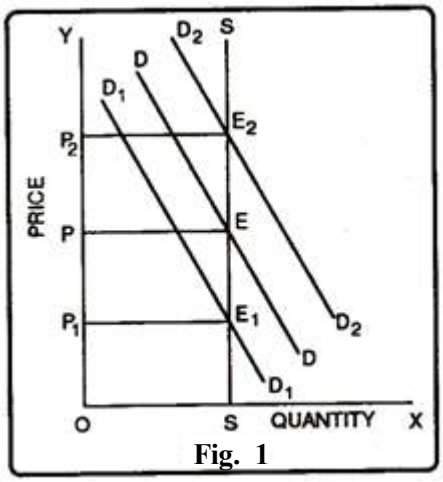

Fig. 1

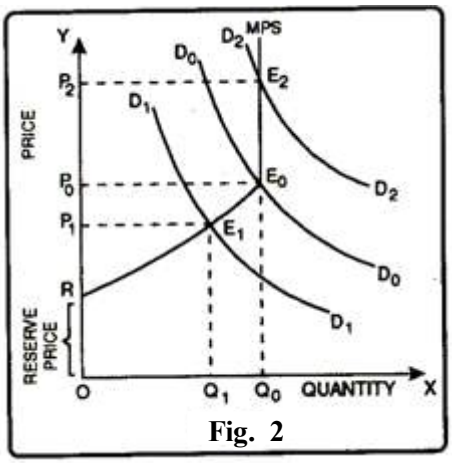

Fig. 2

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2. Durable Goods

Durable goods are those which can be reproduced or those can be stored. Like perishable goods, the supply of durable goods is not vertical throughout the length. Firms selling such goods have a minimum reserve price. They will not sell goods at less than the reserve price. These goods are like wheat, soap, oil etc.

MPS is the market period supply curve where OQ_0 is the stock of the commodity. To start with the demand for the commodity is shown by D_1D_1 where the price is OP_1 and quantity supplied is OQ_1. Q_1O_0 stock will be held back. If the demand is D_2D_2, the whole stock will be sold out at OP_0 price. But in case the demand is D_2D_2, the equilibrium will be at E_2 and the price will be OP_2 where the entire output is sold.

At OR price i.e. 'the 'Reserve Price' the entire output is held back. But from R to Eo, as the price rises, the quantity supplied also rises.

Factors Affecting Reserve Price:

Following are the factors which go a long way to affect the reserve price:

1. Price in Future:

If the seller expects that a high price will prevail in the market in future, the reserve price will be higher and vice-versa.

2. Liquidity Preference:

If the seller is in urgent need of money, his reserve price will be lower. Thus, higher the liquidity preference, higher will be the reserved price and vice-versa.

3. Future Cost of Production:

If the seller expects that in future the cost of production will fall, his reserve price will be lower and vice-versa.

4. Storage Expenses:

If the seller finds that the storage expenses are higher and the time for which the stocks have to be held are longer, his reserve price will be lower and vice-versa.

5. Durability of Commodity:

The durability of the commodity influences the reserve price. The more durable a commodity is, the higher will be the reserved price.

6. Future Demand:

The future demand of the commodity also influences the reserve price of the producer. If the producer expects a higher demand in future, his reserve price will also be higher.

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B. Short Period Price Determination:

Price determination in the short period has been explained with the help of Fig. 3.

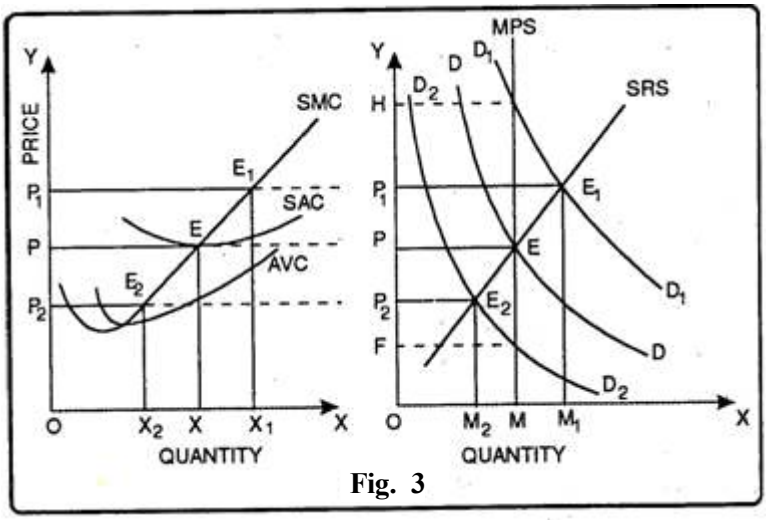

Fig. 3

The figure 3 depicts the process of price determination in the short period. DD is the demand curve of the industry. MPS is the market period supply curve while SRS is the short run supply curve of the industry.

Initially, OP is both the market price as well as the short run price. At price OP the individual firm will adjust its output OX. At equilibrium level of output OX, price is equal to its marginal cost and marginal cost curve cuts the MR curve from below.

The firm enjoys normal profits. Now, suppose demand increases from DD to D_1D_1 and the industry is in equilibrium at point E_1 which determines the price OP_1 The new price OP_1 is less than the new market price i.e., OH. The reason is being that in the short run marginal cost curve rises as more is produced. Thus, the individual firm will take price OP_1 and will produce OX_1 level of output at which price OP_1 equals the marginal cost and the firm enjoys supernormal profits.

On the other hand, if the demand curve falls to D_2D_2 the new equilibrium will be established at E_2 and the price will falls to OP_2. But in the short period the firm will contract output by reducing the employment of labour and other variable factors Therefore, the new equilibrium level established at E_2 will determine the price OP_2 and the firms will produce OX_2 level of output. But, it is worth mentioning here that price OP_2 does not cover the SAC and the firms operating in the industry incur losses.

C. Determination of Long Period Normal Price:

Normal price comes to prevail in the long period. It is also called long period price. Normal price is influenced more by supply than demand. According to Marshall, "Normal price is that price which tends to prevail in a market when full

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time is given to the forces of demand and supply to adjust themselves". Thus, it is clear from the definition that normal price is one that tends to prevail in the long period. It is not a real price.

Under perfect competition, the long run supply gets sufficient period to adjust itself to the changed conditions in demand. If supply is less than demand, price will rise. Thus, total supply will increase and all the producers will get normal profits only.

If supply is more than demand, price will fall and producers suffer losses. Some of the producers may leave the industry under pain of loss. Thus, total supply will decrease and once again price will rise to its normal level.

This has been illustrated with the help of figure 4 below:

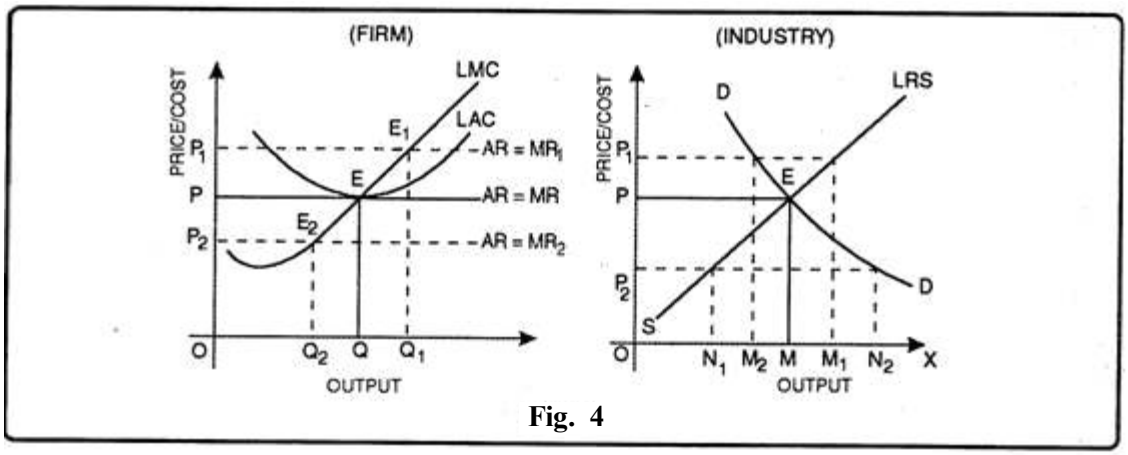

Fig. 4

In figure 4, we have taken output on X-axis and price on Y-axis. Industry's demand curve DD and long run supply curve LRS cut at point E which determines OP price and OM output. If price by the industry is raised to OP_1, the demand is OM_2 and supply is OM_1 Since D < S, price will fall to OP On the other hand, if price is OP_2, in this case S < D. It is because at OP_2 price, supply is ON_1 and demand is ON_2. This will raise price to OP.

A firm under perfect competition in the long run is in equilibrium at output where Price = MC = Minimum LAC. This point is shown by E. It shows that the firm is making just normal profits. If the price is above the minimum long run average cost, the firms will be making super-normal profits.

In the diagram if the price is OP_1, in that case the firm will be producing OQ_1 output and would be making super normal profits. These super-normal profits will lure the new firms to enter the industry. With this, the supply of the industry would increase which would reduce the price and hence the existing firms will be left only with normal profits.

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Q_1 the other hand, if the price is OP_2, in that case the firms will be in equilibrium at $E_2$and hence the firm would be producing OQ_2. In this case the firm will be sustaining losses as AR < AC. Due to these losses, some of the firms will exit from the industry. This will reduce the supply which in turn would raise the price and hence the existing firms will be left with normal profits only.

3.19 SUMMARY

Demand is the desire or want for something. The economics meaning of demand is the effective demand, i.e., the amount the buyers are willing to purchase at a given price and over a given period of time. Demand is the desire to own anything, the ability to pay for it, and the willingness to pay.

Market demand analysis is a core topic in managerial economics, for it seeks to search out and measures the determinants of demand, thus, forces governing sales of a product.

The demand for a product refers to the amount of it which will be bought per unit of time at a particular price.

Consumer demand for a product may be viewed at two levels:

(i) Individual demand, and

(ii) Market demand.

Individual demand refers to the demand for a commodity from the individual point of view. The quantity of a product consumer would buy at a given price over a given period of time is his individual demand for that particular product. Market demand function is the sum total of individual demand function. It is derived by aggregating all individual buyers' demand function in the market.

The demand side of the market is represented by the demand schedule. It is tabular statement narrating the quantities of a commodity demanded in aggregate by all the buyers in the market at different prices over a given period of time. A market demand schedule, thus, represents the total market demand at various prices.

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.

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

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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.

Commodities may be divided into two sub-groups:

(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.

The law of supply is a fundamental principle of economic theory which states that, all else equal, an increase in price results in an increase in quantity supplied. In other words, there is a direct relationship between price and quantity: quantities respond in the same direction as price changes.

Law of supply states that other factors remaining constant, price and quantity supplied of a good are directly related to each other. In other words, when the price paid by buyers for a good rises, then suppliers increase the supply of that good in the market.

Law of supply depicts the producer behavior at the time of changes in the prices of goods and services. When the price of a good rises, the supplier increases the supply in order to earn a profit because of higher prices.

3.20 GLOSSARY

(a) Demand: Demand is the desire or want for something. The economics meaning of demand is the effective demand, i.e., the amount the buyers are willing to purchase at a given price and over a given period of time. Demand is the desire to own anything, the ability to pay for it, and the willingness to pay.

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(b) Individual demand: Individual demand refers to the demand for a commodity from the individual point of view. The quantity of a product consumer would buy at a given price over a given period of time is his individual demand for that particular product.

(c) Law of demand: It refers to the changes in the quantities purchased by the consumer on account of the changes in price.

(d) Law of supply: Law of supply states that other factors remaining constant, price and quantity supplied of a good are directly related to each other. In other words, when the price paid by buyers for a good rises, then suppliers increase the supply of that good in the market.

3.21 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. Give the meaning of Demand.
2. What are Individual Demand and Market Demand?
3. What is Law of Demand?
4. What is Law of Supply?

(B) Extended Answer Questions

1. Explain the Determinants of Demand.
2. Write note on: Demand Function.
3. State the exceptions to the Law of Demand.
4. Discuss the change in Quantity Demanded versus Change in Demand.
5. Discuss the reasons for Change in Demand.
6. Explain Demand Distinctions: Types of Demand.
7. Discuss Supply functions.
8. Explain determination of equilibrium price and quantity.

(C) True or False

1. Demand = Desire + Ability to pay + Will to spend.
2. Market demand function is the sum total of individual demand function.
3. The demand side of the market is represented by the demand schedule.
4. A variation in demand implies 'extension' or 'contraction' of demand.

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5. Group demand refers to the demand for a commodity from the individual point of view.
6. Law of supply states that other factors remaining constant, price and quantity supplied of a good are directly related to each other.

(D) Multiple Choice Questions

1. Which are the following factors Influencing Individual Demand?
   (a) Price (b) Income
   (c) Tastes (d) All of them
2. A variation in demand implies…….
   (a) Extension' or 'contraction' of demand
   (b) Extension' or 'change' of demand
   (c) Remove or contraction' of demand
   (d) None of them

(E) Fill in the Blanks

1. _____ is the desire or want for something
2. Consumer demand for a product may be viewed at two levels: (i) Individual demand, and _____.
3. Commodities may be divided into two sub-groups: (i) consumer goods and _____.
4. _____ refers to the total demand for the commodity produced by a particular industry.
5. An upward sloping demand curve is called _____
6. _____ states that other factors remaining constant, price and quantity supplied of a good are directly related to each other.

3.22 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True, 5. False, 6. True

(D) 1. (d), 2. (a)

(E) 1. Demand, 2. Market demand, 3. Producer goods, 4. Industry demand, 5. Exceptional demand curve, 6. Law of supply

NOTES

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13. Maria Moschandreas (2000). Business Economics, 2nd Edition, Thompson Learning. Description and chapter-preview links.
14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

3.24 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an

NOTES

above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

3.25 TERMINAL QUESTIONS

1. Prepare a report on market demand of Honda Activa.

2. The students are required to identify various types of demand for different services.

3. Discuss the change in Quantity Demanded versus Change in Demand. Discuss the reasons for Change in Demand.

*****

UNIT 4 ELASTICITY OF DEMAND AND SUPPLY

Structure:

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Objectives

After reading this unit you will be able to understand:

- Price Elasticity of Demand and its determination
- Price Elasticity and Marginal Revenue
- Price Elasticity and Consumption Expenditure
- Income Elasticity of demand
- Cross - Elasticity of Demand
- Elasticity of Price expectation
- Use of elasticity
- Price Elasticity of Supply

4.1 INTRODUCTION

Elasticity refers to the degree of responsiveness in supply or demand in relation to changes in price. If a curve is more elastic, then small changes in price will cause large changes in quantity consumed. If a curve is less elastic, then it will take large changes in price to effect a change in quantity consumed.

4.2 ELASTICITY OF DEMAND

Elasticity is one of the most important concepts in neoclassical economic theory. It is useful in understanding the incidence of indirect taxation, marginal concepts as they relate to the theory of the firm and distribution of wealth and different types of goods as they relate to the theory of consumer choice. Elasticity is also crucially important in any discussion of welfare distribution, in particular consumer surplus, producer surplus, or government surplus.

In empirical work elasticity is the estimated coefficient in a linear regression equation where both the dependent variable and the independent variable are in natural logs. Elasticity is a popular tool among empiricists because it is independent of units and thus simplifies data analysis.

The definition of elasticity is based on the mathematical notion of point elasticity.

In general, the "*x*-elasticity of *y*", also called the "elasticity of *y* with respect to *x*", is:

$$E_{y,x} = \left|\frac{\partial \ln y}{\partial \ln x}\right| = \left|\frac{\partial y}{\partial x}.\frac{x}{y}\right| \approx \left|\frac{\%\Delta y}{\%\Delta x}\right|$$

NOTES

The approximation becomes exact in the limit as the changes become infinitesimal in size.

The absolute value operator is for simplicity generally the sign of the elasticity is understood as being always positive or always negative. However, sometimes the elasticity is defined without the absolute value operator, when the sign is may be either positive or negative or may change signs. A context where this use of a signed elasticity is necessary for clarity is the cross-price elasticity of demand the responsiveness of the demand for one product to changes in the price of another product; since the products may be either substitutes or complements, this elasticity could be positive or negative.

4.3 MEANING OF ELASTICITY OF DEMAND

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.

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

4.4 FACTORS INFLUENCING ELASTICITY OF DEMAND

When the demand for a commodity is elastic or inelastic will depend on a variety of factors. The major factors affecting elasticity of demand are:

(a) Nature of Commodity: According to the nature of satisfaction the goods give, they may be classified into luxury, comfort or necessary goods. In general, luxury and comfort goods are price elastic, while necessary goods are price inelastic. Thus, for example, the demand for cosmetics, cloth, salt etc., is generally inelastic while that for radio, furniture, car, etc., is elastic.

(b) Availability of Substitutes: Where there exists a close substitute in the relevant price range, its demand will tend to be elastic. But in respect of commodities having no substitutes, their demand will be somewhat inelastic. Thus, for example, demand for salt, potatoes, onions, etc., is highly inelastic as there are no close or effective substitutes for these commodities. On the other hand, commodities like tea, coffee or beverages such as Thums-up, Mangola, Gold Spot, Fanta, Sosyo etc., having a wide range of substitutes, have a more elastic demand in general.

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(c) Number of Uses: Single use goods will have generally less elastic demand as compared to multi-use goods, e.g., for commodities like coal or electricity having a composite demand, elasticity is relatively high. With the fall in price, these commodities may be demanded increasingly for various uses. It may be elastic in some of the uses, and may be inelastic in some other uses, e.g., coal is used by the railways and consumers as fuel. But the former's demand is inelastic as compared to the latter's. Technically, thus, the demand for a multi-use commodity in those uses where marginal utility is high, will be inelastic while in those uses where the marginal utility is low, the demand will be elastic.

(d) Consumer's Income: Generally, larger the income, the demand for overall commodities tends to be relatively inelastic. The demand pattern of a millionaire is rarely affected even by significant price changes. Similarly, the redistribution of income in favour of low-income people may tend to make demand for some goods relatively elastic.

(e) Height of Price and Range of Price Change: There are certain goods like costly luxury items or bulky goods such as refrigerators, T.V. set etc., which are highly priced in general. In their case, a small change in price will have an insignificant effect on their demand. Their demand will, therefore, be inelastic. However, if the price change is large enough, then their demand will be elastic.

(f) Proportion of Expenditure: Items that constitute a smaller amount of expenditure in a consumer's family budget tend to have a relatively inelastic demand, e.g., a cinegoer who sees a film every fortnight is not likely to give it up when the ticket rates are raised. But one who sees a film every alternate day, perhaps may cut down his number of films. So is the case with matches, sugar, kerosene etc.

(g) Durability of the Commodity: In the case of durable goods, the demand generally tends to be inelastic in the short run, e.g., furniture, bicycle, radio, etc. In the case of perishable commodities, on the other hand, demand is relatively elastic, e.g., milk, vegetables, etc.

(h) Habit: There are certain articles which have a demand on account of habit and in these cases, elasticity is less than unity, e.g., cigarettes to a smoker have inelastic demand.

(i) Complementary Goods: Goods which are jointly demanded have less elasticity, e.g., ink, petrol have inelastic demand for this reason.

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(j) Time: Consumers may expect a further change, so they may not react to an immediate change in price. People are reluctant to change their habits all of a sudden. When durable goods are worn out, these are demanded more. Demand for certain commodities may be postponed for some time, but in the long run, it has to be satisfied.

4.5 CLASSIFICATION OF ELASTICITY OF DEMAND

1. Price elasticity
2. Income elasticity of demand
3. Cross price elasticity of demand.

1. 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 can be defined as the ratio of the relative change in demand and price variables.

PED is a measure of responsiveness of the quantity of a good or service demanded to changes in its price. The formula for the coefficient of price elasticity of demand for a good is:

$$E_d = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in price}} = \frac{\Delta Q_d / Q_d}{\Delta P / P}$$

The above formula usually yields a negative value, due to the inverse nature of the relationship between price and quantity demanded, as described by the "law of demand". For example, if the price increases by 5% and quantity demanded decreases by 5%, then the elasticity at the initial price and quantity = "5%/5% = "1. The only classes of goods which have a PED of greater than 0 are Veblen and Giffen goods. Because the PED is negative for the vast majority of goods and services, however, economists often refer to price elasticity of demand as a positive value (i.e., in absolute value terms).

This measure of elasticity is sometimes referred to as the *own-price* elasticity of demand for a good, i.e., the elasticity of demand with respect to the good's own price, in order to distinguish it from the elasticity of demand for that good with respect to the change in the price of some other good, i.e., a complementary or substitute good. The latter type of elasticity measure is called a *cross*-price elasticity of demand. The difference between the two prices or quantities increases, the

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accuracy of the PED given by the formula above *decreases* for a combination of two reasons. First, the PED for a good is not necessarily constant; as explained below, PED can vary at different points along the demand curve, due to its percentage nature. Elasticity is not the same thing as the slope of the demand curve, which is dependent on the units used for both price and quantity. Second, percentage changes are not symmetric; instead, the percentage change between any two values depends on which one is chosen as the starting value and which as the ending value. For example, if quantity demanded increases *from* 10 units *to* 15 units, the percentage change is 50%, i.e., (15 " 10) ÷ 10 (converted to a percentage). But if quantity demanded decreases *from* 15 units *to* 10 units, the percentage change is "55.5%, i.e., (15 " 10) ÷ 15.

Two alternative elasticity measures avoid or minimize these shortcomings of the basic elasticity formula: *point-price elasticity* and *arc elasticity*.

Point-price Elasticity

One way to avoid the accuracy problem described above is to minimise the difference between the starting and ending prices and quantities. This is the approach taken in the definition of *point-price* elasticity, which uses differential calculus to calculate the elasticity for an infinitesimal change in price and quantity at any given point on the demand curve:

$$E_d = \frac{P}{Q_d} \times \frac{dQ_d}{dP}$$

In other words, it is equal to the absolute value of the first derivative of quantity with respect to price (dQ_d/dP) multiplied by the point's price (P) divided by its quantity (Q_d).

In terms of partial-differential calculus, point-price elasticity of demand can be defined as follows: let x(p,w) be the demand of goods x_1, x_2, ..., x_L as a function of parameters price and wealth, and let $x_l(p,w)$ be the demand for good *l*. The elasticity of demand for good with respect to price p_k is

$$E_{x_l,p_k} = \frac{\partial x_l(p,w)}{\partial p_k} \cdot \frac{p_k}{x_l(p,w)} = \frac{\partial \log x_l(p,w)}{\partial \log p_k}$$

However, the point-price elasticity can be computed only if the formula for the demand function, $Q_d = f(P)$, is known so its derivative with respect to price, dQ_d / dP, can be determined.

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Arc Elasticity

A second solution to the asymmetry problem of having a PED dependent on which of the two given points on a demand curve is chosen as the "original" point and which as the "new" one is to compute the percentage change in P and Q relative to the *average* of the two prices and the *average* of the two quantities, rather than just the change relative to one point or the other. Loosely speaking, this gives an "average" elasticity for the section of the actual demand curve i.e., the *arc* of the curve between the two points. As a result, this measure is known as the *arc elasticity*, in this case with respect to the price of the good. The arc elasticity is defined mathematically as:

$$E_d = \frac{\frac{P_1 + P_2}{2}}{\frac{Q_{d_1} + Q_{d_2}}{2}} \times \frac{\Delta Q_d}{\Delta P} = \frac{P_1 + P_2}{Q_{d_1} + Q_{d_2}} \times \frac{\Delta Q_d}{\Delta P}$$

This method for computing the price elasticity is also known as the "midpoints formula", because the average price and average quantity are the coordinates of the midpoint of the straight line between the two given points. However, because this formula implicitly assumes the section of the demand curve between those points is linear, the greater the curvature of the actual demand curve is over that range, the worse this approximation of its elasticity will be.

4.6 DEGREES OF ELASTICITY OF DEMAND

The variation in demand is not uniform with a change in price. In case of some products, a small change in price leads to a relatively larger change in quantity demanded.

1. Elastic and Inelastic Demand

The terms elastic and inelastic demand do not indicate the degree of responsiveness and unresponsiveness of the quantity demanded to a change in price.

For example, a decline of 1% in price leads to 8% increase in the quantity demanded of a commodity. In such a case, the *demand is said to elastic.* There are other products where the quantity demanded is relatively unresponsive to price changes. A decline of 8% in price, for example, gives rise to 1% increase in quantity demanded. *Demand here is said to be inelastic.*

2. Income Elasticity of Demand

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

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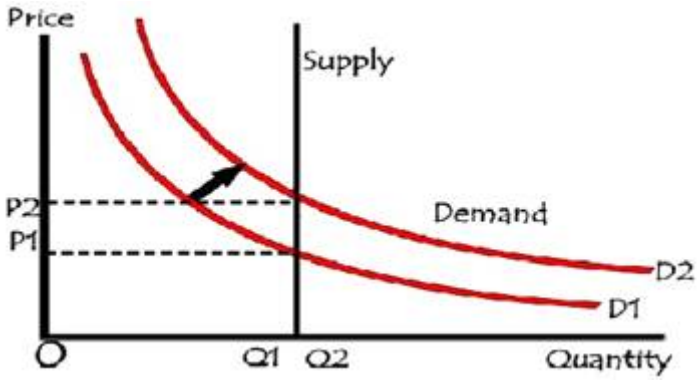
Income elasticity is closely related to the population income distribution and the fraction of a product's sales attributable to buyers from different income brackets. If the income share elasticity is defined as the negative percentage change in individuals given a percentage increase in income bracket, then the income-elasticity, after some computation, becomes the expected value of the income-share elasticity with respect to the income distribution of purchasers of the product. When the income distribution is described by a gamma distribution, the income elasticity is proportional to the percentage difference between the average income of the product's buyers and the average income of the population.



Mathematical Definition

$$E_d = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in real income}}$$

More formally, the income elasticity of demand, , for a given Marshallian demand function for a good is $E_d = \frac{\partial Q}{\partial I}\frac{I}{Q}$

or alternatively: $E_d = \frac{Y_1 + Y_2}{Q_1 + Q_2} \times \frac{\Delta Q}{\Delta Y}$

This can be rewritten in the form: $E_d = \frac{d\ In\ Q}{d\ In\ I}$

With income I, and vector of price. Many necessities have an income elasticity of demand between zero and one: expenditure on these goods may increase with income, but not as fast as income does, so the proportion of expenditure on these goods falls as income rises. This observation for food is known as Engel's law.

NOTES

Applications of Income Elasticity

(i) **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.

(ii) **Market Strategy:** Income elasticity of demand is helpful in developing market strategies.

(iii) **Housing Development Strategies:** On the basis of income elasticity, housing development requirement can be predicted and construction work can be effectively launched upon.

3. 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.

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 measures the responsiveness of the demand for a good to a change in the price of another good. It is measured as the percentage change in demand for the first good that occurs in response to a percentage change in price of the second good. For example, if, in response to a 10% increase in the price of fuel, the demand of new cars that are fuel inefficient decreased by 20%, the cross elasticity of demand would be: $\frac{-20\%}{10\%} = -2$

A negative cross elasticity denotes two products that are complements, while a positive cross elasticity denotes two substitute products. These two key relationships go against one's intuition, but the reason behind them is fairly simple: assume products A and B are complements, meaning that an increase in the demand for A is caused by an increase in the quantity demanded for B. Therefore, if the price of product B decreases, then the demand curve for product A shifts to the right, increasing A's demand, resulting in a negative value for the cross elasticity of demand. The exact opposite reasoning holds for substitutes.

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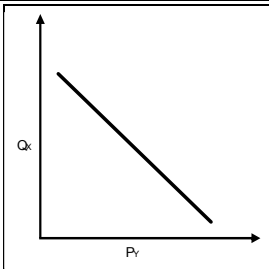
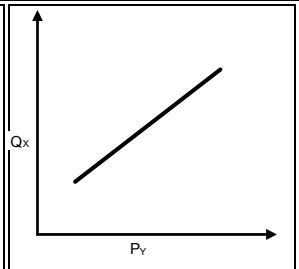
Results for main Types of Goods

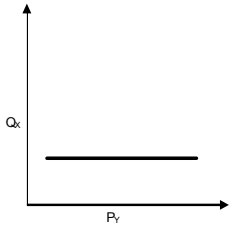
In the example above, the two goods, fuel and cars, are complements; that is, one is used with the other. In these cases the cross elasticity of demand will be negative, as shown by the decrease in demand for cars when the price of fuel increased. Where the two goods are substitutes the cross elasticity of demand will be positive, so that as the price of one goes up the demand of the other will increase. For example, in response to an increase in the price of carbonated soft drinks, the demand for non-carbonated soft drinks will rise. In the case of perfect substitutes, the cross elasticity of demand is equal to positive infinity. Where the two goods are independent, or, as described in consumer theory, if a good is independent in demand then the demand of that good is independent of the quantity consumed of all other goods available to the consumer, the cross elasticity of demand will be zero: as the price of one good changes, there will be no change in demand for the other good.



Two goods that complement each other show a negative cross elasticity of demand: as the price of good Y rises, the demand for good X falls



Two goods that are substitutes have a positive cross elasticity of demand: as the price of good Y rises, the demand for good X rises



Two goods that are independent have a zero cross elasticity of demand: as the price of good Y rises, the demand for good X stays constant

When goods are substitutable, the diversion ratio, which quantifies how much of the displaced demand for product j switches to product i, is measured by the ratio of the cross-elasticity to the own-elasticity multiplied by the ratio of product i's demand to product j's demand. In the discrete case, the diversion ratio is naturally interpreted as the fraction of product j demand which treats product i as a second choice, measuring how much of the demand diverting from product j because of a price increase is diverted to product i can be written as the product of the ratio of the cross-elasticity to the own-elasticity and the ratio of the demand for product i to the demand for product j. In some cases, it has a natural interpretation as the proportion of people buying product j who would consider product i their "second choice".

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4.7 USES OF ELASTICITY OF DEMAND

The concept of elasticity of demand has a wide range of practical application in economics and business.

1. Application for Businessmen

In decision making, the concept of elasticity of demand is of utmost practical use, for while taking decision for pricing policy, the businessman has to know the likely effect of price changes on the demand for his product in the market. He has to consider, for instance, whether a lowering of price will cause an expansion in the demand for his product, and if so to what extent and thus to what extent his total revenue would rise fetching what amount of profit.

This he can know easily if he has an idea about the demand elasticity for his product. Most businessmen consciously or unconsciously know by intuition something about the elasticity of demand for their product while making a price decision. Several, however, do not pay any attention to the price elasticity of demand and make the wrong decisions, so suffer heavy losses. In scientific management decision making, thus, one has to try to form as precise an idea as possible of the degree of elasticity of demand, for it is a convenient short-hand way of expressing the effects of price change on the demand for a product.

By knowing the type of elasticity of demand it is easy to know whether a price cut is better or a price rise for increasing the sales, total revenue and the profit. When the demand for the product is found unitary elastic, price change is ineffective in bringing more total revenue, so unless the cost is changed it is not worthwhile to change the price.

2. Application for the Government and Finance Minister

In determining fiscal policy also, the concept of elasticity of demand is very important to the Government. The Finance Minister has to consider the elasticity of demand while selecting commodities for taxation. Tax imposition on commodities for getting substantial revenue becomes worthwhile only if the taxed goods have an inelastic demand. Otherwise, if the demand is more elastic, it will contract very much with a rise in price as a result of added taxation (like sales tax or excise duty), hence the total revenue yield would not be much. That is why, generally taxes are levied on commodities like kerosene, matches, cigarettes, sugar, etc., which have an inelastic demand.

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3. Application for International Trade

The concept is also useful in formulating export and import policies of a country. Further, in determining terms in the sphere of international trade, the relative elasticity's of demand for commodities in the two countries are very important.

4. Application for Trade Union

The concept of price elasticity is useful to trade unions in wage bargaining. The union leaders, when they find that demands for their industry's product is fairly elastic, will ask for a higher wage to workers and use the producer to cut the price and increase sales which will compensate for his loss in total profit.

4.8 ELASTICITY OF SUPPLY

Elasticity of Supply is the responsiveness of producers to changes in the price of their goods or services. As a general rule, if prices raise so does the supply.

Elasticity of supply is measured as the ratio of proportionate change in the quantity supplied to the proportionate change in price. High elasticity indicates the supply is sensitive to changes in prices, low elasticity indicates little sensitivity to price changes, and no elasticity means any relationship with price.

4.9 PRICE ELASTICITY OF SUPPLY

Price elasticity of supply (PES or Es) is a measure used in economics to show the responsiveness, or elasticity, of the quantity supplied of a good or service to a change in its price.

If supply is elastic (i.e. PES > 1), then producers can increase output without a rise in cost or a time delay

If supply is inelastic (i.e. PES <1), then firms find it hard to change production in a given time period.

What is the formula for calculating price elasticity of supply?

The formula for price elasticity of supply is:

Percentage change in quantity supplied divided by the percentage change in price

When Pes > 1, then supply is price elastic

When Pes < 1, then supply is price inelastic

When Pes = 0, supply is perfectly inelastic

When Pes = infinity, supply is perfectly elastic following a change in demand

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4.10 FACTORS AFFECT THE ELASTICITY OF SUPPLY

1. **Spare Production Capacity:** If there is plenty of spare capacity then a business can increase output without a rise in costs and supply will be elastic in response to a change in demand. The supply of goods and services is most elastic during a recession, when there is plenty of spare labour and capital resources.
2. **Stocks of Finished Products and Components:** If stocks of raw materials and finished products are at a high level then a firm is able to respond to a change in demand - supply will be elastic. Conversely when stocks are low, dwindling supplies force prices higher because of scarcity
3. **The Ease and Cost of Factor Substitution/Mobility:** If both capital and labour are occupationally mobile then the elasticity of supply for a product is higher than if capital and labour cannot easily be switched. E.g. a printing press which can switch easily between printing magazines and greetings cards. Or falling prices of cocoa encourage farmers to switch into rubber production
4. **Time Period and Production Speed:** Supply is more price elastic the longer the time period that a firm is allowed to adjust its production levels. In some agricultural markets the momentary supply is fixed and is determined mainly by planting decisions made months before, and also climatic conditions, which affect the production yield. In contrast the supply of milk is price elastic because of a short time span from cows producing milk and products reaching the market place.

4.11 TYPES OF ELASTICITY OF SUPPLY

Different commodities respond differently to a given change in price. Depending upon the degree of responsiveness of the quantity supplied to the price change, there are five kinds of price elasticity of supply.

1. Perfectly Elastic Supply

When there is an infinite supply at a particular price and the supply becomes zero with a slight fall in price, then the supply of such a commodity is said to be perfectly elastic. In such a case E_s = " and the supply curve is a c horizontal straight line parallel to the X-axis, as shown in Fig:

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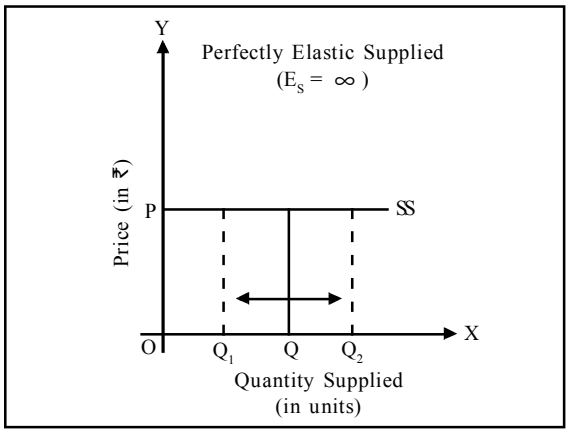

Table 4.1: Perfectly Elastic Supply

Price (in ₹)	Supply (in units)
30	100
30	200
30	300

Quantity supplied can be 100, 200 or 300 units at the same price of ₹ 30. As seen in the diagram, quantity supplied can be OQ or OQ_1 or OQ_2 at the same price of OP. It must be noted that perfectly elastic supply is an imaginary situation.

2. Perfectly Inelastic Supply

When the supply does not change with change in price, then supply for such a commodity is said to be perfectly inelastic.

In such a case, $E_s = 0$ and the supply curve (SS) is a vertical straight line parallel to the Y-axis as shown s in Fig.

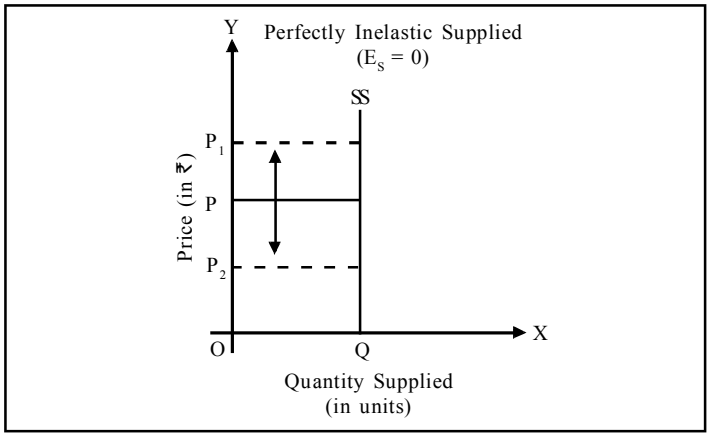

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Table 4.2: Perfectly Inelastic Supply

Price (in ₹)	Supply (in units)
20	20
30	20
40	20

Quantity supplied remains same at 20 units, whether the price is ₹ 20, ₹ 30 or 140. As seen in the diagram, quantity supplied remains the same at OQ, with change in price from OP to OP_1 or OP_2. It must be noted that perfectly inelastic supply is an imaginary situation.

3. Highly Elastic Supply

When percentage change in quantity supplied is more than the percentage change in price, then supply for such a commodity is said to be highly elastic. In such a case, $E_s > 1$ and the supply curve has an intercept on the Y-axis as shown in Fig.

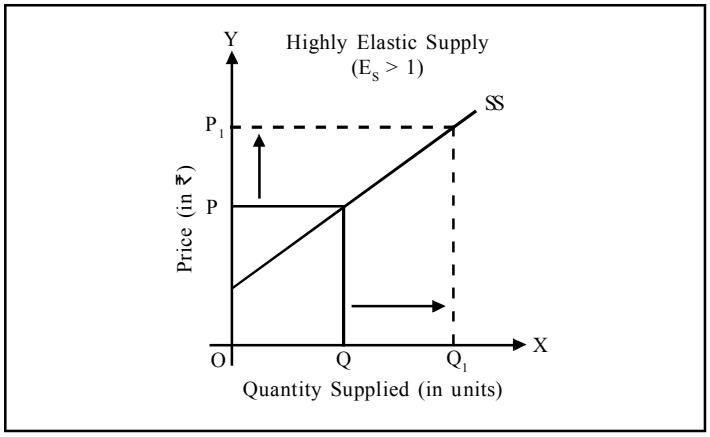

Table 4.3: Highly Elastic Supply

Price (in ₹)	Supply (in units)
10	10
15	200

As seen in the schedule, the quantity supplied rises by 100% due to a 50% rise in price. In Fig, the quantity supplied rises from OQ to OQ_1 with rise in price from OP to OP_1. As QQ_1 is proportionately more than PP_1 elasticity of supply is more than 1.

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4. Less Elastic Supply

When percentage change in quantity supplied is less than the percentage change in price, then supply for such a commodity is said to be less elastic. In such a case, $E_s < 1$ and the supply curve has an intercept on the X-axis as shown in Fig.

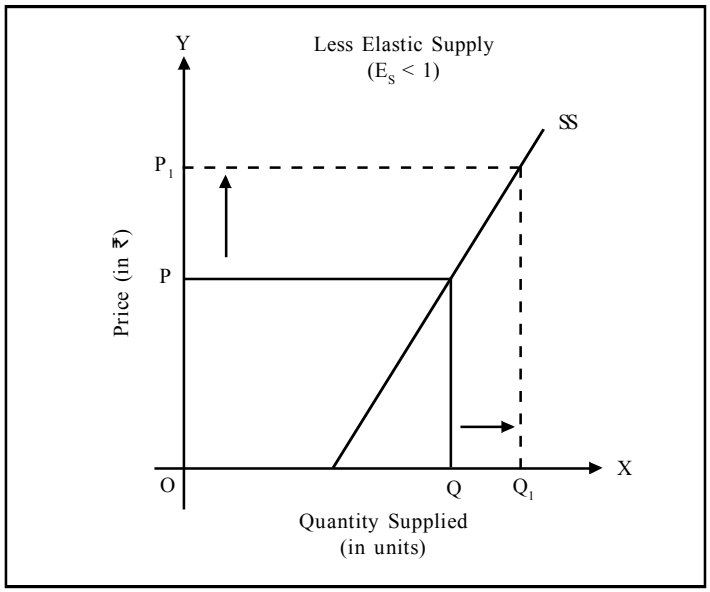

Table 4.4: Less Elastic Supply

Price (in ₹)	Supply (in units)
10	10
15	120

In Table, the quantity supplied rises by 20 % due to 50% rise in price. In Fig, the quan-tity supplied rises from OQ to OQ_1 with rise in price from OP to OP_1. As QQ_1 is proportion-ately less than PP_1, elasticity of supply is less than 1.

5. Unitary Elastic Supply

When percentage change in quantity supplied is equal to percentage change in price, then supply for such a commodity is said to the unitary elastic. In such a case, $E_s = 1$ and supply curve is a straight line passing through the origin as shown in Fig.

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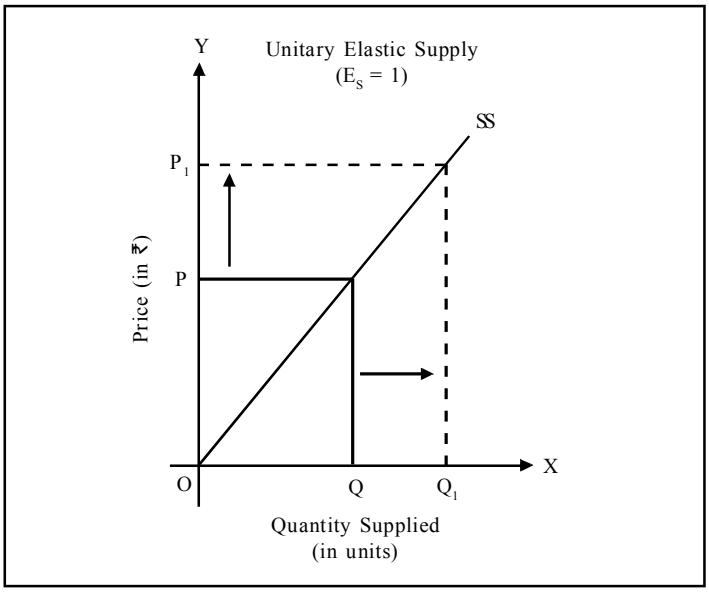

Table 4.5: Unitary Elastic Supply

Price (in ₹)	Supply (in units)
10	100
15	150

In Table, the quantity supplied also rises by 50% due to 50% rise in price. In Fig, the quantity supplied rises from OQ to OQ_1 with rise in price from OP to OP_1. As QQ_X is proportionately equal to PP_1, elasticity of supply is equal to 1.

4.12 SUMMARY

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.

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.

Marshall has suggested a three-fold classification of types of price elasticity of demand, viewing the numerical co-efficient of price elasticity in terms of unity or 1. Since the numerical co-efficient (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.

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There are three different methods of measuring price elasticity of demand: i)Ratio method to measure co-efficient of price elasticity; ii) Total revenue method; and iii) Point 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.

According to the nature of satisfaction the goods give, they may be classified into luxury, comfort or necessary goods. In general, luxury and comfort goods are price elastic, while necessary goods are price inelastic. Thus, for example, the demand for food grains, cloth, salt etc., is generally inelastic while that for radio, furniture, car, etc., is elastic.

Generally, larger the income, the demand for overall commodities tends to be relatively inelastic. The demand pattern of a millionaire is rarely affected even by significant price changes. Similarly, the redistribution of income in favor of low-income people may tend to make demand for some goods relatively elastic.

The income elasticity is defined as a ratio percentage or proportional change in the quantity demanded to the percentage or proportional change in income. Income elasticity co-efficient is, thus, measured by the following formula: Percentage change in quantity demanded

Income elasticity = Percentage change in income. 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.

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

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coffee are substitutes for each other, pen and ink, car and petrol are complementary goods.

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.

The concept is also useful in formulating export and import policies of a country. Further, in determining terms in the sphere of international trade, the relative elasticity of demand for commodities in the two countries are very important.

4.13 GLOSSARY

(a) Price Elasticity of Demand: Price elasticity of demand PED is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price.

(b) Income Elasticity of Demand: Income elasticity of demand measures the responsiveness of the demand for a good to a change in the income of the people demanding the good, ceteris paribus. It is calculated as the ratio of the percentage change in demand to the percentage change in income.

(c) Cross Elasticity Demand: 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.

(d) Price Elasticity of Supply: Price Elasticity of Supply (PES) is an elasticity defined as a numerical measure of the responsiveness of the supply of a given good to a change in the price of that good.

4.14 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is elasticity of demand?
2. On what factors does elasticity of demand depend? Explain.

NOTES

3. Explain the concept of cross elasticity of demand. Indicate its usefulness in the classification of market situations.
4. Distinguish between price elasticity, income elasticity and cross elasticity of demand.
5. What is point elasticity of demand? How is it measured?

(B) Extended Answer Questions

1. What is elasticity of demand?
2. On what factors does elasticity of demand depend? Explain.
3. Explain the concept of cross elasticity of demand. Indicate its usefulness in the classification of market situations.
4. Distinguish between price elasticity, income elasticity and cross elasticity of demand.
5. What is point elasticity of demand? How is it measured?

(C) True or False

1. Elasticity is the ratio of the percentage change in one variable to the percentage change in another variable.
2. Elasticity of Demand = Percentage change in determinant of demand
3. When the proportion of change in the quantity demanded is greater than that of price, the demand is said to be relatively elastic.
4. Total Revenue (or Total Outlay) = Demand × (Quantity Purchased or sold)
5. In the case of durable goods, the demand generally tends to be inelastic in the short run, e.g., furniture, bicycle, radio, etc.

(D) Multiple Choice Questions

1. The quantity demanded (QD) of a soft drink brand A has decreased. This could be because:

(i) A's consumers have had an increase in income.

(ii) The price of A has increased.

(iii) A's advertising is not as effective as in the past.

(iv) The price of rival brand B has increased.

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2. Demand curves in P-Q space are derived while holding constant _____.

(i) Consumer tastes and the prices of other goods.

(ii) Incomes, tastes, and the price of the good.

(iii) Incomes and tastes.

(iv) Incomes, tastes, and the prices of other goods.

3. Suppose the demand for good Z goes up when the price of good Y goes down. We can say that goods Z and Y are _____.

(i) Perfect substitutes.

(ii) Unrelated goods.

(iii) Complements.

(iv) Substitutes.

4. If the demand for coffee decreases as income decreases, coffee is _____.

(i) a normal good.

(ii) a complementary good.

(iii) an inferior good.

(iv) a substitute good.

(E) Fill in the Blanks

1. Marshall has suggested a three-fold classification of types of _____.
2. Demand for safety pins is _____.
3. According to the nature of satisfaction the goods give, they may be classified into luxury, comfort or _____ goods.
4. Perfectly elastic demand curve is _____.

4.15 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. False, 5. True

(D) 1. (ii), 2. (iv), 3. (iii), 4. (i)

(E) 1. Price elasticity of demand, 2. Inelastic, 3. Necessary, 4. Horizontal

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4.17 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

4.18 TERMINAL QUESTIONS

1. Why perfectly elastic demand curve is Horizontal? Discuss.

2. Explain the concept of cross elasticity of demand. Indicate its usefulness in the classification of market situations.

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3. Distinguish between price elasticity, income elasticity and cross elasticity of demand.

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UNIT 5 FAILURE OF THE MARKET ECONOMY AND ROLE OF THE GOVERNMENT ANALYSIS OF FINANCIAL STATEMENTS

Structure:

Objectives

After reading this unit you will be able to understand:

- Imperfect market information and Market failure
- Growth of monopolies and market failure
- Market failure in case of Public goods
- Public provision of Public Goods
- Externalities and Government Intervention

NOTES

5.1 INTRODUCTION

A market economy is an economy in which decisions regarding investment, production, and distribution are based on market determined supply and demand, and prices of goods and services are determined in a free price system.

5.2 INTRODUCTION TO MARKET ECONOMY

A market economy is an economic system in which economic decisions and the pricing of goods and services are guided solely by the aggregate interactions of a country's individual citizens and businesses. There is little government intervention or central planning. This is the opposite of a centrally planned economy, in which government decisions drive most aspects of a country's economic activity.

The theoretical basis for market economies was developed by classical economists such as Adam Smith, David Ricardo and Jean-Baptiste Say in the late 19th and early 20th centuries. These classically liberal free market advocates believed that protectionism and government intervention tended to lead to economic inefficiencies that actually made people worse off.

Market economies work on the assumption that forces such as supply and demand are the best determinants of aggregate wellbeing. Strict adherents to the theory rarely engage in government interventions such as price fixing, license quotas and industry subsidies. Theoretical proponents argue that central planners could not possibly gather and analyze enough information to make the optimal economic decision for all participants. Instead, each rational person with perfect information and free will should be able to maximize his well being given the set of options with which he is presented. Moreover, this allows individuals to attach different amounts of value to leisure, wealth, goods or future consumption. The personal economic value of these different aspects is known as utility. Detractors assert that the conditions that allow markets to function properly cannot hold in the real world. They contend that information is not perfect and universal; many people do not behave rationally; and corruption and uninhibited power can allow certain actors to exercise undue influence at the expense of others.

Almost every economy in the modern world falls somewhere along a continuum running from pure market to fully planned. Most developed nations are technically mixed economies because they blend free markets with some government interference. However, they are often said to have market economies because they allow market forces to drive the vast majority of activities, typically engaging in government intervention only to the extent it is needed to provide stability.

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Although the market economy is clearly the popular system of choice, there is significant debate regarding the amount of government intervention considered optimal for efficient economic operations. Nations such as Cuba, China and North Korea have been heavily influenced by the Communist theories under Marxism-Leninism, which promote coordinated economic activity and centralized planning to achieve egalitarian and shared outcomes. Such economies have struggled at times due to corruption, inept leadership, limitations to the application of these theories and trade sanctions from capitalist nations.

5.3 IMPERFECT MARKET

Imperfect competition market structure is where the firms that operate in a market have a lot of control over the good or service they produce. This will happen when the numbers of firms that produce that good or supply a certain services are very few in the market. Imperfect competition market structure is the most common type of market structure in the market. We can illustrate imperfect competition by an example in the energy sector. If there is only one gas station in your geographical area and you cannot afford to go and buy fuel from the neighboring gas station because of its distance and costs. Then your local gas station will price its commodity above the prevailing market prices because there is no competition from other firm. The consumers do not have any choice but to purchase from this station at the inflated prices. The gas station has therefore created an imperfect market.

There are some imperfect types of competition that are useful to the society. An example of a useful market structure is the natural monopoly. This type of market structure is as a result of the government giving some company the sole license to produce certain commodity in the market. The other reason why such a monopoly may exist is that the marginal cost of producing such a commodity is very high. The government will therefore ensure one company is producing in the market to avoid the distribution of proceeds to the many company creating one efficient company. This way the firm in the market will have a large customer's base that will be able to pay for the average total costs without bringing the prices of the commodity down. If the prices of these goods and services were to be brought down then it would not be economical to produce them. If competition was allowed then this commodity will seize to be produced or will be undersupplied due to high costs. An example of this is the provision of railway, electricity and fuel/gas. Every citizen in any country will attest that the providers for these services are very few in their country. These products will be similar to almost all citizens in a country. Example is the electricity and fuel sector. These services will be similar to all citizens and will be provided by one company.

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The characteristic of imperfect market structure is that they reduce the economic surplus to varying degrees. Economic surplus is the extra revenue you acquire from selling a commodity at a higher price more than what you were willing to sell in the market. There are five major sources of market power in the imperfect market competition.

5.4 MARKET FAILURE

Market failure is a situation in which the allocation of goods and services is not efficient. That is, there exists another conceivable outcome where an individual may be made better-off without making someone else worse-off.

Market failures are often associated with time-inconsistent preferences, information asymmetries, non-competitive markets, principal–agent problems, externalities, or public goods. The existence of a market failure is often the reason that self-regulatory organizations, governments or supra-national institutions intervene in a particular market. Economists, especially micro-economists, are often concerned with the causes of market failure and possible means of correction. Such analysis plays an important role in many types of public policy decisions and studies. However, government policy interventions, such as taxes, subsidies, bailouts, wage and price controls, and regulations (including poorly implemented attempts to correct market failure), may also lead to an inefficient allocation of resources, sometimes called government failure.

Given the tension between, on the one hand, the undeniable costs to society caused by market failure, and on the other hand, the potential that attempts to mitigate these costs could lead to even greater costs from "government failure," there is sometimes a choice between imperfect outcomes, i.e. imperfect market outcomes with or without government interventions. But either way, if a market failure exists the outcome is not Pareto efficient. Most mainstream economists believe that there are circumstances (like building codes or endangered species) in which it is possible for government or other organizations to improve the inefficient market outcome. Several heterodox schools of thought disagree with this as a matter of principle.

5.5 IMPERFECT MARKET INFORMATION AND MARKET FAILURE

Since market prices reflect all available information, if some of that information is wrong, then the pricing would be wrong in some respect also and a market failure (inefficient allocation of resources) could occur.

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So for example, the commodity market for coffee is highly dependent on weather forecasts and crop estimates from a few people who go around inspecting the coffee plantations. If this information were missing or wrong (weather forecasts are often wrong), then the price of coffee might be too high or low for the actual crop that will be picked.

5.6 REASONS FOR MARKET FAILURE

It reflects failure of government policy in removing market distortions created by price controls and subsidies.

1. Incomplete Markets

Markets for certain things are incomplete or missing under perfect competition. The absence of markets for such things as public goods and common property resources is a cause of market failure. There is no way to equate their social and private benefits and costs either in the present or in the future because their markets are incomplete or missing.

2. Indivisibilities

The Paretian optimality is based on the assumption of complete divisibility of products and factors used in consumption and production. In reality, goods and factors are not infinitely divisible. Rather, they are indivisible. The problem of divisibility arises in the production of those goods and services that are used jointly by more than one person.

An important example is of road in a locality. It is used by a number of persons in the locality. But the problem is how to share the costs of repairs and maintenance of the road. In fact, very few persons will be interested in its maintenance. Thus marginal social costs and marginal social benefits will diverge from each other and Pareto optimality will not be achieved.

3. Common Property Resources

Another cause of market failure is a common property resource. Common ownership when coupled with open access, would also lead to wasteful exploitation in which a user ignores the effects of his action on others. Open access to the commonly owned resources is a crucial ingredient of waste and inefficiency.

Its most common example is fish in a lake. Anyone can catch and eat it but no one has an exclusive property right over it. It means that a common property resource is non-excludable (anyone can use it) and non-rivalrous (no one has an exclusive right over it). The lake is a common property for all fishermen.

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When a fisherman catches more fish, he reduces the catch of other fishermen. But he does count this as a cost, yet it is a cost to society. Because the lake is a common property resource where there is no mechanism to restrict entry and to catch fish. The fisherman who catches more fish imposes a negative externality on other fishermen so that the lake is overexploited.

This is called the tragedy of the commons which leads to the elimination of social gains due to the overuse of common property. Thus when property rights are common, indefinite or non-existent, social costs will be more than private costs and there will not be Pareto Optimality.

4. Imperfect Markets

Pareto efficiency increases under perfect competition. But it declines under market distortions or imperfections. Let us consider a case of monopoly. Initially, monopoly equilibrium is at point E where the private marginal cost curve, PMC, cuts the marginal revenue curve, MR, from below.

The monopolist produces OQ_1 output at OP_1 price. But the production process generates smoke in the air. Therefore, the pollution board levies a tax equal to ÒÅ on the monopoly firm. The imposition of a pollution tax is, in fact, a fixed cost to the monopoly firm. Now the social marginal cost curve cuts the marginal revenue curve at point e.

The monopolist increases the price of his product from OP_1 to OP_2 and restricts output to OQ_2 and thereby reduces consumers' surplus to Q_2MLQ_1 (= $OQ_1 LP_1 - OQ_2 MP_2$). In fact, $Q_2 MLQ_1$ is the social cost of OQ_2 output. But the net loss to society is $Q_2 MLQ_1 - TE$= eMLT, the shaded area in the figure 5.1.

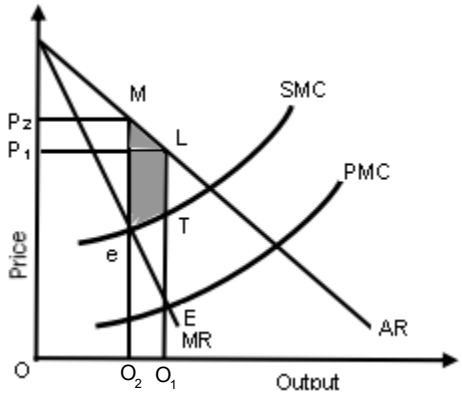

Fig. 5.1: Imperfect Markets

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5. Asymmetric Information

Pareto optimality assumes that producers and consumers have perfect information regarding market behaviour. But according to Joseph Stiglitz, "In the real world, there is asymmetric (incomplete) information due to ignorance and uncertainty on the part of buyers and sellers. Thus they are unable to equate social and private benefits and costs."

Suppose a producer introduces a new antipollution device in the market. But it is very difficult for him to predict the current demand of his product. On the other hand, consumers may be ignorant about quality and utility of this anti-pollution device. In some cases, information about market behaviour in the future may be available but that may be insufficient or incomplete. Thus market asymmetries, fail to allocate efficiently.

6. Externalities

The presence of externalities in consumption and production also lead to market failure. Externalities are market imperfections where the market offers no price for service or disservice. These externalities lead to misallocation of resources and cause consumption or production to fall short of Pareto optimality.

Externalities, lead to the divergence of social costs from private costs, and of social benefits from private benefits. When social and private costs and social and private benefits diverge, perfect competition will not achieve Pareto optimality.

Because under perfect competition private marginal cost (PMC) is equated to private marginal benefit (i.e. the price of the product). We discuss below how external economies and diseconomies of consumption and production affect adversely the allocation of resources and prevent the attainment of Pareto optimality.

(i) Positive Externalities of Production:

According to Pigou, when some firm renders a benefit or cost of a service to other firms without appropriating to itself all the benefits or costs of his service, it is an external economy of production. External economies of production accrue to one or more firms in the form of reduced average costs as a result of the activities of another firm.

In other words, these economies accrue to other firms in the industry with the expansion of a firm. They may be the result of reduced input costs which lead to pecuniary external economies. Whenever external economies exist, social marginal benefit will exceed private marginal benefit and private marginal cost will exceed social marginal cost.

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This is illustrated in Figure 5.2 where PMC is the private marginal cost curve or supply curve of firms. The demand curve D intersects the PMC curve at point E and determines the competitive market price OP and output OQ.

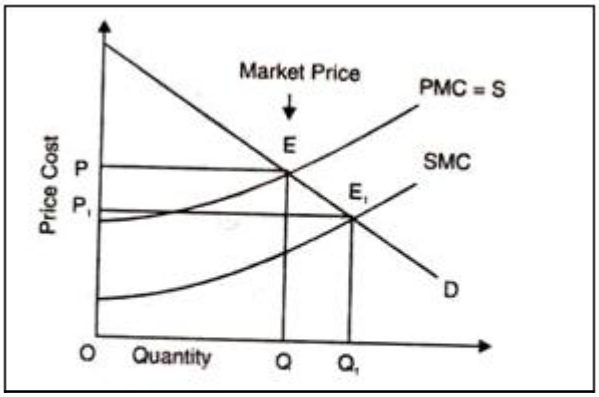

Fig. 5.2: Positive Externalities of Production

SMC is the social marginal cost curve which intersects the demand curve D at point E_1 and determines the social optimum output level OQ_1 at price OP_1. Since for every unit of output between OQ and OQ_1 social marginal cost ($\hat{I}Ð_1$) is less than the competitive market price OP, its production involves a net social gain equal to QQ_1.

(ii) Negative Externalities of Production:

When the production of a commodity or service by a firm affects adversely other firms in the industry, social marginal cost is higher than social marginal benefit. Suppose, a factory situated in a residential area emits smoke which affects adversely health and household articles of the residents.

In this case, the factory benefits at the expense of residents who have to incur extra expenses to keep themselves healthy and their households clean. These are social marginal costs because of harmful externalities which are higher than private marginal cost and also social marginal benefit.

This is illustrated in Fig. 5.3 where the PMC curve which intersects the D curve at point E and determines the competitive price OP and output OQ. But the socially optimum output is OQ_1 and price is OP_1, as determined by the intersection of SMC and D curve at point E_1.

Thus the firms are producing Q_1 Q more than the social optimal output OQ_1. In this case, for every unit between Q_1 and Q, social marginal cost (SMC) is more than the competitive market price OP. Thus its production involves a social loss i.e.. $OQ - OQ_1 - QQ_1$.

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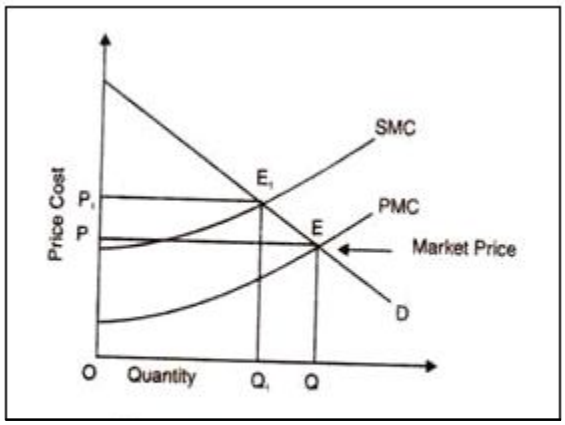

Fig. 5.3: Negative Externalities of Production

(i) Positive Externalities in Consumption:

Externalities in Consumption lead to non-attainment of Pareto optimality. External economies of consumption arise from non-market interdependences of the satisfactions enjoyed by different consumers. An increase in the consumption of a good or service which affects favourably the consumption patterns and desires of other consumers is an external economy of consumption.

When an individual installs a TV set, the satisfaction of his neighbours increases because they can watch TV programmes free at his place. Here social benefit is larger and social cost is lower than the private benefit and cost. But the TV owner is likely to use his TV set to a smaller extent than the interests of society require because of the inconvenience and nuisance caused by his neighbours to him.

(ii) Negative Externalities in Consumption:

Negative externalities in consumption arise when the consumption of a good or service by one consumer leads to reduced utility (dissatisfaction or loss of welfare) of other consumers. Negative externalities in consumption arise in the case of fashions and articles of conspicuous consumption which reduce their utility to some consumers. For example, smokers cause disutility to non-smokers, and noise nuisance from stereo systems to neighbours etc. Such diseconomies of consumption prevent the attainment of Pareto optimality.

Suppose there are two room-mates A and B. Individual A likes to smoke while individual B likes clean air. Further, B's utility of consuming clean air is affected by individual A's smoking. This is explained in terms of Figure 5.4 (A) & 5.4 (B). Initially, individual A's utility from smoking gives him 50 utilis at point A while individual B's consumption of clean air gives him 80 utilis at point B. When there are no externalities in consumption, the tangent at point A and point Â are parallel to each other.

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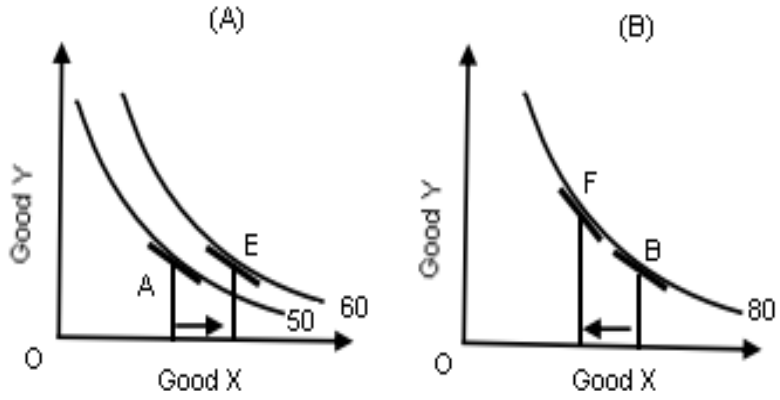

Fig. 5.4: Negative Externalities of Production

If individual A smokes at his leisure then his utility increases to 60 utilis and he moves to point E. The effect of individual A's smoking reduces the utility of clean air to individual B who moves from point B to point F on the same utility curve.

Individual A has moved on a higher utility curve from 50 to utility curve 60, but the non-smoker is on the same utility curve 80. Thus Pareto optimality is not attained because the utility of one consumer (smoker) A has increased whereas the utility level of the other consumer (non-smoker) Â has been reduced.

7. Public Goods

Another cause of market failure is the existence of public goods. A public good is one whose consumption or use by one individual does not reduce the amount available for others. An example of a public good is water which is available to one person and is also available to others without any additional cost. Its consumption is always joint and equal.

It is non-excludable if it can be consumed by anyone. It is non-rivalrous if no one has an exclusive rights over its consumption. Its benefits can be provided to an additional consumer at zero marginal cost. Thus public goods are both non-excludable and non- rivalrous. Moreover, environmental quality is generally considered as a public good and when it is valued at market price, it leads to market failure.

The Paretian condition for a public good is that its marginal social benefit (MSB) should equal its marginal social cost (MSC). But the characteristics of a public good are such that the economy will not reach a point of Pareto optimality in a perfectly competitive market. Public goods create externalities.

The externality starts when the marginal cost of consuming or producing an additional unit of a public good is zero but a price above zero is being charged. This violates the Paretian welfare maximization criterion of equating marginal social cost and

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marginal social benefit. This is because the benefits of a public good must be provided at a zero marginal social cost.

Suppose potable water is supplied by the municipal corporation. There are two individuals A and Â who use it. Both consume the same quantity of water. But they differ in how much they are willing to pay for any given quantity.

This is illustrated in Figure 5.5 where D_a and D_b are the demand curves of two individuals A and Â respectively. Therefore, demand prices are OP_a and OP_b corresponding to a given quantity OW of water. The curve ÓD is the vertical summation of D_a and D_b curves.

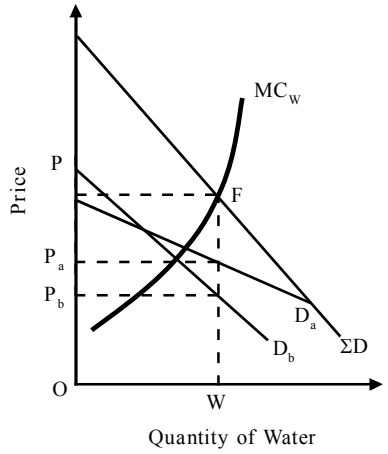

Fig. 5.5: Negative Externalities of Production

The Lindhal equilibrium for a public good exists where the sum of the individual prices equal marginal cost. Therefore,

$OP = OP_a + OP_b = MC_W$

But each consumer is being charged a different price. This is a case of price discrimination because price OP_a is greater than price OP_b for the same quantity of water OW. Hence there is market failure.

8. Public Bads

There are also public bads in which one person experiencing some disutility does not diminish the disutility of another, such as air and water pollution. Public goods and public bads cannot be handled by the institution of private property. K.E. Boulding has explained public bads with the following example: "If someone drives his car into my living room and pollutes it, I can sue him for damages. This is a private bad. But if someone congests the roads or pollutes the air, however, there is not much I can do about it as an individual. This is public bad."

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Market failure is a necessary but not a sufficient condition for intervention. To be truly worthwhile, a government intervention must outperform the market or improve its functions. Second, the benefits from such intervention must exceed the costs of planning, implementation, and enforcement, as well as any indirect and unintended costs of distortions introduced to other sectors of the economy by such intervention.

5.7 GROWTH OF MONOPOLIES AND MARKET FAILURE

According to general equilibrium economics, a monopoly can identify or create a rigid demand curve, restrict supply and cause deadweight loss to the economy. The underprovision of a market good or service is known as a market failure. Underprovision is measured against the concept of perfect competition in theoretical economics.

General Equilibrium Monopoly

General equilibrium economics refers to a 20th century model developed by neoclassical economists about a specific yet unrealistic notion of perfectly competitive markets. Classic monopoly theory was founded – and is normally still discussed today – in this tradition.

Per the theory, market failure results when power is concentrated into a monopoly (a single provider of a good or service), a monopsony (a single buyer of a good or service), a cartelized oligopoly (few large providers refusing to directly compete) or a natural monopoly (in which an unusual cost structure leads to an efficient single-firm outcome).

Typically, all of these possible outcomes are broadly covered by modern conceptions of monopoly. The fear is that monopoly firms will take advantage of their position to force consumers to pay prices that are higher than equilibrium.

Many economists and non-economists challenge the theoretical validity of general equilibrium economics because of the highly unrealistic assumptions in perfect competition models. Some of these criticisms also extend to its modern adaptation, dynamic stochastic general equilibrium.

Even if these challenges do not disprove the underlying arguments for monopoly-induced market failure, history provides almost no examples of market monopolies. In other words, the theory of monopoly market failure has a poor empirical track record.

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Milton Friedman, Joseph Schumpeter, Mark Hendrickson and others suggest that the only monopolies that cause market failure are government-protected. A political, or legal, monopoly can charge monopoly prices because the state has erected barriers against competition.

This form of monopoly was the basis of the mercantilist economic system in the 16th and 17th centuries. Modern examples include utilities and education.

5.8 MARKET FAILURE IN CASE OF PUBLIC GOODS

Public goods are the goods that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.

Public goods provide an example of market failure resulting from missing markets. Which goods and services are best left to the market? And which are more efficiently and fairly provided as collective consumption goods by the state? This is at the heart of your revision of public goods.

Central to yiou revision will be to understand why public goods may not be provided by the market. You can work this out by distinguishing between public and private goods and focusing on ideas of rivalry and excludability in consumption.

Students should understand the free rider and valuation problems – there are big debates in economics about the optimum size of the state. Rapid changes in technology are also changing the nature of what is and what is not a public good.

The characteristics of pure public goods are the opposite of private goods:

Non-excludability: The benefits derived from pure public goods cannot be confined solely to those who have paid for it. Indeed non-payers can enjoy the benefits of consumption at no financial cost – economists call this the 'free-rider' problem. With private goods, consumption ultimately depends on the ability to pay

Non-rival consumption: Consumption by one consumer does not restrict consumption by other consumers – in other words the marginal cost of supplying a public good to an extra person is zero. If it is supplied to one person, it is available to all.

Non-rejectable: The collective supply of a public good for all means that it cannot be rejected by people, a good example is a nuclear defence system or flood defence projects.

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5.9 PUBLIC PROVISION OF PUBLIC GOODS

It is well known that pure public goods are underprovided in static games with private, voluntary contributions. Public provision is usually modeled using a median voter framework, in which the public good is funded by a proportional income tax. This paper compares the private and public provision of public goods in dynamic settings. With private provision, it is possible to sustain cooperation and provide the public good efficiently. With public provision, dynamic majority-rule solutions exist even when taxes are not restricted to be proportional to income; thus, income redistribution can be chosen jointly with the level of the public good. At low discount factors, private provision tends to result in lower levels of the public good relative to public provision. As patience increases, however, public provision results in lower levels of the public good than private provision. This occurs because higher levels of income redistribution are sustainable under public provision. Such redistribution becomes increasingly feasible at higher discount factors, resulting in income subsidies for particular groups instead of higher levels of the public good. In contrast, under private provision, all groups are forced to settle for increases in the level of the public good. In terms of financing the public good, private provision tends to result in benefit taxation, with little variation in individual contribution rates. Public provision allows a wider range of tax rates, although there is a tendency towards benefit taxation when preferences vary and progressive taxation when incomes vary.

5.10 EXTERNALITIES AND GOVERNMENT INTERVENTION

Government can use wide range of policies that it could use to bring an efficient allocation of resources where externalities exist.

(1) Regulation: it is a method used by government to control externalities. Methods like -

(a) Government could lay down maximum pollution levels.

(b) Government could ban pollution creating activities.

For instance: In the UK, the Environmental Protection Act 1989 laid down maximum environmental standards for emission for more than 3500 factories involved in chemical process, waste incineration and oil refining. Government banned burning of ordinary coal in urban areas.

(2) Extending Property Rights: If a chemical company lorry destroyed your home, you would expect the chemical company to pay compensation. If the chemical company polluted air in atmosphere and the tree in your garden died, it

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would be unlikely that you would gain compensation, particularly if the chemical plant is in the UK and the dead trees were in Germany.

Externalities often arise because property rights are not fully allocated. Nobody owns the atmosphere, oceans, and rivers. Government can give water companies right to charge companies polluting water which dump waste in sea and rivers. It can give local residents the right to claim compensation if the pollution levels are more than a certain amount.

However there are some problems for extending property rights. If the polluter is in another country and sufferer is in another country. For example: If Brazil is cutting its forest which will lead to global warming and western countries are being affected. Western countries can pay Brazil for not cutting down the forest.

Another example could be of asbestos sheet worker who have the right to claim if his health is damaged working in the company due to asbestos. Company will not pay him until it is clear that his health is damaged due to asbestos. This could take longer time and the worker can even die until his reports come.

If there is a tree in your garden and your friends garden and the road contractor wants to cut down the roots coming out. You may be having much value for the tree where as your friend may be fairly unaffected by cutting down the trees root. Hence it is difficult to measure the exact cost of the property.

(3) Taxes: Government can set extra taxes on the externalities equal to the amount of externalities. This will result in fall in demand and less will be produced causing less externalities. For example government can impose tax on petrol equal to the amount which is required to clear pollution it creates.

(4) Subsidies: Assume government wants to control emissions of sulphur in to the environment. It will issue permits to pollute. The total of which equals the maximum amount of sulphur it wishes to be emitted for a period of time.

5.11 SUMMARY

A market economy is an economic system in which economic decisions and the pricing of goods and services are guided solely by the aggregate interactions of a country's individual citizens and businesses. There is little government intervention or central planning. This is the opposite of a centrally planned economy, in which government decisions drive most aspects of a country's economic activity.

The theoretical basis for market economies was developed by classical economists such as Adam Smith, David Ricardo and Jean-Baptiste Say in the late 19th and early 20th centuries. These classically liberal free market advocates believed that protectionism and government intervention tended to lead to economic inefficiencies that actually made people worse off.

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Market economies work on the assumption that forces such as supply and demand are the best determinants of aggregate wellbeing. Strict adherents to the theory rarely engage in government interventions such as price fixing, license quotas and industry subsidies.

Imperfect competition market structure is where the firms that operate in a market have a lot of control over the good or service they produce. This will happen when the numbers of firms that produce that good or supply a certain services are very few in the market. Imperfect competition market structure is the most common type of market structure in the market.

Market failure is a situation in which the allocation of goods and services is not efficient. That is, there exists another conceivable outcome where an individual may be made better-off without making someone else worse-off.

Market failures are often associated with time-inconsistent preferences, information asymmetries, non-competitive markets, principal–agent problems, externalities, or public goods. The existence of a market failure is often the reason that self-regulatory organizations, governments or supra-national institutions intervene in a particular market.

Markets for certain things are incomplete or missing under perfect competition. The absence of markets for such things as public goods and common property resources is a cause of market failure. There is no way to equate their social and private benefits and costs either in the present or in the future because their markets are incomplete or missing.

General equilibrium economics refers to a 20th century model developed by neoclassical economists about a specific yet unrealistic notion of perfectly competitive markets. Classic monopoly theory was founded – and is normally still discussed today – in this tradition.

Public goods are the goods that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.

Public goods provide an example of market failure resulting from missing markets. Which goods and services are best left to the market? And which are more efficiently and fairly provided as collective consumption goods by the state? This is at the heart of your revision of public goods.

Central to your revision will be to understand why public goods may not be provided by the market. You can work this out by distinguishing between public and private goods and focusing on the ideas of rivalry and excludability in consumption.

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Non-excludability: The benefits derived from pure public goods cannot be confined solely to those who have paid for it. Indeed non-payers can enjoy the benefits of consumption at no financial cost – economists call this the 'free-rider' problem. With private goods, consumption ultimately depends on the ability to pay

Non-rival consumption: Consumption by one consumer does not restrict consumption by other consumers – in other words the marginal cost of supplying a public good to an extra person is zero. If it is supplied to one person, it is available to all.

Non-rejectable: The collective supply of a public good for all means that it cannot be rejected by people, a good example is a nuclear defence system or flood defence projects.

It is well known that pure public goods are underprovided in static games with private, voluntary contributions. Public provision is usually modeled using a median voter framework, in which the public good is funded by a proportional income tax. This paper compares the private and public provision of public goods in dynamic settings. With private provision, it is possible to sustain cooperation and provide the public good efficiently. With public provision, dynamic majority-rule solutions exist even when taxes are not restricted to be proportional to income; thus, income redistribution can be chosen jointly with the level of the public good. At low discount factors, private provision tends to result in lower levels of the public good relative to public provision

5.12 GLOSSARY

(a) Market Economy: A market economy is an economic system in which economic decisions and the pricing of goods and services are guided solely by the aggregate interactions of a country's individual citizens and businesses. There is little government intervention or central planning. This is the opposite of a centrally planned economy, in which government decisions drive most aspects of a country's economic activity.

(b) Imperfect Competition Market Structure: Imperfect competition market structure is where the firms that operate in a market have a lot of control over the good or service they produce.

(c) Market Failure: Market failure is a situation in which the allocation of goods and services is not efficient. That is, there exists another conceivable outcome where an individual may be made better-off without making someone else worse-off.

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(d) Public Goods: Public goods are the goods that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.

(e) Non-excludability: The benefits derived from pure public goods cannot be confined solely to those who have paid for it. Indeed non-payers can enjoy the benefits of consumption at no financial cost – economists call this the 'free-rider' problem. With private goods, consumption ultimately depends on the ability to pay

(f) Non-rival Consumption: Consumption by one consumer does not restrict consumption by other consumers – in other words the marginal cost of supplying a public good to an extra person is zero. If it is supplied to one person, it is available to all.

5.13 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Market Economy?
2. What is imperfect market information?
3. Give the meaning of market failure.
4. What are Public goods?
5. What is Externalities?
6. What is Government Intervention?

(B) Extended Answer Questions

1. Discuss about imperfect market information.
2. Explain reasons for Market failure.
3. Discuss growth of monopolies and market failure.
4. Explain about market failure in case of Public goods.
5. Discuss about public provision of Public Goods.

(C) True or False

1. A market economy is an economic system in which economic decisions and the pricing of goods and services are guided solely by the aggregate interactions of a country's individual citizens and businesses.
2. Imperfect competition market structure is where the firms that operate in a market have a lot of control over the good or service they produce.

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3. Market failure is a situation in which the allocation of goods and services is not efficient.
4. Public goods are the goods that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.

(D) Multiple Choice Questions

1. What is an economic system in which economic decisions and the pricing of goods and services are guided solely by the aggregate interactions of a country's individual citizens and businesses?
   (a) A market economy
   (b) Imperfect competition market structure
   (c) Market failure
   (d) Public goods
2. _____ is where the firms that operate in a market have a lot of control over the good or service they produce.
   (a) A market economy
   (b) Imperfect competition market structure
   (c) Market failure
   (d) Public goods
3. What is a situation in which the allocation of goods and services is not efficient?
   (a) A market economy
   (b) Imperfect competition market structure
   (c) Market failure
   (d) Public goods
4. What are the goods that are both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others?
   (a) A market economy
   (b) Imperfect competition market structure
   (c) Market failure
   (d) Public goods

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(E) Fill in the Blanks

1. A market economy is an economic system in which economic decisions and the pricing of goods and services are guided solely by the aggregate interactions of a country's individual _____.
2. _____ market structure is where the firms that operate in a market have a lot of control over the good or service they produce.
3. _____ is a situation in which the allocation of goods and services is not efficient.
4. _____ are the goods that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others.

5.14 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True, 5. True

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

(E) 1. Citizens and businesses, 2. Imperfect competition, 3. Market failure, 4. Public goods

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14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

5.16 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

5.17 TERMINAL QUESTIONS

1. Explain in details about Externalities and Government Intervention.

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2. Discuss about imperfect market information. Explain reasons for Market failure.

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3. Discuss growth of monopolies and market failure. Explain about market failure in case of Public goods.

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UNIT 6 CARDINAL UTILITY THEORY

Structure:

Objectives

After reading this unit you will be able to understand:

- Cardinal Utility Theory
- Law of Diminishing Marginal Utility
- Consumer's Equilibrium
- Derivation of demand curve
- Drawback of Cardinal Approach

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6.1 INTRODUCTION

Cardinal utility theory is based on the cardinal measurement of utility which assumes that utility is measurable and additive. This theory was developed by neo-classical economists like Marshall, Pigou, Robertson etc. It is expressed as a quantity measured in hypothetical units which called utils. If a consumer imagines that one mango has 8 utils and an apple 4 utils, it implies that the utility of mango is twice than of an apple.

6.2 CARDINAL UTILITY THEORY

Cardinal utility theory is the oldest theory of demand which provides an explanation of consumer's demand for a product and derives the law of demand which establishes an inverse relationship between price and quantity demanded of a product.

The price of a product depends upon the demand for and the supply of it. In this part of the book we are concerned with the theory of consumer's behaviour, which explains his demand for a good and the factors determining it. Individual's demand for a product depends upon price of the product, income of the individual, the prices of related goods.

It can be put in the following functional form: Dx= f(Px, I, Py, P2, T etc.)

Where, Dx stands for the demand of good X, Px for price of good X, I for individual's income, Py Pz for the prices of related goods and T for tastes and preferences of the individual. But among these determinants of demand, economists single out price of the good in question as the most important factor governing the demand for it. Indeed, the function of a theory of consumer's behaviour is to establish a relationship between quantity demanded of a good and its own price and to provide an explanation for it.

Recently, cardinal utility approach to the theory of demand has been subjected to severe criticisms and as a result some alternative theories, namely, Indifference Curve Analysis, Samuelson's Revealed Preference Theory, and Hicks' Logical Weak Ordering Theory have been propounded.

6.3 ASSUMPTIONS OF CARDINAL UTILITY ANALYSIS

Cardinal utility analysis of demand is based upon certain important assumptions. Before explaining how cardinal utility analysis explains consumer's equilibrium in regard to the demand for a good, it is essential to describe the basic assumptions

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on which the whole utility analysis rests. As we shall see later, cardinal utility analysis has been criticized because of its unrealistic assumptions.

The basic assumptions or premises of cardinal utility analysis are as follows:

The Cardinal Measurability of Utility

The exponents of cardinal utility analysis regard utility to be a cardinal concept. In other words, they hold that utility is a measurable and quantifiable entity. According to them, a person can express utility or satisfaction he derives from the goods in the quantitative cardinal terms. Thus, a person can say that he derives utility equal to 10 units from the consumption of a unit of good A, and 20 units from the consumption of a unit of good B.

Moreover, the cardinal measurement of utility implies that a person can compare utilities derived from goods in respect of size, that is, how much one level of utility is greater than another. A person can say that the utility he gets from the consumption of one unit of good B is double the utility he obtains from the consumption of one unit of good A.

According to Marshall, marginal utility is actually measurable in terms of money. Money represents the general purchasing power and it can therefore be regarded as a command over alternative utility-yielding goods. Marshall argues that the amount of money which a person is prepared to pay for a unit of a good rather than go without it is a measure of the utility he derives from that good.

Thus, according to him, money is the measuring rod of utility Some economists belonging to the cardinalist school measure utility in imaginary units called "utils" They assume that a consumer is capable of saying that one apple provides him utility equal to 4 utils. Further, on this ground, he can say that he gets twice as much utility from an apple as compared to an orange.

The Hypothesis of Independent Utilities

The second important tenet of the cardinal utility analysis is the hypothesis of independent utilities. On this hypothesis, the utility which a consumer derives from a good is the function of the quantity of that good and of that good only In other words, the utility which a consumer obtains from a good does not depend upon the quantity consumed of other goods; it depends upon the quantity purchased of that good alone.

On this assumption, then the total utility which a person gets from the whole collection of goods purchased by him is simply the total sum of the separate utilities of the goods. Thus, the cardinalist school regards utility as 'additive', that is, separate utilities of different goods can be added to obtain the total sum of the utilities of all goods purchased.

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Constancy of the Marginal Utility of Money

Another important assumption of the cardinal utility analysis is the constancy of the marginal utility of money. Thus, while the cardinal utility analysis assumes that marginal utilities of commodities diminish as more of them are purchased or consumed, but the marginal utility of money remains constant throughout when the individual is spending money on a good and due to which the amount of money with him varies. Daniel Bernoulli first of all introduced this assumption but later Marshall adopted this in his famous book "Principles of Economics'.

As stated above, Marshall measured marginal utilities in terms of money. But measurement of marginal utility of goods in terms of money is only possible if the marginal utility of money itself remains constant. It should be noted that the assumption of constant marginal utility of money is very crucial to the Marshallian analysis, because otherwise Marshall could not measure the marginal utilities of goods in terms of money. If money which is the unit of measurement itself varies as one is measuring with it, it cannot then yield correct measurement of the marginal utility of goods.

When price of a good falls and as a result the real income of the consumer rises, marginal utility of money to him will fall but Marshall ignored this and assumed that marginal utility of money did not change as a result of the change in price. Likewise, when price of a good rises the real income of the consumer will fall and his marginal utility of money will rise. But Marshall ignored this and assumed that marginal utility of money remains the same. Marshall defended this assumption on the ground that "his (the individual consumer's) expenditure on any one thing is only a small part of his whole expenditure."

Introspective Method

Another important assumption of the cardinal utility analysis is the use of introspective method in judging the behaviour of marginal utility. "Introspection is the ability of the observer to reconstruct events which go on in the mind of another person with the help of self-observation. This form of comprehension may be just guesswork or intuition or the result of long lasting experience."

Thus, the economists construct with the help of their own experience the trend of feeling which goes on in other men's mind. From his own response to certain forces and by experience and observation one gains understanding of the way other people's minds would work in similar situations. To sum up, in introspective method we attribute to another person what we know of our own mind. That is, by looking into ourselves we see inside the heads of other individuals.

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So the lw of diminishing marginal utility is based upon introspection. We know from our own mind that as we have more of a thing, the less utility we derive from an additional unit of it. We conclude from it that other individuals' mind will work in a similar fashion, that is, marginal utility to them of a good will diminish as they have more units of it.

With the above basic premises, the founders of cardinal utility analysis have developed two laws which occupy an important place in economic theory and have several applications and uses.

6.4 CHARACTERISTICS OF CARDINAL UTILITY ANALYSIS

1. **Rationality:** The consumer is assumed to the rational. He tries to maximize his total utility under the income constraint.
2. **Cardinal Utility:** The utility of each commodity is measurable. Utility is cardinal concept. The most convenient measure is money. Thus utility can be measured quantitatively in monetary units or cardinal units.
3. **Constant Marginal Utility of Money:** The utility derived from commodities are measured in terms of money. So, money is a unit of measurement in cardinal approach. Hence, marginal utility of money should be constant.
4. **Diminishing Marginal Utility:** If the stock of commodities increases with the consumer, each additional stock or unit of the commodity gives him less and less satisfaction. It means utility increases at a decreasing rate.
5. **Independent Utilities:** It means utility obtained from commodity X is not dependent on utility obtained from commodity Y. It does not affected by the consumption of other commodities.

6.5 LAW OF DIMINISHING MARGINAL UTILITY

An important tenet of cardinal utility analysis relates to the behaviour of marginal utility. This familiar behaviour of marginal utility has been stated in the Law of Diminishing Marginal Utility according to which marginal utility of a good diminishes as an individual consumes more units of a good. In other words, as a consumer takes more units of a good, the extra utility or satisfaction that he derives from an extra unit of the good goes on falling. It should be carefully noted that it is the marginal utility and not the total utility that declines with the increase in the consumption of a good. The law of diminishing marginal utility means that the total utility increases at a decreasing rate.

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Marshall who has been a famous exponent of the cardinal utility analysis has stated the law of diminishing marginal utility as follows:

"The additional benefit which a person derives from a given increase of his stock of a thing diminishes with every increase in the stock that he already has."

This law is based upon two important facts. First, while the total wants of a man are virtually unlimited, each single want is satiable. Therefore, as an individual consumes more and more units of a good, intensity of his want for the good goes on falling and a point is reached where the individual no longer wants any more units of the good. That is, when saturation point is reached, marginal utility of a good becomes zero. Zero marginal utility of a good implies that the individual has all that he wants of the good in question.

The second fact on which the law of diminishing marginal utility is based is that the different goods are not perfect substitutes for each other in the satisfaction of various wants. When an individual consumes more and more units of a good, the intensity of his particular want for the good diminishes but if the units of that good could be devoted to the satisfaction of other wants and yielded as much satisfaction as they did initially in the satisfaction of the first want, marginal utility of the good would not have diminished.

It is obvious from above that the law of diminishing marginal utility describes a familiar and fundamental tendency of human nature. This law has been arrived at by introspection and by observing how consumers behave.

Illustration of the Law of Diminishing Marginal Utility:

Consider Table 6.1 where we have presented the total and marginal utilities derived by a person from cups of tea consumed per day. When one cup of tea is taken per day the total utility derived by the person is 12 utils. And because this is the first cup its marginal utility is also 12 utils with the consumption of 2nd cup per day, the total utility rises to 22 utils but marginal utility falls to 10. It will be seen from the table that as the consumption of tea increases to six cups per day, marginal utility from the additional cup goes on diminishing (i.e. the total utility goes on increasing at a diminishing rate).

However, when the cups of tea consumed per day increases to seven, then instead of giving positive marginal utility, the seventh cup gives negative marginal utility equal to – 2 utils. This is because too many cups of tea consumed per day (say more than six for a particular individual) may cause acidity and gas trouble. Thus, the extra cups of tea beyond six to the individual in question gives him disutility rather than positive satisfaction.

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Table 6.1: Diminishing Marginal Utility

Cups of Tea Consumed per day (Q)	Total Utility (utils) TU	Marginals Utility (utils) $\frac{\Delta TU}{\Delta Q}$
1	12	12
2	22	10
3	30	8
4	36	6
5	40	4
6	41	1
7	39	–2
8	34	–5

Figure 6.1 illustrates the total utility and the marginal utility curves. The total utility curve drawn in Figure 6.1 is based upon three assumptions. First, as the quantity consumed per period by a consumer increases his total utility increases but at a decreasing rate. This implies that as the consumption per period of a commodity by the consumer increases, marginal utility diminishes as shown in the lower panel of Figure 6.1.

Secondly, as will be observed from the figure when the rate of consumption of a commodity per period increases to Q_4, the total utility of the consumer reaches its maximum level.

Therefore, the quantity Q_4 of the commodity is called satiation quantity or satiety point. Thirdly, the increase in the quantity consumed of the good per period by the consumer beyond the satiation point has an adverse effect on his total utility that is, his total utility declines if more than Q_4 quantity of the good is consumed.

This means beyond Q_4 marginal utility of the commodity for the consumer becomes negative ads will be seen from the lower panel of Figure 6.1 beyond the satiation point Q_4 marginal utility curve MU goes below the X-axis indicating it becomes negative beyond quantity Q_4 per period of the commodity consumed.

It is important to understand how we have drawn the marginal utility curve. As stated above marginal utility is the increase in total utility of the consumer caused by the consumption of an additional unit of the commodity per period. We can directly find out the marginal utility of the successive units of the commodity consumed by measuring the additional utility which a consumer obtains from successive units of the commodity and plotting them against their respective quantities.

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However, in terms of calculus, marginal utility of a commodity X is the slope of the total utility function $U = f(Q_x)$. Thus, we can derive the marginal utility curve by measuring the slope at various points of the total utility curve TU in the upper panel of Figure 6.1 by drawing tangents at them. For instance, at the quantity Q_1 marginal utility (i.e. $dU/dQ = MU_1$) is found out by drawing tangent at point A and measuring its slope which is then plotted against quantity in the lower panel of Figure 6.1. In the lower panel we measure marginal utility of the commodity on the Y-axis. Likewise, at quantity Q_2 marginal utility of the commodity has been obtained by measuring slope of the total utility curve TU at point B and plotting it in the lower panel against the quantity Q_2.

It will be seen from the figure that at Q_4 of the commodity consumed, the total utility reaches at the maximum level T. Therefore, at quantity Q_4 the slope of the total utility curve is zero at this point. Beyond the quantity Q_4 the total utility declines and marginal utility becomes negative. Thus, quantity Q_4 of the commodity represents the satiation quantity.

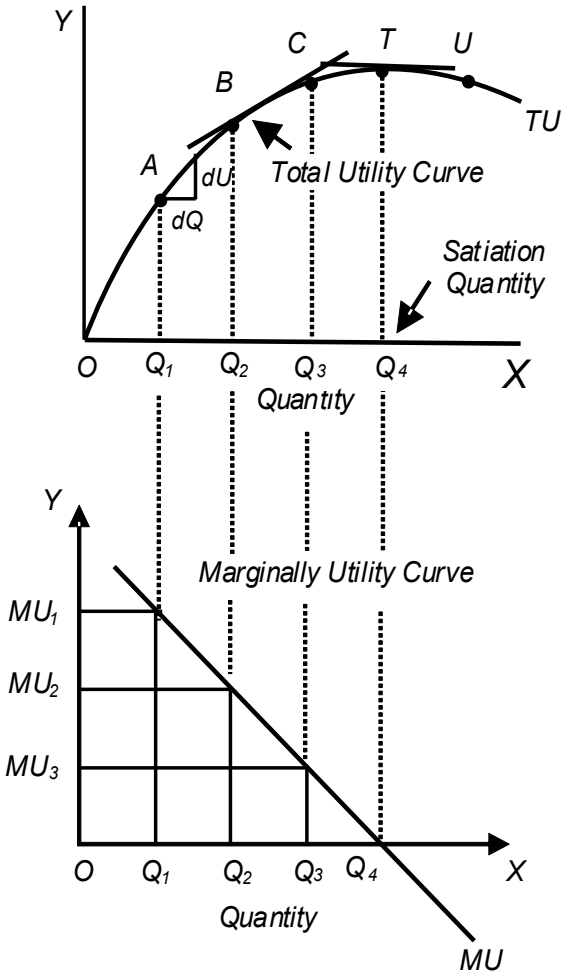

Fig. 6.1: Total Utility and Marginal Utility

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Another important relationship between total utility and marginal utility is worth noting. At any quantity of a commodity consumed the total utility is the sum of the marginal utilities. For example, if marginal utility of the first, second, and third units of the commodity consumed are 15, 12, and 8 units, the total utility obtained from these three units of consumption of the commodity must equals 35 units (15 + 12 + 8 = 35).

Similarly, in terms of graphs of total utility and marginal utility depicted in Figure 6.1 the total utility of the quantity Q_4 of the commodity consumed is the sum of the marginal utilities of the units of commodity up to point Q_4. That is, the entire area under the marginal utility curve MU in lower panel up to the point Q_4 is the sum of marginal utilities which must be equal to the total utility Q_4T in the upper panel.

Marginal Utility and Consumer's Tastes and Preferences:

The utility people derive from consuming a particular commodity depends on their tastes and preferences. Some consumers like oranges, others prefer apples and still others prefer bananas for consumption. Therefore, the utility which different individuals get from these various fruits depends on their tastes and preferences.

An individual would have different marginal utility curves for different commodities depending on his tastes and preferences. Thus, utility which people derive from various goods reflect their tastes and preferences for them. However, it is worth noting that we cannot compare utility across consumers. Each consumer has a unique subjective utility scale. In the context of cardinal utility analysis, a change in consumer's tastes and preferences means a shift in his one or more marginal utility curves.

However, it may be noted that a consumer's tastes and preferences do not frequently change, as these are determined by his habits. Of course, tastes and preferences can change occasionally. Therefore, in economic theory we generally assume that tastes or preferences are given and relatively stable.

Significance of Diminishing Marginal Utility:

The significance of the diminishing marginal utility of a good for the theory of demand is that it helps us to show that the quantity demanded of a good increase as its price falls and vice versa. Thus, it is because of the diminishing marginal utility that the demand curve slopes downward. If properly understood the law of diminishing marginal utility applies to all objects of desire including money.

But it is worth mentioning that marginal utility of money is generally never zero or negative. Money represents purchasing power over all other goods, that is, a man can satisfy all his material wants if he possesses enough money. Since man's total wants are practically unlimited, therefore, the marginal utility of money to him never falls to zero.

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The marginal utility analysis has a good number of uses and applications in both economic theory and policy. The concept of marginal utility is of crucial significance in explaining determination of the prices of commodities. The discovery of the concept of marginal utility has helped us to explain the paradox of value which troubled Adam Smith in "The Wealth of Nations."

Adam Smith was greatly surprised to know why water which is so very essential and useful to life has such a low price (indeed no price), while diamonds which are quite unnecessary, have such a high price. He could not resolve this water-diamond paradox. But modern economists can solve it with the aid of the concept of marginal utility.

According to the modern economists, the total utility of a commodity does not determine the price of a commodity and it is the marginal utility which is crucially important determinant of price. Now, the water is available in abundant quantities so that its relative marginal utility is very low or even zero. Therefore, its price is low or zero. On the other hand, the diamonds are scarce and therefore their relative marginal utility is quite high and this is the reason why their prices are high.

Prof. Samuelson explains this paradox of value in the following words:

The more there is of a commodity, the less the relative desirability of its last little unit becomes, even though its total usefulness grows as we get more of the commodity. So, it is obvious why a large amount of water has a low price or why air is actually a free good despite its vast usefulness. The many later units pull down the market value of all units.

Besides, the Marshallian concept of consumer's surplus is based on the principle of diminishing marginal utility.

6.6 CONSUMER'S EQUILIBRIUM

Principle of equi-marginal utility occupies an important place in cardinal utility analysis. It is through this principle that consumer's equilibrium is explained. A consumer has a given income which he has to spend on various goods he wants. Now, the question is how he would allocate his given money income among various goods, that is to say, what would be his equilibrium position in respect of the purchases of the various goods. It may be mentioned here that consumer is assumed to be 'rational', that is, he carefully calculates utilities and substitutes one good for another so as to maximise his utility or satisfaction.

A consumer is in equilibrium when given his tastes, and price of the two goods, he spends a given money income on the purchase of two goods in such a way as to get the maximum satisfaction, According to Koulsayiannis, "The consumer is in equilibrium when he maximises his utility, given his income and market prices."

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Assumptions

The indifference curve analysis of consumer's equilibrium is based on the following assumptions:

(1) The consumer's indifference map for the two goods X and Y is based on his scale of preferences for them which does not change at all in this analysis.

(2) His money income is given and constant. It is ₹ 10 which he spends on the two goods in question.

(3) Prices of the two goods X and Y are also given and constant. X is priced at ₹ 2 per unit and Y at ₹ 1 per unit.

(4) The goods X and Y are homogeneous and divisible.

(5) There is no change in the tastes and habits of the consumer throughout the analysis

(6) There is perfect competition in the market from where he makes his purchases of the two goods.

(7) The consumer is rational and thus maximises his satisfaction from the purchase of the two goods.

Conditions

There are three conditions for consumer's equilibrium:

(1) The Budget line should be Tangent to the Indifference Curve. Given these assumptions, the consumer can buy 5 units of X by spending the entire sum of ₹ 10 on good X or on 10 units of Y. Table 6.2 illustrates some of the possible combinations on which ₹ 10 can be allocated.

Table 6.2: Expenditure Plan

Combination	Good X (units)	Good Y (units)
Q	5	0
N	4	2
T	3	4
S	2½	5
K	1½	7
R	1	8
P	0	10

Fig. shows these seven possible combinations indicated by points P, R, K, S, T, N and Q. The line PQ shows combinations of goods X and Y, given their prices, when he spends his income on them. This is because, algebraically I = Px X + Py,

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where I represents the consumer's income, Px and Py the prices of goods X and Y, respectively.

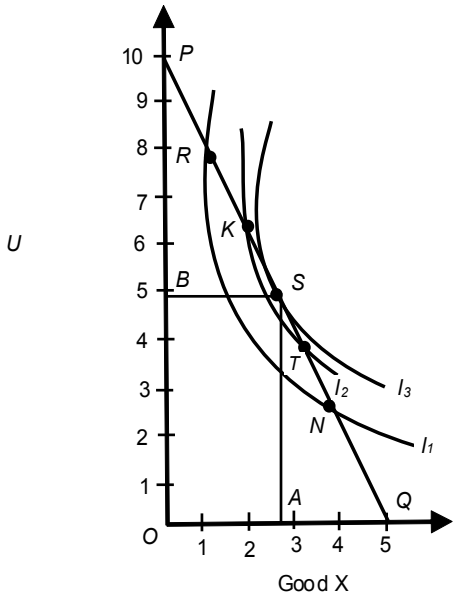

Fig. 6.2

This budget equation is the equation of the line connecting the points Q and P, where Q = I /Px and P = I/Py. Thus PQ is the budget line.

On this budget line, the consumer can have any combination, out of the possible seven combinations P, R, K, S, T, N, or Q. Combination P or Q is out of question for in either case he would have only Y or only X. He would not take combination R or N on a lower indifferences curve I1 because combination K or T is also available to him on a higher indifference curve l2.

But there is another combination S which is on the highest indifference curve l3 on this budget line PQ. Since all other combinations lie on lower indifference curves, they represent lower levels of satisfaction than combination S which is the consumer's equilibrium point. We may thus enumerate the conditions of consumer's equilibrium.

The consumer is in equilibrium when his budget line is tangent to an indifference curve. PQ is tangent to curve I3 at S. At point S, he is also satisfying the budget equation I (₹ 10) = 04. Px + OB.Py

= 2½ units of X. ₹ 2+5 units of Y. ₹ 1

= ₹ 5 + ₹ 5

= ₹ 10

(2) At the point of Equilibrium the Slope of the Indifference Curve and of the Budget Line should be the Same. At S, the slope of the indifference curve is, in

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fact, the marginal rate of substitution of X for Y and on the budget line it is the ratio of the price of X to the price of Y. The slope of the budget line

PQ = I /Ð ÷ / I/Px

= I/PY x PX/I = Px/Py

And the slope of I3, curve is MRSxy.

Thus MRSxy = Px/Py at point S in Fig. 6.2.

This is a necessary but not a sufficient condition tor consumer's equilibrium.

(3) Indifference curve should be Convex to the Origin. Therefore, the last conditions are that at the point of equilibrium, the marginal rate of substitution of X for Y must be falling for equilibrium to be stable. It means that the indifference curve must be convex to the origin at the equilibrium point. If the indifference curve is concave to the origin at the point R, the MRSxy increases.

The consumer is at the minimum point of satisfaction at R on the concave I1 curve in Fig. 6.3. A movement away from R toward either axis along PQ would lead him to higher indifference curve. Point S on the curve I1 is, in fact, the point of maximum satisfaction and of stable equilibrium.

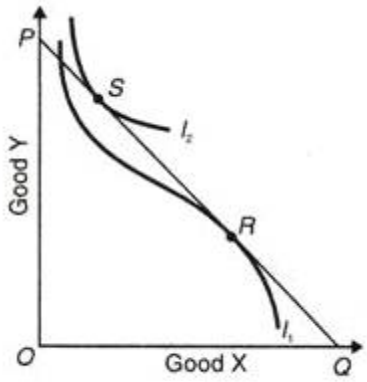

Fig. 6.3

Thus for equilibrium to be stable at any point on an indifference curve, the marginal rate of substitution between any two goods must be diminishing and be equal to their price ratio i.e. MRSXV= Px/Py Therefore, the indifference curve must be convex to the origin at the point of tangency with the budget line.

6.7 LAW OF EQUI MARGINAL UTILITY

The law of equi marginal utility was presented in 19th century by an Australian economists H. H. Gossen. It is also known as law of maximum satisfaction or law of substitution or Gossen's second law. A consumer has number of wants. He tries to spend limited income on different things in such a way that marginal utility of all

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things is equal. When he buys several things with given money income he equalizes marginal utilities of all such things. The law of equi marginal utility is an extension of the law of diminishing marginal utility. The consumer can get maximum utility by allocating income among commodities in such a way that last dollar spent on each item provides the same marginal utility.

Definition

"A person can get maximum utility with his given income when it is spent on different commodities in such a way that the marginal utility of money spent on each item is equal".

It is clear that consumer can get maximum utility from the expenditure of his limited income. He should purchase such amount of each commodity that the last unit of money spend on each item provides same marginal utility.

6.8 ASSUMPTIONS OF THE LAW OF EQUI-MARGINAL UTILITY

(a) There is no change in the prices of the goods.

(b) The income of consumer is fixed.

(c) The marginal utility of money is constant.

(d) Consumer has perfect knowledge of utility obtained from goods.

(e) Consumer is normal person so he tries to seek maximum satisfaction.

(f) The utility is measurable in cardinal terms.

(g) Consumer has many wants.

(h) The goods have substitutes.

6.9 LIMITATIONS OF THE LAW OF EQUI-MARGINAL UTILITY

Like other laws of economics, law of equi-marginal utility is also subject to various limitations. This law, like other laws of economics, brings out an important tendency among the people. This is not necessary that all people exactly follow this law in the allocation of their money income and therefore all may not obtain maximum satisfaction.

This is due to the following reasons:

(1) For applying this law of equi-marginal utility in the real life, consumer must weigh in his mind the marginal utilities of different commodities. For this he has to calculate and compare the marginal utilities obtained from different commodities.

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But it has been pointed out that the ordinary consumers are not so rational and calculating. Consumers are generally governed by habits and customs. Because of their habits and customs they spend particular amounts of money on different commodities, regardless of whether the particular allocation maximises their satisfaction or not.

(2) For applying this law in actual life and equate the marginal utility of the last rupee spent on different commodities, the consumers must be able to measure the marginal utilities of different commodities in cardinal terms. However, this is easier said than done. It has been said that it is not possible for the consumer to measure utility cardinally.

Being a state of psychological feeling and also there being no objective units with which to measure utility, it is cardinally immeasurable. It is because of the immeasurability of utility in cardinal terms that the consumer's behaviour has beenexplained with the help of ordinal utility by J.R. Hicks and R.G.D. Allen.

(3) Another limitation of the law of equi-marginal utility is found in case of indivisibility of certain goods. Goods are often available in large indivisible units. Because the goods are indivisible, it is not possible to equate the marginal utility of money spent on them. For instance, in allocating money between the purchase of car and foodgrains, marginal utilities of the last rupee spent on them cannot be equated.

An ordinary car costs about Rs. 300,000 and is indivisible, whereas foodgrains are divisible and money spent on them can be easily varied. Therefore, the marginal utility of rupee obtained from cars cannot be equalised with that obtained from foodgrains. Thus, indivisibility of certain goods is a great obstacle in the way of equalisation of marginal utility of a rupee from different commodities.

6.10 CRITICAL EVALUATION OF MARSHALL'S CARDINAL UTILITY ANALYSIS:

Cardinal utility analysis of demand which we have studied above has been criticised on various grounds.

The following shortcomings and drawbacks of cardinal utility analysis have been pointed out:

(1) Cardinal Measurability of Utility is unrealistic

Cardinal utility analysis of demand is based on the assumption that utility can be measured in absolute, objective and quantitative terms. In other words, it is assumed in this analysis that utility is cardinally measurable. According to this, how much utility a consumer obtains from goods can be expressed or stated in cardinal

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numbers such as 1, 2, 3, 4 and so forth. But in actual practice utility cannot be measured in such quantitative or cardinal terms.

Since utility is a psychic feeling and a subjective thing, it cannot be measured in quantitative terms. In real life, consumers are only able to compare the satisfactions derived from various goods or various combinations of the goods. In other words, in the real life consumer can state only whether a good or a combination of goods gives him more or less, or equal satisfaction as compared to another. Thus, economists like J.R. Hicks are of the opinion that the assumption of cardinal measurability of utility is unrealistic and therefore it should be given up.

(2) Hypothesis of Independent Utilities is Wrong

Utility analysis also assumes that utilities derived from various goods are independent. This means that the utility which a consumer derives from a good is the function of the quantity of that good and of that good alone. In other words, the assumption of independent utilities implies that the utility which a consumer obtains from a good does not depend upon the quantity consumed of other goods; it depends upon the quantity purchased of that good alone.

On this assumption, the total utility which a person gets from the whole collection of goods purchased by him is simply the total sum of the separate utilities of various goods. In other words, utility functions are additive.

Neo-classical economists such as Jevons, Menger, Walras and Marshall considered that utility functions were additive. But in the real life this is not so. In actual life the utility or satisfaction derived from a good depends upon the availability of some other goods which may be either substitutes for or complementary with each other. For example, the utility derived from a pen depends upon whether ink is available or not.

On the contrary, if you have only tea, then the utility derived from it would be greater but if along with tea you also have the coffee, then the utility of tea to you would be comparatively less. Whereas pen and ink are complements with each other, tea and coffee are substitutes for each other.

It is thus clear that various goods are related to each other in the sense that some are complements with each other and some are substitutes for each other. As a result of this, the utilities derived from various goods are interdependent, that is, they depend upon each other. Therefore, the utility obtained from a good is not the function of its quantity alone but also depends upon the existence or consumption of other related goods (complements or substitutes).

It is thus evident that the assumption of the independence of utilities by Marshall and other supporters of marginal utility analysis is a great defect and shortcoming

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of their analysis. As we shall see below, the hypothesis of independent utilities along with the assumption of constant marginal utility of money reduces the validity of Marshallian demand theorem to the one- commodity model only.

(3) Assumption of Constant Marginal Utility of Money is not Valid

An important assumption of cardinal utility analysis is that when a consumer spends varying amount on a good or various goods or when the price of a good changes, marginal utility of money remains unchanged. But in actual practice this is not correct. As a consumer spends his money income on the goods, money income left with him declines.

With the decline in money income of the consumer as a result of increase in his expenditure on goods, the marginal utility of money to him rises. Further, when price of a commodity changes, the real income of the consumer also changes. With this change in real income, marginal utility of money will change and this would have an effect on the demand for the good in question, even though the total money income available with the consumer remains the same.

But utility analysis ignores all this and does not take cognizance of the changes in real income and its effect on demand for goods following the change in price of a good. As we shall see below, it is because of the assumption of constant marginal utility of money that Marshall ignored the income effect of the price change which prevented Marshall from understanding the composite character of the price effect (that is, price effect is the sum of substitution effect and income effect).

Moreover, as we shall see later, the assumption of constant marginal utility of money together with the hypothesis of independent utilities renders the Marshall's demand theorem to be valid in case of one commodity. Further, it is because of the constant marginal utility of money and therefore the neglect of the income effect by Marshall that he could not explain Giffen Paradox.

According to Marshall, utility from a good can be measured in terms of money (that is, how much money a consumer is prepared to sacrifice for a good). But, to be able to measure utility in terms of money marginal utility of money itself should remain constant. Therefore, assumption of constant marginal utility of money is very crucial to Marshallian demand analysis. On the basis of constant marginal utility of money Marshall could assert that "utility is not only measurable in principle" but also "measurable in fact".

But, as we shall see below, in case a consumer has to spread his money income on a number of goods, there is a necessity for revision of marginal utility of money with every change in price of a good. In other words, in a multi-commodity model marginal utility of money does not remain invariant or constant.

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Now, when it is realised that marginal utility of money does not remain constant, then Marshall's belief that utility is 'measurable in fact' in terms of money does not hold good. However, if in marginal utility analysis, utility is conceived only to be 'measurable in principle' and not in fact, then it practically gives up cardinal measurement of utility and comes near to the ordinal measurement of utility.

(4) Marshallian Demand Therem cannot Genuinely be Derived Except in a one Commodity Case

J.R. Hicks and Tapas Majumdar have criticised Marshallian utility analysis on the ground that "Marshallian demand theorem cannot genuinely be derived from the marginal utility hypothesis except in a one-commodity model without contradicting the assumption of constant marginal utility of money. In other words, Marshall's demand theorem and constant marginal utility of money are incompatible except in a one commodity case. As a result, Marshall's demand theorem cannot be validity derived in the case when a consumer spends his money on more than one good.

In order to know the truth of this assertion consider a consumer who has a given amount of money income to spend on some goods with given prices? According to utility analysis, the consumer will be in equilibrium when he is spending money on goods in such a way that the marginal utility of each good is proportional to its price.

(5) Cardinal Utility Analysis does not Split up the Price Affect into Substitution and Income Effects

The third shortcoming of the cardinal utility analysis is that it does not distinguish between the income effect and the substitutional effect of the price change.

We know that when the price of a good falls, the consumer becomes better off than before, that is, a fall in price of a good brings about an increase in the real income of the consumer. In other words, if with the fall in price the consumer purchases the same quantity of the good as before, then he would be left with some income.

With this income he would be in a position to purchase more of this good as well as other goods. This is the income effect of the fall in price on the quantity demanded of a good. Besides, when the price of a good falls, it becomes relatively cheaper than other goods and as a result the consumer is induced to substitute that good for others. This results is increase in quantity demanded of that good. This is the substitution effect of the price change on the quantity demanded of the good.

With the fall in price of a good, the quantity demanded of it rises because of income effect and substitution effect. But cardinal utility analysis does not make clear the distinction between the income and the substitution effects of the price

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change. In fact, Marshall and other exponents of marginal utility analysis ignored income effect of the price change by assuming the constancy of marginal utility of money. Thus, according to Tapas Majumdar, "the assumption of constant marginal utility of money obscured Marshall's insight into the truly composite character of the unduly simplified price-demand relationship".

They explained the changes in demand as a result of change in the price of a good on the basis of substitution effect on it. Thus, marginal utility analysis does not tell us about how much quantity demanded increases due to income effect and how much due to substitution effect as a result of the fall in price of a good J R Hicks rightly remarks, "that distinction between income effect and substitution effect of a price change is accordingly left by the cardinal theory as an empty box which is crying out to be filled. In the same way, Tapas Majumdar says, "The efficiency and precision with which the Hicks-Allen approach can distinguish between the income and subsitutuion effects of a price change really leaves the cardinal argument in a very poor state indeed.

(6) Marshall could not explain Giffen Paradox

By not visualizing the price effect as a combination of substitution and income effects and ignoring the income effect of the price change, Marshall could not explain the Giffen Paradox. He treated it merely as an exception to his law of demand. In contrast to it, indifference curve analysis has been able to explain satisfactorily the Giffen good case.

According to indifference curve analysis, in case of a Giffen Paradox or the Giffen good negative income effect of the price change is more powerful than substitution effect so that when the price of a Giffen good falls the negative income effect outweighs the substitution effect with the result that quantity demanded of it falls.

Thus in case of a Giffen good, quantity demanded varies directly with the price and the Marshall's law of demand does not hold good. It is because of the constant marginal utility of money and therefore the neglect of the income effect of price change that Marshall could not explain why the quantity demanded of the Giffen good falls when its price falls and rises when its price rises. This is a serious lacuna in Marshalllian's utility analysis of demand.

(7) Marginal Utility Analysis Assumes too much and Explains too Little

Marginal utility analysis is also criticised on the ground that it takes more assumptions and also more severe ones than those of ordinal utility analysis of indifference curve technique Marginal utility analysis assumes, among others, that utility is cardinally measurable and also that marginal utility of money remains constant.

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Hicks-Allen's indifference curve analysis does not take these assumptions and even then it is not only able to deduce all the theorems which cardinal utility analysis can but also deduces a more general theorem of demand.

In other words, indifference curve analysis explains not only that much as cardinal utility analysis does but even goes further and that too with fewer and less severe assumptions. Taking less severe assumption of ordinal utility and without assuming constant marginal utility of money, analysis is able to arrive at the condition of consumer's equilibrium, namely, equality o marginal rate of substitution (MRS) with the price ratio between the goods, which is similar to the proportionality rule of Marshall. Further, since indifference curve analysis does not assume constant marginal utility of money, it is able to derive a valid demand theorem in a more than one commodity case.

In other words indifference curve analysis dearly explains why in case o Giffen goods quality demanded increases with the rise in price and decreases with the fall in price. Indifference curve analysis explains even the case of ordinary inferior goods (other than Giffen goods) in a more analytical Inner.

It may be noted that even if the valid demand f derived for the Marshallian hypothesis, it would still be rejected because "better hypothesis" of indifference preference analysis was available which can enunciate more general demand theorem (covering the case of Giffen goods) with fewer, less severe and more realistic assumptions.

Because of the above drawbacks, cardinal utility analysis has been given up in modern economic theory and demand is analysed with new approaches to demand theory.

6.11 DERIVATION OF DEMAND CURVE

Marshall derived the demand curves for goods from their utility functions. It should be further noted that in his utility analysis of demand Marshall assumed the utility functions of different goods to be independent of each other.

In other words, Marshallian technique of deriving demand curves for the goods from their utility functions rests on the hypothesis of additive utility functions, that is, utility function of each good consumed by the consumer does not depend on the quantity consumed of any other good.

In case of independent utilities or additive utility functions, the relations of substitution and complementarity between goods are ruled out. Further, in deriving demand curve or law of demand Marshall assumes the marginal utility of money expenditure (MU_m) to remain constant.

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We now proceed to derive demand curve from the cardinal utility analysis. Consider the case of a consumer who has a certain given income to spend on a number of goods. According to the law of equi-marginal utility, the consumer is in equilibrium in regard to his purchases of various goods when marginal utilities of the goods are proportional to their prices.

Thus, the consumer is in equi-librium when he is buying the quantities of the two goods in such a way that satisfies the following proportionality rule:

$MU_x/P_x = MU_y/P_y = MU_m$

where MU_m stands for marginal utility of money income.

With a certain given income for money expenditure the consumer would have a certain marginal utility of money (MU_m) in general. In order to attain the equilibrium position, according to the above proportionality rule, the consumer will equalise his marginal utility of money (expenditure) with the ratio of the marginal utility and the price of each commodity he buys.

It follows therefore that a rational consumer will equalise the marginal utility of money (MU_m) with MU_x/P_x of good X, with MU_y/P_y of good Y and so on. Given Ceteris Paribus assumption, suppose the price of good X falls. With the fall in the price of good X, the price of good Y. consumer's income and tastes remaining unchanged, the equality of the MU_x/P_x with MU_y/P_y and MU_m in general would be disturbed.

With the lower price than before MU_x/P_x will be greater than MU_y/P_y or MU_m (It is assumed of course that the marginal utility of money does not change as a result of the change in the price of one good). Then in order to restore the equality, marginal utility of X or MU_m must be reduced.

And the marginal utility of X or MU_x can be reduced only by the consumer buying more of the good X. It is thus clear from the proportionality rule that as the price of a good falls, its quantity demanded will rise, other things remaining the same. This will make the demand curve downward sloping. How the quantity purchased of good in-creases with the fall in its price and also how the demand curve is derived is il-lustrated in Fig. 6.4.

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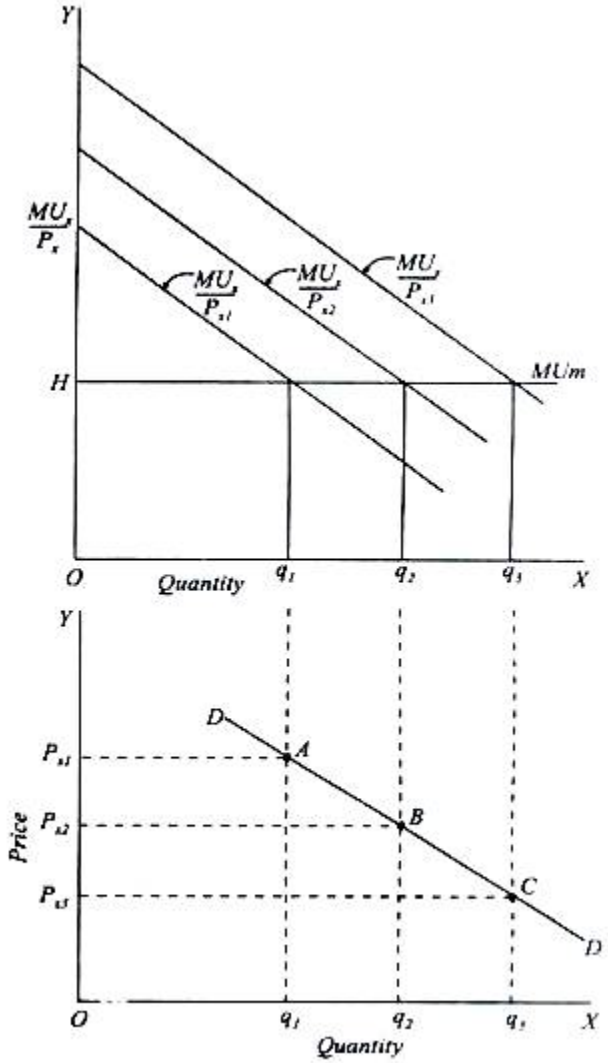

Fig. 6.4: Derivation of Demand Curve

In the upper portion of the Fig. 6.4, on the Y-axis MU_x/P_x is shown and on the X-axis is the quantity demanded of good X is shown. Given a certain in-come of the consumer, the marginal utility of money is equal to OH. The consumer is buying Oq_1 of good X when the price is Px_1 since at the quantity Oq_1 of X, the marginal utility of money OH is equal to MU_x/P_{x1}. Now, when price of good X falls, to Px_2 the curve will shift upward to the new position MU_x/P_{x2}. In order to equate marginal utility of money (OH) with the new MU_x/P_{x2} the consumer increases the quantity de-manded to Oq_2.

Thus, with the fall in price of good X to Px_2, the consumer buys more of it. It should be noted that no account is taken of the increase in real income of the consumer as a result of fall in price of good X. This is be-cause if the change in real income is taken into account then the marginal utility of money will also change and this would have an effect on the purchases of goods.

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Marginal utility of money can remain constant in two cases. Firstly, when the elasticity of marginal utility curve (price elasticity of demand) is unity so that even with increase in the purchase of a commod-ity following the fall in price, the money expenditure made on it remains the same.

Second, mar-ginal utility of money will remain approximately constant for small changes in price of unimportant goods, that is, goods which account for negligible part of consumer's budget. In case of these unimportant goods increase in real income following the fall in price is negligible and therefore can be ignored.

At the bottom of Figure 6.4 the demand curve for X is derived. In this lower diagram, price is measured the on X-axis. As in the upper portion, the X-axis represents quantity. When the price of good X is Px_1, the relevant curve of Marginal Utility/Price is MU_x/P_{x1} which is shown in the upper portion.

With MU_x/P_{x1} as explained earlier, he boys Oq_1 of good X. Now, in the lower portion this quantity Oq_1 is directly shown to be demanded at the price. When price of X falls to the curve of Marginal Utility/Price shifts upward to the new position MU_x/P_{x2}. With $MU_x/P_{x2}$the consumer buys Oq_2 of X.

This quantity Oq_2 is directly shown to be demanded at price Px_2 in the lower portion. Similarly, by varying the price further we can know the quantity demanded at other prices. Thus, by joining points A, B and C we obtain the demand curve DD. The demand curve DD slopes downward which shows that as the price of a good falls, its quantity purchased rises.

6.12 DRAWBACK OF CARDINAL APPROACH

The cardinal utility theory has three basic limitations as follows:

1. Utility cannot be cardinally measured. Hence, the assumption that utility derived from the consumption of various commodities can be measured and expressed in quantitative terms is very unrealistic.
2. As income increases the marginal utility of money changes. Hence the assumption of constant marginal utility of money is not realistic.
3. The law of diminishing marginal utility is a psychological law, which cannot be empirically established and has to be taken for granted.
4. Cardinal utility analysis attempts to quantify utility using cardinal numbers. Cardinal utility assumes that a single utility is measurable in its own right. This contrasts with ordinal utility, which holds that utility is comparable on a scale.

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5. Cardinal utility attempts to perform calculations and determine utility indices. There is limitation to this approach found in the feasibility of assigning numerical value to a single utility.
6. A utility with a value of four is not necessarily twice as good as a utility with a value of two; the higher value simply means that it is better. Utility is also not additive; two utilities, both with values of three, do not combine to create a utility value of six.

6.13 SUMMARY

Cardinal utility theory is based on the cardinal measurement of utility which assumes that utility is measurable and additive. This theory was developed by neo-classical economists like Marshall, Pigou, Robertson etc. It is expressed as a quantity measured in hypothetical units which called utils. If a consumer imagines that one mango has 8 utils and an apple 4 utils, it implies that the utility of mango is twice than of an apple.

Cardinal utility theory is the oldest theory of demand which provides an explanation of consumer's demand for a product and derives the law of demand which establishes an inverse relationship between price and quantity demanded of a product.

The price of a product depends upon the demand for and the supply of it. In this part of the book we are concerned with the theory of consumer's behaviour, which explains his demand for a good and the factors determining it. Individual's demand for a product depends upon price of the product, income of the individual, the prices of related goods.

Cardinal utility analysis of demand is based upon certain important assumptions. Before explaining how cardinal utility analysis explains consumer's equilibrium in regard to the demand for a good, it is essential to describe the basic assumptions on which the whole utility analysis rests. As we shall see later, cardinal utility analysis has been criticized because of its unrealistic assumptions.

According to Marshall, marginal utility is actually measurable in terms of money. Money represents the general purchasing power and it can therefore be regarded as a command over alternative utility-yielding goods. Marshall argues that the amount of money which a person is prepared to pay for a unit of a good rather than go without it is a measure of the utility he derives from that good.

An important tenet of cardinal utility analysis relates to the behaviour of marginal utility. This familiar behaviour of marginal utility has been stated in the Law of Diminishing Marginal Utility according to which marginal utility of a good diminishes as an individual consumes more units of a good. In other words, as a consumer

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takes more units of a good, the extra utility or satisfaction that he derives from an extra unit of the good goes on falling. It should be carefully noted that it is the marginal utility and not the total utility that declines with the increase in the consumption of a good

The utility people derive from consuming a particular commodity depends on their tastes and preferences. Some consumers like oranges, others prefer apples and still others prefer bananas for consumption. Therefore, the utility which different individuals get from these various fruits depends on their tastes and preferences.

An individual would have different marginal utility curves for different commodities depending on his tastes and preferences. Thus, utility which people derive from various goods reflect their tastes and preferences for them. However, it is worth noting that we cannot compare utility across consumers. Each consumer has a unique subjective utility scale. In the context of cardinal utility analysis, a change in consumer's tastes and preferences means a shift in his one or more marginal utility curves.

Principle of equi-marginal utility occupies an important place in cardinal utility analysis. It is through this principle that consumer's equilibrium is explained. A consumer has a given income which he has to spend on various goods he wants. Now, the question is how he would allocate his given money income among various goods, that is to say, what would be his equilibrium position in respect of the purchases of the various goods. It may be mentioned here that consumer is assumed to be 'rational', that is, he carefully calculates utilities and substitutes one good for another so as to maximise his utility or satisfaction.

The law of equi-marginal utility states that the consumer will distribute his money income between the goods in such a way that the utility derived from the last rupee spent on each good is equal. In other words, consumer is in equilibrium position when marginal utility of money expenditure on each good is the same. Now, the marginal utility of money expenditure on a good is equal to the marginal utility of a good divided by the price of the good.

Cardinal utility analysis of demand is based on the assumption that utility can be measured in absolute, objective and quantitative terms. In other words, it is assumed in this analysis that utility is cardinally measurable. According to this, how much utility a consumer obtains from goods can be expressed or stated in cardinal numbers such as 1, 2, 3, 4 and so forth. But in actual practice utility cannot be measured in such quantitative or cardinal terms.

Utility analysis also assumes that utilities derived from various goods are independent. This means that the utility which a consumer derives from a good is the function of the quantity of that good and of that good alone. In other words, the

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assumption of independent utilities implies that the utility which a consumer obtains from a good does not depend upon the quantity consumed of other goods; it depends upon the quantity purchased of that good alone.

Neo-classical economists such as Jevons, Menger, Walras and Marshall considered that utility functions were additive. But in the real life this is not so. In actual life the utility or satisfaction derived from a good depends upon the availability of some other goods which may be either substitutes for or complementary with each other. For example, the utility derived from a pen depends upon whether ink is available or not.

Marginal utility analysis is also criticised on the ground that it takes more assumptions and also more severe ones than those of ordinal utility analysis of indifference curve technique Marginal utility analysis assumes, among others, that utility is cardinally measurable and also that marginal utility of money remains constant. Hicks-Allen's indifference curve analysis does not take these assumptions and even then it is not only able to deduce all the theorems which cardinal utility analysis can but also deduces a more general theorem of demand.

Marshall derived the demand curves for goods from their utility functions. It should be further noted that in his utility analysis of demand Marshall assumed the utility functions of different goods to be independent of each other.

6.14 GLOSSARY

(a) Cardinal Utility Theory: Cardinal utility theory is based on the cardinal measurement of utility which assumes that utility is measurable and additive. This theory was developed by neo-classical economists like Marshall, Pigou, Robertson etc. It is expressed as a quantity measured in hypothetical units which called utils. If a consumer imagines that one mango has 8 utils and an apple 4 utils, it implies that the utility of mango is twice than of an apple.

(b) Cardinal Utility Analysis: Cardinal utility analysis of demand is based upon certain important assumptions. Before explaining how cardinal utility analysis explains consumer's equilibrium in regard to the demand for a good, it is essential to describe the basic assumptions on which the whole utility analysis rests. As we shall see later, cardinal utility analysis has been criticized because of its unrealistic assumptions.

(c) The Law of Equi-marginal Utility: The law of equi-marginal utility states that the consumer will distribute his money income between the goods in such a way that the utility derived from the last rupee spent on each good is equal. In other words, consumer is in equilibrium position when marginal

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utility of money expenditure on each good is the same. Now, the marginal utility of money expenditure on a good is equal to the marginal utility of a good divided by the price of the good.

(d) Consumer's Equilibrium: Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure. The consumer has to pay a price for each unit of the commodity. So, he cannot buy or consume unlimited quantity.

6.15 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Cardinal Utility Theory?
2. What is Law of Diminishing Marginal Utility?
3. What is Consumer's Equilibrium?
4. What is Derivation of demand curve?

(B) Extended Answer Questions

1. Explain in details about Cardinal Utility Theory.
2. Discuss the Law of Diminishing Marginal Utility.
3. Explain Consumer's Equilibrium with Assumptions.
4. Explain in details about Derivation of Demand Curve.
5. Discuss Law of Equi Marginal Utility with assumptions.
6. Explain the drawback of Cardinal Approach.

(C) True or False

1. Ordinal utility theory is based on the cardinal measurement of utility which assumes that utility is measurable and additive.
2. Cardinal utility analysis of demand is based upon certain important assumptions. Before explaining how cardinal utility analysis explains consumer's equilibrium in regard to the demand for a good, it is essential to describe the basic assumptions on which the whole utility analysis rests.
3. The law of equi-marginal utility states that the consumer will distribute his money income between the goods in such a way that the utility derived from the last rupee spent on each good is equal.
4. Marshall derived the demand curves for goods from their utility functions.

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(D) Multiple Chocie Questions

1. What is based on the cardinal measurement of utility which assumes that utility is measurable and additive?
   (a) Cardinal utility theory
   (b) Ordinal utility theory
   (c) Law of equi-marginal utility
   (d) None of the above
2. What states the consumer will distribute his money income between the goods in such a way that the utility derived from the last rupee spent on each good is equal?
   (a) Cardinal utility theory
   (b) Ordinal utility theory
   (c) Law of equi-marginal utility
   (d) None of the above

(E) Fill in the Blanks

1. _____ is based on the cardinal measurement of utility which assumes that utility is measurable and additive.
2. _____ states that the consumer will distribute his money income between the goods in such a way that the utility derived from the last rupee spent on each good is equal.
3. _____ derived the demand curves for goods from their utility functions. It should be further noted that in his utility analysis of demand Marshall assumed the utility functions of different goods to be independent of each other.

6.16 KEY TO CHECK YOUR ANSWER

(C) 1. False, 2. True, 3. True, 4. True

(D) 1. (a), 2. (c)

(E) 1. Cardinal utility theory, 2. The law of equi-marginal utility, 3. Marshall

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13. Maria Moschandreas (2000). Business Economics, 2nd Edition, Thompson Learning. Description and chapter-preview links.
14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

6.18 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an

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above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

6.19 TERMINAL QUESTIONS

1. Why the utility people derive from consuming a particular commodity depends on their tastes and preferences? Discuss.

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2. Explain in details about Cardinal Utility Theory. Explain the drawback of Cardinal Approach.

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3. Discuss the Law of Diminishing Marginal Utility. Discuss Law of Equi Marginal Utility with assumptions.

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UNIT 7 ORDINAL UTILITY APPROACH

Structure:

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Objectives

After reading this unit you will be able to understand:

- Indifference curve analysis
- Diminishing marginal rate of substitution
- Properties of indifference curves
- Indifference curve map
- Budget line
- Consumer's equilibrium
- Effect of income and price change in consumer's equilibrium
- Income effect and substitution effect of inferior goods
- Complementarily and substitutability
- The extreme choices
- Derivation of individual demand curve
- Comparison of ordinal and cardinal utility approach
- Application of indifference curve analysis

7.1 INTRODUCTION

The Ordinal Utility approach is based on the fact that the utility of a commodity cannot be measured in absolute quantity, but however, it will be possible for a consumer to tell subjectively whether the commodity derives more or less or equal satisfaction when compared to another.

7.2 MEANING OF INDIFFERENCE CURVE

Indifference curve is defined as the locus of points on the graph each representing a different combination of two substitute goods, which yield the same utility or level of satisfaction to a consumer. The combinations of goods give equal satisfaction to a consumer.

Therefore, a consumer is indifferent between any two combinations of two goods when it comes to making a choice between them. When these combinations are plotted on the graph, the resulting curve is called indifference curve. This curve is also called as iso-utility curve or equal utility curve.

7.3 INDIFFERENCE CURVE ANALYSIS

When a consumer consumes various goods and services, then there are some combinations, which give him exactly the same total satisfaction. The graphical representation of such combinations is termed as indifference curve.

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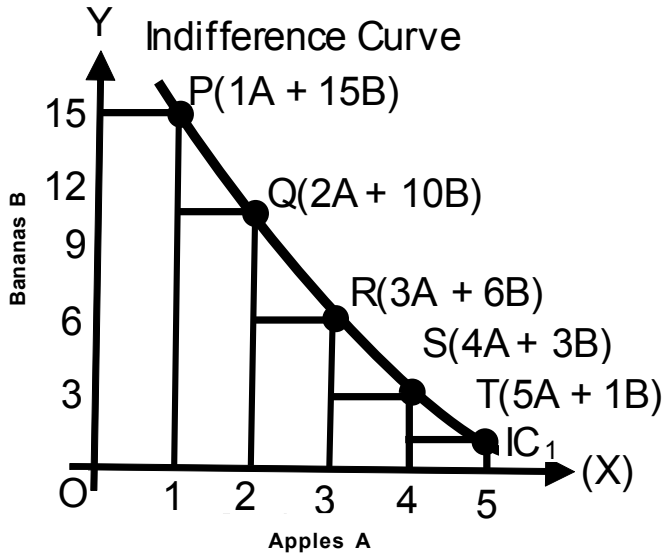
Indifference curve refers to the graphical representation of various alternative combinations of bundles of two goods among which the consumer is indifferent. Alternately, indifference curve is a locus of points that show such combinations of two commodities which give the consumer same satisfaction. Let us understand this with the help of following indifference schedule, which shows all the combinations giving equal satisfaction to the consumer.

Table 7.1: Indifference Schedule

Combination of Apples and Bananas	Apples (A)	Bananas (B)
P	1	15
Q	2	10
R	3	6
S	4	3
T	5	1



As seen in the schedule, consumer is indifferent between five combinations of apple and banana. Combination 'P' (1A + 15B) gives the same utility as (2A + 10B), (3A + 6B) and so on. When these combinations are represented graphically and joined together, we get an indifference curve 'IC_1' as shown in Fig. given above.

In the diagram, apples are measured along the X-axis and bananas on the Y-axis. All points (P, Q, R, S and T) on the curve show different combinations of apples and bananas. These points are joined with the help of a smooth curve, known as indifference curve (IC_1). An indifference curve is the locus of all the points, representing different combinations that are equally satisfactory to the consumer.

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Every point on IC_1, represents an equal amount of satisfaction to the consumer. So, the consumer is said to be indifferent between the combinations located on Indifference Curve 'IC_1'. The combinations P, Q, R, S and T give equal satisfaction to the consumer and therefore he is indifferent among them. These combinations are together known as 'Indifference Set'.

Monotonic Preferences

Monotonic preference means that a rational consumer always prefers more of a commodity as it offers him a higher level of satisfaction. In simple words, monotonic preferences imply that as consumption increases total utility also increases. For instance, a consumer's preferences are monotonic only when between any two bundles, he prefers the bundle which has more of at least one of the goods and no less of the other good as compared to the other bundle.

Example: Consider 2 Goods

Apples (A) and Bananas (B)

(a) Suppose two different bundles are: 1st: (10A, 10B); and 2nd: (7A, 7B).

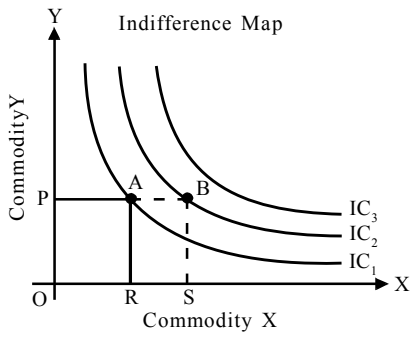
Consumer's preference of 1st bundle as compared to 2nd bundle will be called monotonic preference as 1st bundle contains more of both apples and bananas.

(b) If 2 bundles are: 1st: (1 OA, 7B); 2nd: (9A, 7B).

Consumer's preference of 1st bundle as compared to 2nd bundle will be called monotonic preference as 1st bundle contains more of apples, although bananas are same.

Indifference Map

Indifference Map refers to the family of indifference curves that represent consumer preferences over all the bundles of the two goods. An indifference curve represents all the combinations, which provide same level of satisfaction. However, every higher or lower level of satisfaction can be shown on different indifference curves. It means, infinite number of indifference curves can be drawn.



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In Fig, IC_1 represents the lowest satisfaction, IC_2 shows satisfaction more than that of IC_1 and the highest level of satisfaction is depicted by indifference curve IC_3. However, each indifference curve shows the same level of satisfaction individually.

It must be noted that 'Higher Indifference curves represent higher levels of satisfaction' as higher indifference curve represents larger bundle of goods, which means more utility because of monotonic preference.

Marginal Rate of Substitution (MRS)

MRS refers to the rate at which the commodities can be substituted with each other, so that total satisfaction of the consumer remains the same. For example, in the example of apples (A) and bananas (B), MRS of 'A' for 'B', will be number of units of 'B', that the consumer is willing to sacrifice for an additional unit of 'A', so as to maintain the same level of satisfaction.

MRS_{AB} = Units of Bananas (B) willing to Sacrifice / Units of Apples (A) willing to Gain

MRS_{AB} = "B/"A

MRS_{AB} is the rate at which a consumer is willing to give up Bananas for one more unit of Apple. It means, MRS measures the slope of indifference curve.

It must be noted that in mathematical terms, MRS should always be negative as numerator (units to be sacrificed) will always have negative value. However, for analysis, absolute value of MRS is always considered.

Table 7.2: MRS between Apple and Banana

Combination	Apples (A)	Banana (B)	MRS_{AB}
P	1	15	–
Q	2	10	5B:1 A
R	3	6	4B:1A
S	4	3	3B:1A
T	5	1	2B:1 A

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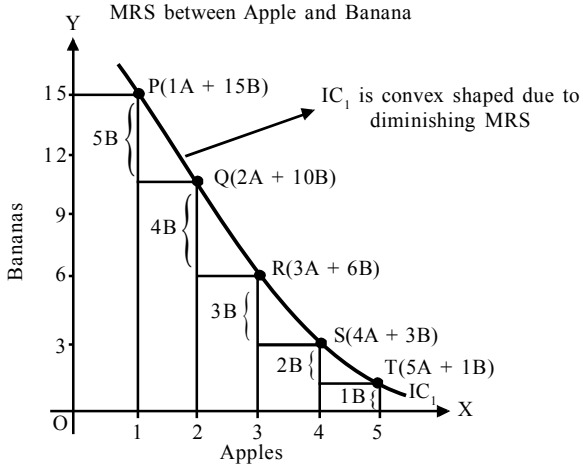

As seen in the given schedule and diagram, when consumer moves from P to Q, he sacrifices 5 bananas for 1 apple. Thus, MRS_{AB} comes out to be 5:1. Similarly, from Q to R, MRS_{AB} is 4:1. In combination T, the sacrifice falls to 2 bananas for 1 apple. In other words, the MRS of apples for bananas is diminishing.

7.4 WHY MRS DIMINISHES?

MRS falls because of the law of diminishing marginal utility. In the given example of apples and bananas, Combination 'P' has only 1 apple and, therefore, apple is relatively more important than bananas. Due to this, the consumer is willing to give up more bananas for an additional apple. But as he consumes more and more of apples, his marginal utility from apples keeps on declining. As a result, he is willing to give up less and less of bananas for each apple.

7.5 PROPERTIES OF INDIFFERENCE CURVE

1. Indifference Curves are Always Convex to the Origin

An indifference curve is convex to the origin because of diminishing MRS. MRS declines continuously because of the law of diminishing marginal utility. As seen in Table 2.6, when the consumer consumes more and more of apples, his marginal utility from apples keeps on declining and he is willing to give up less and less of bananas for each apple. Therefore, indifference curves are convex to the origin. It must be noted that MRS indicates the slope of indifference curve.

2. Indifference Curve Slope Downwards

It implies that as a consumer consumes more of one good, he must consume less of the other good. It happens because if the consumer decides to have more units

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of one good (say apples), he will have to reduce the number of units of another good (say bananas), so that total utility remains the same.

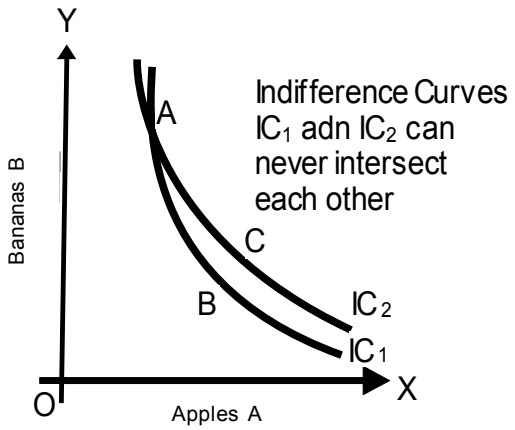
3. Higher Indifference Curves Represent Higher Levels of Satisfaction

Higher indifference curve represents large bundle of goods, which means more utility because of monotonic preference. Consider point 'A' on IC_X and point 'B' on IC_2 in Fig. At 'A', consumer gets the combination (OR, OP) of the two commodities X and Y. At 'B', consumer gets the combination (OS, OP). As OS > OR, the consumer gets more satisfaction at IC_2.

4. Indifference Curves can Never Intersect each Other

As two indifference curves cannot represent the same level of satisfaction, they cannot intersect each other. It means, only one indifference curve will pass through a given point on an indifference map. In Fig. 2.7, satisfaction from point A and from B on IC_1 will be the same.

Similarly, points A and C on IC_2 also give the same level of satisfaction. It means, points B and C should also give the same level of satisfaction. However, this is not possible, as B and C lie on two different indifference curves, IC_1 and IC_2 respectively and represent different levels of satisfaction. Therefore, two indifference curves cannot intersect each other.



7.6 ASSUMPTIONS OF INDIFFERENCE CURVE

The various assumptions of indifference curve are:

1. Two Commodities

It is assumed that the consumer has a fixed amount of money, whole of which is to be spent on the two goods, given constant prices of both the goods.

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2. Non Satiety

It is assumed that the consumer has not reached the point of saturation. Consumer always prefer more of both commodities, i.e. he always tries to move to a higher indifference curve to get higher and higher satisfaction.

3. Ordinal Utility

Consumer can rank his preferences on the basis of the satisfaction from each bundle of goods.

4. Diminishing Marginal Rate of Substitution

Indifference curve analysis assumes diminishing marginal rate of substitution. Due to this assumption, an indifference curve is convex to the origin.

5. Rational Consumer

The consumer is assumed to behave in a rational manner, i.e. he aims to maximize his total satisfaction.

7.7 DIMINISHING MARGINAL RATE OF SUBSTITUTION

The marginal rate of substitution is the rate of exchange between some units of goods X and Ó which are equally preferred. The marginal rate of substitution of X for Y $(MRS)_{xy}$ is the amount of Y that will be given up for obtaining each additional unit of X. This rate is explained below in Table 7.3.

Table 7.3: Marginal Rate of Substitution

(1) Combination	(2) X	(3) Y	(4) MRS of X for Y
L	1	9	–
M	2	6	3:1
N	3	4	2:1
P	4	3	1:1

To have the second combination and yet to be at the same level of satisfaction, the consumer is prepared to forgo 3 units of Y for obtaining an extra unit of X. The marginal rate of substitution of X for Ó is 3:1. The rate of substitution will then be the number of units of Ó for which one unit of X is a substitute. As the consumer proceeds to have additional units of X, he is willing to give away less and less units of Ó so that the marginal rate of substitution falls from 3:1 to 1:1 in the fourth combination (Col. 4).

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In Fig. 7.1 above at point M on the indifference curve I, the consumer is willing to give up 3 units of Ó to get an additional unit of X. Hence, MRS_{xy} =3. As he moves along the curve from M to N, MRS_{xy}, =2. When the con-sumer moves downwards along the indifference curve, he ac-quires more of X and less of Y. The amount of Ó he is prepared to give up to get additional units of X becomes smaller and smaller.

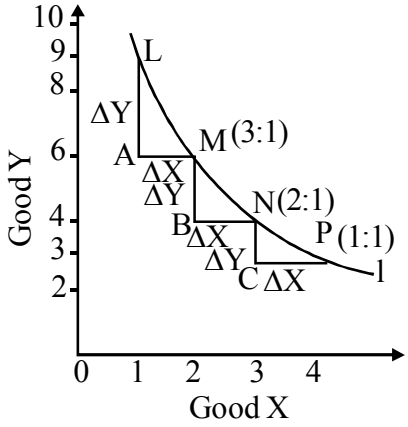

Fig. 7.1

The marginal rate of substitution of X for Ó (MRS_{xy}) is, in fact, the slope of the curve at a point on the indifference curve, such as points M, N or P in Fig. 7.1. Thus MRS_{xy} = "Y/"X

It means that the MRS_{xy} is the ratio of change in good Y to a given change in X. In the figure, there are three triangles on the I_1 curve whose vertical sides LA, MB and NC represent ÀÓ which diminish and the horizontal sides AM, BN and CP signify AX which remains the same.

At point M, MRS_{xy} = LA/AM at N it is MB/BN. This also shows that as the consumer moves downwards along the curve, he possesses additional units of X, and gives up lesser and lesser units of Y, i.e., the MRS_{xy} diminishes. It is due to this law of diminishing MRS that an indifference curve is convex to the origin.

7.8 EXCEPTIONS OF DMRS LAW

However, this law is not applicable in the case of perfect substitutes and complementary goods. These are the exceptions of the DMRS law whereby an indifference curve is not convex to the origin but is a straight line and L- shaped.

1. Straight Line Indifference Curve

If MRS of X for Y or Y for X is diminishing, the indifference curve must be convex to the origin. If it is con-stant, the indifference curve will be a straight line sloping

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downwards to the right at a 45° angle to either axis, as in Fig. 7.2. This is the case of perfect substitute goods like Lux and Godrej soap, Tata and Brooke Bond Tea, etc.

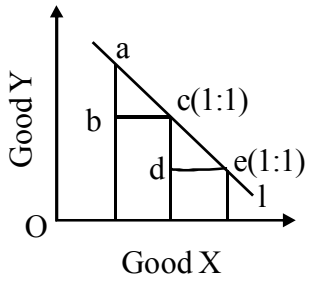

Fig. 7.2

When a consumer substitutes Lux for Godrej or vice versa, his satisfaction remains the same. Thus MRS_y for perfect substitutes is constant, i.e., MRS_{xy}

1. This is clear from equal triangles, "abc = "cde, below the I curve.

2. L -Shaped Indifference Curve

When two goods are used simulta-neously in a constant ratio such as left shoe and right shoe, the indifference curve is L-Shaped or of 90° angle. Such a curve is for perfect complementary goods and their MRS is always zero MRS_{xy} =0. Figure 7.3 shows preferences of consumer for left and right shoes. Since shoes are perfect complementary, at point Â of I curve an additional right shoe will not increase his satisfaction 90° until he gets another left shoe of the same size.

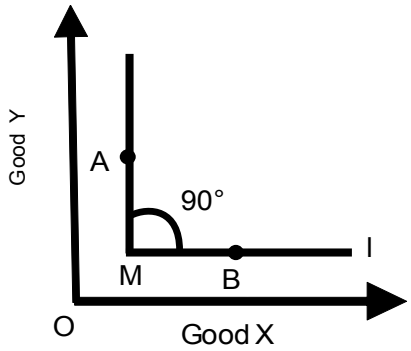

Fig. 7.3

The same is the case at point I A where he gets an additional left shoe without another right shoe. So the consumer will get full satisfaction at point M of the I curve where he purchases a left and right shoe of the same size and his $MRS_{xy} = 0$. This is because he cannot substitute right and left shoes.

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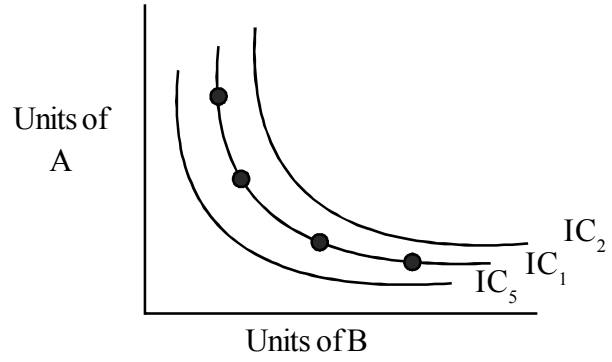
7.9 INDIFFERENCE CURVE MAP

An indifference map is the collection of indifference curves possessed by an individual.

We can draw more than one indifference curve on the same diagram. This family of curves is called indifference map. We know that right side curve yield higher utility and it goes on increasing as we move righter, While the curve in the left yield lesser utility and it goes on decreasing as we move towards left. (The reason is right hand side point means more consumption of either of 2 goods, hence higher satisfaction).



- IC1, IC2 and IC3 are three indifference curves.
- All the points on IC2 will yield higher satisfaction than the points on IC1 and
- All the points on IC3 will yield lesser satisfaction than the points on IC1

7.10 BUDGET LINE

Budget line is a graphical representation of all possible combinations of two goods which can be purchased with given income and prices, such that the cost of each of these combinations is equal to the money income of the consumer. Alternately, Budget Line is locus of different combinations of the two goods which the consumer consumes and which cost exactly his income.

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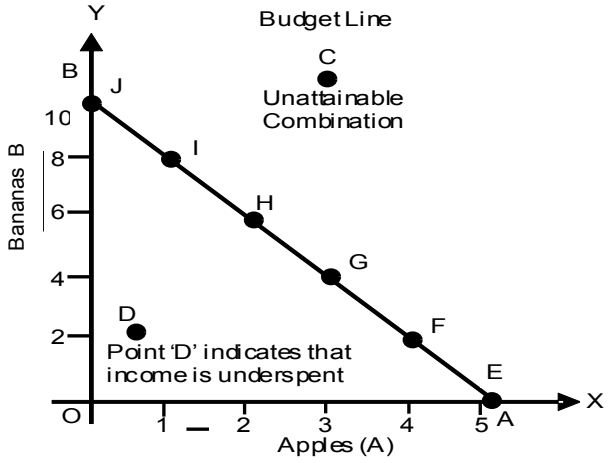

Let us understand the concept of Budget line with the help of an example: Suppose, a consumer has an income of ₹ 20. He wants to spend it on two commodities: X and Y and both are priced at ₹ 10 each. Now, the consumer has three options to spend his entire income: (i) Buy 2 units of X; (ii) Buy 2 units of Y; or (iii) Buy 1 unit of X and 1 unit of Y. It means, possible bundles can be: (2, 0); (0, 2) or (1, 1). When all these three bundles are represented graphically, we get a downward sloping straight line, known as 'Budget Line'. It is also known as price line.

Budget Set

Budget set is the set of all possible combinations of the two goods which a consumer can afford, given his income and prices in the market.

In addition to the three options, there are some more options available to the consumer within his income, even if entire income is not spent. Budget set includes all the bundles with the total income of ₹ 20, i.e. possible bundles or Consumer's bundles are: (0, 0); (0, 1); (0, 2); (1, 0); (2, 0); (1,1). Consumer's Bundle is a quantitative combination of two goods which can be purchased by a consumer from his given income.

Diagrammatic Explanation of Budget Line:

Suppose, a consumer has a budget of ₹ 20 to be spent on two commodities: apples (A) and bananas (B). If apple is priced at ₹ 4 each and banana at ₹ 2 each, then the consumer can determine the various combinations (bundles), which form the budget line. The possible options of spending income of ₹ 20 are given in Table 7.4:

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Table 7.4: Schedule of Budget Line

Combination of Apples and Bananas	Apples (A) 4 each)	Bananas (B) (Rs. 2 each)	Money spent = Income (Rs.)
E	5	0	(5 x 4) + (0 x 2) = 20
F	4	2	(4 x 4) + (2 x 2) = 20
G	3	4	(3 x 4) + (4 x 2) = 20
H	2	6	(2 x 4) + (6 x 2) = 20
1	1	8	(1 x 4) + (8 x 2) = 20
J	0	10	(Ox 4)+ (10×2) =20

In Fig, number of apples is taken on the X-axis and bananas on the Y-axis. At one extreme (Point 'E'), consumer can buy 5 apples by spending his entire income of ₹ 20 only on apples. The other extreme (Point 'j'), shows that the entire income is spent only on bananas. Between E and J, there are other combinations like F, G, H and I. By joining all these points, we get a straight line 'AB' known as the Budget Line or Price line.

Every point on this budget line indicates those bundles of apples and bananas, which the consumer can purchase by spending his entire income of f 20 at the given prices of goods.

Important Points about Budget line

1. Budget line AB slopes downwards as more of one good can be bought by decreasing some units of the other good.
2. Bundles which cost exactly equal to consumer's money income (like combinations E to J) lie on the budget line.
3. Bundles which cost less than consumer's money income (like combination D) shows under spending. They lie inside the budget line.
4. Bundles which cost more than consumer's money income (like combination C) are not available to the consumer. They lie outside the budget line.

Algebraic Expression of Budget Line

The budget line can be expressed as an equation:

$\mathbf{M = (P_A \times Q_A) + (P_B \times Q_B)}$

Where:

M = Money income;

Q_A = Quantity of apples (A);

Q_B = Quantity of bananas (B);

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P_A = Price of each apple;

P_B = Price of each banana.

All points on the budget line 'AB' indicate those bundles, which cost exactly equal to 'M'.

Algebraic Expression for Budget Set: The consumer can buy any bundle (A, B), such that: $M > (P_A \times Q_A) + (P_B \times Q_B)$

Slope of the Budget Line

We know, the slope of a curve is calculated as a change in variable on the vertical or Y-axis divided by change in variable on the horizontal or X-axis. In the example of apples and bananas, slope of the budget line will be number of units of bananas, that the consumer is willing to sacrifice for an additional unit of apple.

Slope of Budget Line = Units of Bananas (B) willing to Sacrifice/ Units of Apples (A) willing to Gain = "B/"A

As seen in Fig. 2.8, 2 bananas need to be sacrificed each time to gain 1 apple.

So, Slope of Budget Line = -2/1 = **2/1 = 2

Numerator will always have negative value as it shows number of units to be sacrificed. However, for analysis, absolute value is always considered.

This slope of budget line is equal to 'Price Ratio' of two goods.

What is Price Ratio?

Price Ratio is the price of the good on the horizontal or X-axis divided by the price of the good on the vertical or Y-axis. For instance, If good X is plotted on the horizontal axis and good Y on the vertical axis, then:

Price Ratio = Price of X (P_X)/Price of Y(P_Y) = P_X / P_Y

Why slope of Budget Line is represented by Price Ratio?

A point on the budget line indicates a bundle which the consumer can purchase by spending his entire income. So, if the consumer wants to have one more unit of good 1 (say, Apples or A), then he will have to give up some amount of good 2 (say, Bananas or B)'The number of bananas needed to be given up to gain 1 apple depends on the prices of apples and bananas.

As per Table, Apple (A) is priced at ₹ 4 (P_A) and Bananas (B) at ₹ 2 (P_B). It means, to gain 1 apple, consumer will have to reduce his expenditure on bananas by ₹ 4, i.e. consumer will have to sacrifice 2 bananas to gain 1 apple. It means, consumer will have to give P_A/P_B units of Banana to gain one apple. P_A/P_B is nothing

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but the price ratio between Apples and Bananas. So, it is rightly said that Price Ratio indicates the slope of Budget Line.

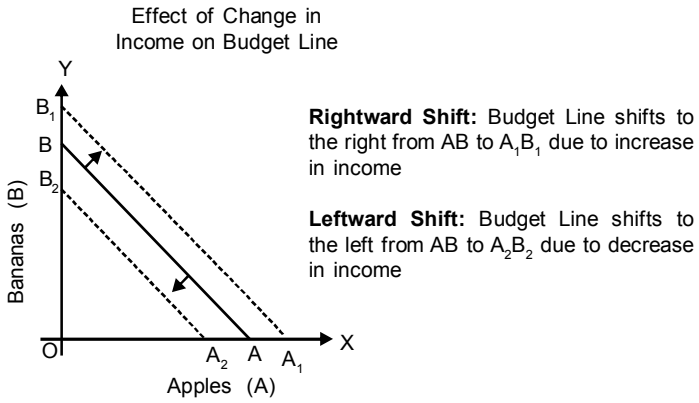
Moreover, Price ratio remains constant throughout because P_X and P_Y on the basis of which AX and AY are calculated are constant throughout.

Shift in Budget Line

Budget line is drawn with the assumptions of constant income of consumer and constant prices of the commodities. A new budget line would have to be drawn if either (a) Income of the consumer changes, or (b) Price of the commodity changes. Let us understand this with the example of apples and bananas:

1. Effect of a Change in the Income of Consumer:

If there is any change in the income, assuming no change in prices of apples and bananas, then the budget line will shift. When income increases, the consumer will be able to buy more bundles of goods, which were previously not possible. It will shift the budget line to the right from 'AB' to 'A_1B_1', as seen in Fig. The new budget line A_1B_1 will be parallel to the original budget line 'AB'.



Similarly, a decrease in income will lead to a leftward shift in the budget line to A_2B_2.

Why is the new Budget line parallel to original budget line?

The new budget line 'A_1B_4' or 'A_2B_2' is parallel to original budget line 'AB' because there is no change in the slope. We know, the slope of a curve is calculated as a change in one variable that occurs due to change in another variable. In case of budget line, slope = P_X/P_Y As change in income does not disturb the price ratio of the two commodities, the slope will not change and the budget line, after change in income will remain parallel to the original budget line.

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2. Effect of change in the relative Prices (Apples and Bananas)

If there is any change in prices of the two commodities, assuming no change in the money income of consumer, then budget line will change. It will change the slope of budget line, as price ratio will change, with change in prices.

(i) Change in the price of commodity on X-axis (Apples):

When the price of apples falls, then new budget line is represented by a shift in budget line (see Fig. 7.4) to the right from 'AB' to 'A_1B'. The new budget line meets the Y-axis at the same point 'B', because the price of bananas has not changed. But it will touch the X-axis to the right of 'A' at point 'A_1, because the consumer can now pur-chase more apples, with the same income level.

Similarly, a rise in the price of apples will shift the budget line towards left from 'AB' to 'A_2B'.

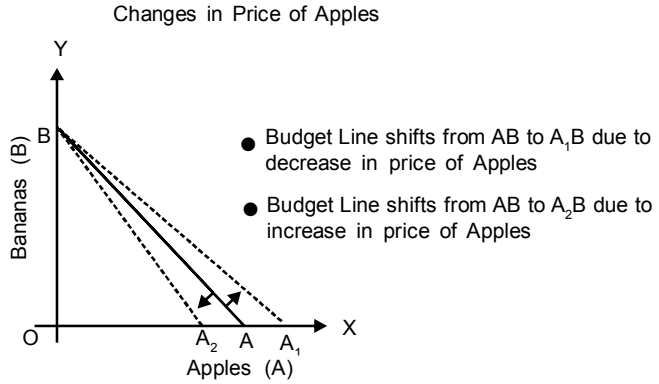

Fig. 7.4

(ii) Change in the price of commodity on Y-axis (Bananas):

With a fall in the price of bananas, the new budget line will shift to the right from 'AB' to AB_1. The new budget line meets the X-axis at the same point 'A', due to no change in the price of apples. But it will touch the Y-axis to the right of 'B' at point 'B_1', because the consumer can now purchase more bananas, with the same income level.

7.11 CONSUMER'S EQUILIBRIUM

The term 'equilibrium' is frequently used in economic analysis. Equilibrium means a state of rest or a position of no change. It refers to a position of rest, which provides the maximum benefit or gain under a given situation. A consumer is said to be in equilibrium, when he does not intend to change his level of consumption, i.e., when he derives maximum satisfaction.

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Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure. The consumer has to pay a price for each unit of the commodity. So, he cannot buy or consume unlimited quantity. As per the Law of DMU, utility derived from each successive unit goes on decreasing. At the same time, his income also decreases with purchase of more and more units of a commodity.

So, a rational consumer aims to balance his expenditure in such a manner, so that he gets maximum satisfaction with minimum expenditure. When he does so, he is said to be in equilibrium. After reaching the point of equilibrium, there is no further incentive to make any change in the quantity of the commodity purchased.

It is assumed that the consumer knows the different goods on which his income can be spent and the utility that he is likely to get out of such consumption. It means that the consumer has perfect knowledge of the various choices available to him.

7.12 SITUATIONS OF CONSUMER'S EQUILIBRIUM

Consumer's equilibrium can be discussed under two different situations:

1. Consumer spends his entire income on a Single Commodity
2. Consumer spends his entire income on Two Commodities

1. Consumer's Equilibrium in case of Single Commodity

The Law of DMU can be used to explain consumer's equilibrium in case of a single commodity. Therefore, all the assumptions of Law of DMU are taken as assumptions of consumer's equilibrium in case of single commodity.

A consumer purchasing a single commodity will be at equilibrium, when he is buying such a quantity of that commodity, which gives him maximum satisfaction. The number of units to be consumed of the given commodity by a consumer depends on 2 factors:

(i) Price of the given commodity;

(ii) Expected utility (Marginal utility) from each successive unit.

To determine the equilibrium point, consumer compares the price (or cost) of the given commodity with its utility (satisfaction or benefit). Being a rational consumer, he will be at equilibrium when marginal utility is equal to price paid for the commodity. We know, marginal utility is expressed in utils and price is expressed in terms of money However, marginal utility and price can be effectively compared only when both are stated in the same units. Therefore, marginal utility in utils is expressed in terms of money.

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Marginal Utility in terms of Money = Marginal Utility in utils/ Marginal Utility of one rupee (MU_M)

MU of one rupee is the extra utility obtained when an additional rupee is spent on other goods. As utility is a subjective concept and differs from person to person, it is assumed that a consumer himself defines the MU of one rupee, in terms of satisfaction from bundle of goods.

Equilibrium Condition

Consumer in consumption of single commodity (say, x) will be at equilibrium when:

Marginal Utility (MU_x) is equal to Price (P_x) paid for the commodity;

i.e. MU = Price

(i) If $MU_X > P_x$, then consumer is not at equilibrium and he goes on buying because benefit is greater than cost. As he buys more, MU falls because of operation of the law of diminishing marginal utility. When MU becomes equal to price, consumer gets the maximum benefits and is in equilibrium.

(ii) Similarly, when $MU_X < P_x$, then also consumer is not at equilibrium as he will have to reduce consumption of commodity x to raise his total satisfaction till MU becomes equal to price.

Note:

In addition to condition of "MU = Price", one more condition is needed to attain consumer's equilibrium: "MU falls as consumption increases". However, this second condition is always implied because of operation of Law of DMU. So, a consumer in consumption of single commodity will be at equilibrium when MU = Price.

Let us now determine the consumer's equilibrium if the consumer spends his entire income on single commodity. Suppose, the consumer wants to buy a good (say, x), which is priced at ₹ 10 per unit. Further suppose that marginal utility derived from each successive unit (in utils and in is determined and is given in Table 7.5 (For sake of simplicity, it is assumed that 1 util = ₹ 1, i.e. MU_M = ₹ 1).

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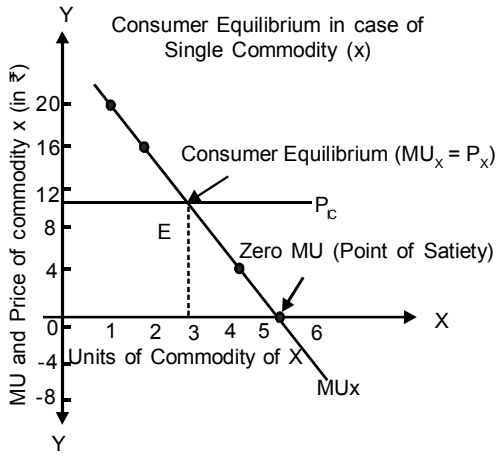
Table 7.5: Consumer's Equilibrium in case of Single Commodity

Units of X	Price (P_x) (Rs.)	Marginal utility (utils)	Marginal utility in Rs. (MU_X) 1 util =Rs. 1	Difference MU_X and P_x	Remarks
1	10	20	20/1 = 20	20-10= 10	$MU_X > P_{x>}$so
2	10	16	16/1 = 16	16-10= 6	consumer will increase the consumption
3	10	10	10/1 = 10	10-10= 0	Consumer's Equilibrium ($MU_X=P_X$)
4	10	4	4/1 = 4	4-10= -6	$MU_X < P_x$, so
5	10	0	0/1 = 0	0-10=-10	consumer will decrease the consumption
6	10	-6	– 6/1 = -6	-6-10=-16	



In Fig, MU_X curve slopes downwards, indicating that the marginal utility falls with successive consumption of commodity x due to operation of Law of DMU. Price (P_x) is a horizontal and straight price line as price is fixed at ₹ 10 per unit. From the given schedule and diagram, it is clear that the consumer will be at equilibrium at point 'E', when he consumes 3 units of commodity x, because at point E, $MU_X = P_x$

(i) He will not consume 4 units of x as MU of ₹ 4 is less than price paid of ₹ 10.

(ii) Similarly, he will not consume 2 units of x as MU of ₹ 16 is more than the price paid.

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So, it can be concluded that a consumer in consumption of single commodity (say, x) will be at equilibrium when marginal utility from the commodity (MUJ is equal to price (PJ paid for the commodity.

For Practical Problems of 'Consumer's Equilibrium in case of Single Commodity', refer Examples 4 to 7 (Section 2.9) and 2 Unsolved Problems given in the Exercise.

2. Consumer's Equilibrium in case of Two Commodities

The Law of DMU applies in case of either one commodity or one use of a commodity. However, in real life, a consumer normally consumes more than one commodity. In such a situation, 'Law of Equi-Marginal Utility' helps in optimum allocation of his income.

Law of Equi-marginal utility is also known as:

(i) Law of Substitution;

(ii) Law of maximum satisfaction;

(iii) Gossen's Second Law.

As law of Equi-marginal utility is based on Law of DMU, all assumptions of the latter also apply to the former. Let us now discuss equilibrium of consumer by taking two goods: 'x' and 'y'. The same analysis can be extended for any number of goods.

In case of consumer equilibrium under single commodity, we assumed that the entire income was spent on a single commodity. Now, consumer wants to allocate his money income between the two goods to attain the equilibrium position.

According to the law of Equi-marginal utility, a consumer gets maximum satisfaction, when ratios of MU of two commodities and their respective prices are equal and MU falls as consumption increases. It means, there are two necessary conditions to attain Consumer's Equilibrium in case of Two Commodities:

(i) Marginal Utility (MU) of last rupee spent on each commodity is same:

(i) We know, a consumer in consumption of single commodity (say, x) is at equilibrium when $MU_x/P_x = MU_M$

(ii) Similarly, consumer consuming another commodity (say, y) will be at equilibrium when $MU_Y/P_Y = MU_M$

Equating 1 and 2, we get: $MU_X/P_X = MU_Y/P_Y = MU_M$

As marginal utility of money (MU_M) is assumed to be constant, the above equilibrium condition can be restated as:

$MU_X = MU_Y/P_Y$ or $MU_X/MU_Y = P_X/P_Y$

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What happens when MU_X/P_X is Not Equal to MU_Y/P_Y

(i) Suppose, $MU_X/P_X > MU_Y/P_Y$. In this case, the consumer is getting more marginal utility per rupee in case of good X as compared to Y. Therefore, he will buy more of X and less of Y. This will lead to fall in MU_X and rise in MU_Y. The consumer will continue to buy more of X till $MU_X/P_X = MU_Y/P_Y$

(ii) When $MU_X/P_X < MU_Y/P_Y$, the consumer is getting more marginal utility per rupee in case of good Y as compared to X. Therefore, he will buy more of Y and less of X. This will lead fall in MU_Y and rise in MU_X. The consumer will continue to buy more of Y till $MU_X/P_X = MU_Y/P_Y$.

It brings us to a conclusion that $MU_X/P_X = MU_Y/P_Y$ is a necessary condition to attain Consumer's Equilibrium.

(ii) MU Falls as Consumption Increases

The second condition needed to attain consumer's equilibrium is that MU of a commodity must fall as more of it is consumed. If MU does not fall as consumption increases, the consumer will end up buying only one good which is unrealistic and consumer will never reach the equilibrium position.

Finally, it can be concluded that a consumer in consumption of two commodities will be at equilibrium when he spends his limited income in such a way that the ratios of marginal utilities of two commodities and their respective prices are equal and MU falls as consumption increases.

Explanation with the help of an Example:

Let us now discuss the law of equi-marginal utility with the help of a numerical example. Suppose, total money income of the consumer is ₹ 5, which he wishes to spend on two commodities: 'x' and 'y'. Both these commodities are priced at ₹ 1 per unit. So, consumer can buy maximum 5 units of 'x' or 5 units of 'y'. In Table 7.6, we have shown the marginal utility which the consumer derives from various units of 'x' and 'y'.

Table 7.6: Consumer's Equilibrium in case of Two Commodities

Units	MU of commodity 'x' (in utils)	MU of commodity 'y' (in utils)
1	20	16
2	14	12
3	12	8
4	7	5
5	5	3

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From Table 7.6, it is obvious that the consumer will spend the first rupee on commodity 'x', which will provide him utility of 20 utils. The second rupee will be spent on commodity 'y' to get utility of 16 utils. To reach the equilibrium, consumer should purchase that combination of both the goods, when:

(i) MU of last rupee spent on each commodity is same; and

(ii) MU falls as consumption increases.

It happens when consumer buys 3 units of 'x' and 2 units of 'y' because:

(i) MU from last rupee (i.e. 5^{th} rupee) spent on commodity y gives the same satisfaction of 12 utils as given by last rupee (i.e. 4^{th} rupee) spent on commodity x; and

(ii) MU of each commodity falls as consumption increases.

The total satisfaction of 74 utils will be obtained when consumer buys 3 units of 'x' and 2 units of 'y'. It reflects the state of consumer's equilibrium. If the consumer spends his income in any other order, total satisfaction will be less than 74 utils.

Limitation of Utility Analysis

In the utility analysis, it is assumed that utility is cardinally measurable, i.e., it can be expressed in exact unit. However, utility is a feeling of mind and there cannot be a standard measure of what a person feels. So, utility cannot be expressed in figures. There are other limitations too. But, their discussion is beyond the scope.

7.13 EFFECT OF INCOME AND PRICE CHANGE IN CONSUMER'S EQUILIBRIUM

Effect of Income Change

Suppose when the consumer's income is M, the price line is AB. The equilibrium position is R where AB touches indifference curve IC_1.

If the consumer's income increases, he will be able to buy more X and Y. The Price Line will move outwards parallel to itself, be-coming (say) CD. The equilibrium position of the consumer will now be S, where CD touches another indifference curve IC_3. If the income increases again, the Price Line will move further outwards. If it is now GH, the consumer will be at equilibrium at V.

If we join R, S, V and similar other points of tangency we get a line like ICC. This line shows the effects of income changes on consumption. It is called the Income – Consumption Curve or the Expenditure- Consumption Curve. When income increases the consumer moves upwards along ICC; when income decreases he moves downwards along ICC.

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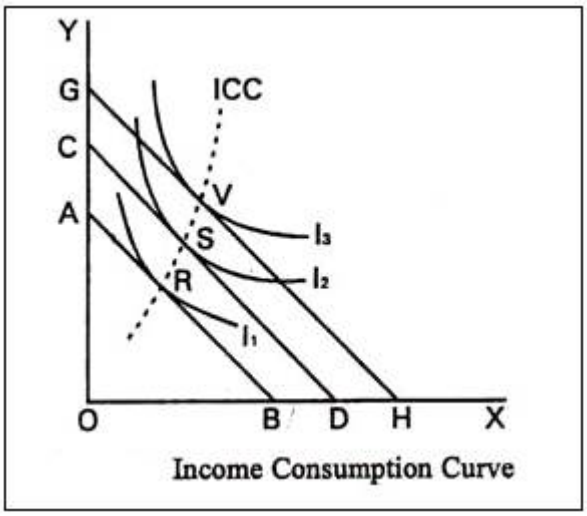

The shape of ICC depends on the shape of the indifference curves. In case of inferior goods it will bend away from the axis which represents such goods, showing that, as income increases, the consumption of such a good decreases.

Effect of Price Change

Suppose AB is the price line when the price of X is such that the consumer can buy OB with his income. The consumer is at equili-brium at R. Suppose now the price of X falls. The consumer can now buy more X. So the Price Line becomes (say) AC.

The equili-brium position is now S, where AC touches indifference curve I_1. If the price of X falls further, the consumer will be at equilibrium at a point like V. A line joining R, S, V and similar other points shows the effects of price changes on consumption. It is called the Price Consumption Curve.

When the price of both the commodities change, the positions of both A and B change. The point of tangency between the new price line and an indifference curve shows the new equili-brium position. So all prices change, and their effect on the consumer's equilibrium position, can be diagrammatically represented on the Indifference Map of the consumer.

(a) Normal Goods

A change in price of a commodity affects its demand. Its demand curve is affected both by the income effect and the substitution effect. The effects vary according to the nature of the commodity and the taste and preferences of the consumer. In case of normal goods, the demand varies inversely with the price.

Both the income effect and substitution effect induce the consumer to buy more of the commodity, the price of which has fallen. The ultimate effect on demand for the

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commodity is increase. The reverse effect occurs when price rises. These are shown in Fig. 7.5. In case of normal goods the income-elasticities of demand are positive.

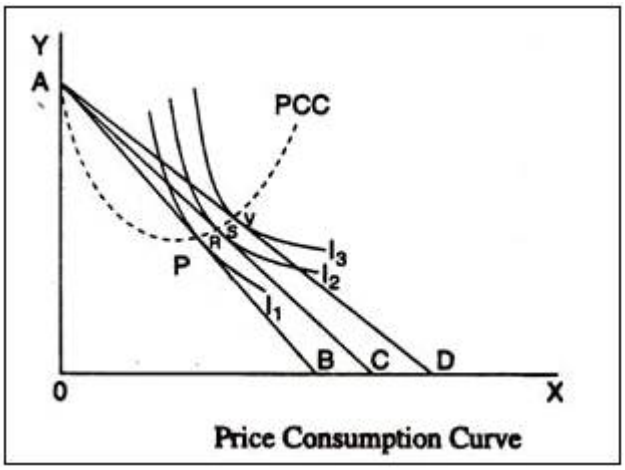

Fig. 7.5

(b) Inferior Goods

Goods which are both purchased less when income rises, are called Inferior Goods. In case of such goods, the income effect is negative or weak and the substitution effect is positive or strong. The ultimate effect on demand for such a commodity is a slow increase or complete stoppages.

For example, a man may buy less (or no) coarse cloth and use more fine cloth in its place as his income rises. The inferior goods depend on the taste of individual buyer. When a commodity has several grades and specific qualities of goods and services, any of the grades can be called inferior goods for somebody or some group of people.

7.14 SUBSTITUTION AND INCOME EFFECTS FOR AN INFERIOR GOOD

If X is an inferior good, the income effect of a fall in the price of X will be positive because as the real income of the consumer increases, less quantity of X will be demanded. This is so because price and quantity demanded move in the same direction On the other hand, the negative substitution effect will increase the quantity demanded of X.

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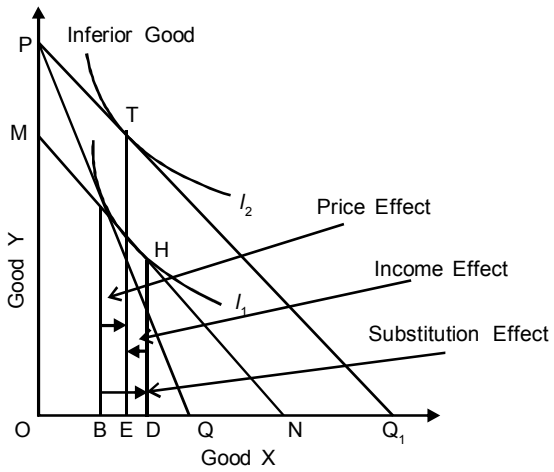

The negative substitution effect is stronger than the positive income effect in the case of inferior goods so that the total price effect is negative. It means that when the price of the inferior good falls, the consumer purchases more of it due to compensating variation in income. The case of X as an inferior good. Initially, the consumer is in equilibrium at point R where the budget line PQ is tangent to the curve I_1. With the fall in the price of X, he moves to point T on the budget line PQ_1, at the higher indifference curve His movement from R to Tor from Â to E on the horizontal axis is the price effect. By compensating variation in income, he is in equilibrium at point H on the new budget line MN along the original curve I_1.

The movements from R to H on the I_1 curve are the substitution effect measured horizontally by BD of X. To isolate the income effect, return the increased real income to the consumer which was taken from him so that he is again at point T of the tangency of PQ_1 line and the curve l_2. The movement from H to T is the income effect of the fall in the price of X and is measured by DE.

This income effect is positive because the fall in the price of the inferior good X leads, via compensating variation in income, to the decrease in its quantity demanded by DE. When the relation between price and quantity demanded is direct via compensating variation in income, the income effect is always positive.

In the case of an inferior good, the negative substitution effect is greater than the positive income effect so that the total price effect is negative. Thus the price effect (-) BE = (-) BD (substitution effect) + DE (income effect). In other words, the overall price move from R to T which comprises both the income and substitution effects has led to the increase in the quantity demanded by BE after the fall in the price of X. This establishes the downward sloping demand curve even in the case of an inferior good.

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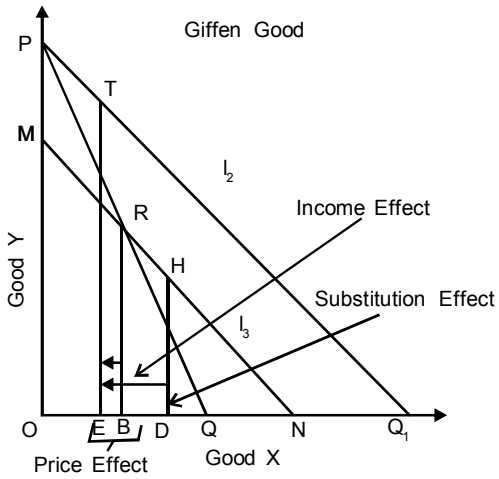
7.15 SUBSTITUTION AND INCOME EFFECTS FOR A GIFFEN GOOD

A strongly inferior good is a Giffen good, after Sir Robert Giffen who found that potatoes were an indispensable food item for the poor peasants of Ireland. He observed that in the famine of 1848, a rise in the price of potatoes led to an increase in their quantity demanded. Thereafter, a fall in the price led to a reduction in their quantity demanded.

This direct relation between price an quantity demanded in relation to essential food items is called the Giffen paradox. The reason for such a paradoxical tendency is that when the price of some food articles like bread of mass consumption rises, this is tantamount to a fall in the real income of the consumers who reduce their expenses on more expensive food items, as a result the demand for the bread increases. Similarly, a fall in the price of bread raises the real income of consumers who substitute expensive food item for bread thereby reducing the demand of bread.

In the case of a Giffen good, the positive income effect is stronger than the negative substitution effect so that the consumer buys less of it when its price falls. Suppose X is a Giffen good and the initial equilibrium point is R where the budget line PQ is tangent to the indifference curve l_1. Now the price of X falls and the consumer moves to point T of the tangency between the budget line PQ and the curve I_2. His movement from point R to T is the price effect whereby he reduces his consumption of X by BE.



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To isolate the substitution effect, the increased real income due the fall in the price of X is withdrawn from the consumer by drawling the budget line MN parallel PQ_1 and tangent to the original curve I_1 at point H. As a result, he moves from point R to H along the l_1 curve. This is the negative substitution effect which leads him to buy BD more of X with the fall in its price, real income being constant. To isolate the income effect, when the income that was taken away from the consumer is returned to him, he moves from point H to T so that he reduces the consumption of X by a very large quantity DE. This is the positive income effect because with the fall in the price of the Giffen good X, its quantity demanded is reduced by DE via compensating variation in income. In other words, it is positive with respect to price change, that is, the fall in the price of good X leads, via the income effect, to a decrease to the quantity demanded.

Thus in the case of a Giffen good, the positive income effect is stronger than the negative substitution effect so that the total price effect is positive. That is why, the demand curve for a Giffen good has positive slope from left to right upwards. Thus the price effect BE= DE (income effect) + (-) BD (substitution effect).

According to Hicks, a giffen good must satisfy the following conditions: (i) the consumer must spend a large part of his income on it; (ii) it must be an inferior good with strong income effect; and (iii) the substitution effect must be weak. But Giffen goods are very rare which may satisfy these conditions.

7.16 COMPLEMENTARILY AND SUBSTITUTABILITY

The term complementarity – derived from the Latin word complere, "to fill up" is used in many disciplines, with different meanings. It found its way into the language of economists in the 19th century. Since the early 1990s, it has gained increased attention in microeconomics, thanks largely to the work of Stanford economists Paul Milgrom, John Roberts and their co-authors. They define complementarity as a relationship between two or more elements such that one element enhances the value of the other one (see John Roberts' book "The Modern Firm"). The notion of complementarity gives greater specificity to the closely related ones of 'synergy' and 'fit'.

In the context of organisations, complementarities exist when two or more factors – be they strategic choices, organisational arrangements, capabilities or other such elements – increase each other's effects on performance. For example, Casey Ichniowski, Kathryn Shaw and Giovanna Prennushi showed that particular work practices such as training and flexible job assignments had a greater effect on the productivity of steel finishing lines when they were part of a coherent HR system, than when they were used in isolation. A review of the empirical literature on

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complementarities by Edgar Ennen and myself has demonstrated that complementarities can be very powerful performance drivers, in particular when they involve many, diverse elements.

Complementarity thinking thus goes an important step beyond conventional "best practice" approaches. When many strategic or organisational choices are closely related to one another, seeking to optimise one of them without adapting the others may not yield the hoped-for performance gains, or may even backfire. Complementarities also make imitation by competitors more difficult, thus offering an additional competitive advantage to firms.

Substitutability

Substitutability is a construct borrowed from microeconomics that describes a continuum of possible interactions among the reinforcers in a given situation. Highly substitutable reinforcers, which occupy one end of the continuum, are readily traded for each other due to their functional similarity. Complementary reinforcers, at the other end of the continuum, tend to be consumed jointly in fairly rigid proportion, and therefore cannot be traded for one another except to achieve that proportion. At the center of the continuum are reinforcers that are independent with respect to each other; consumption of one has no influence on consumption of another. Psychological research and analyses in terms of substitutability employ standard operant conditioning paradigms in which humans and nonhumans choose between alternative reinforcers. The range of reinforcer interactions found in these studies is more readily accommodated and predicted when behavior-analytic models of choice consider issues of substitutability. New insights are gained into such areas as eating and drinking, electrical brain stimulation, temporal separation of choice alternatives, behavior therapy, drug use, and addictions. Moreover, the generalized matching law (Baum, 1974) gains greater explanatory power and comprehensiveness when measures of substitutability are included.

Substitute goods are goods which, as a result of changed conditions, may replace each other in use (or consumption). A substitute good, in contrast to a complementary good, is a good with a positive cross elasticity of demand. This means a good's demand is increased when the price of another good is increased.

7.17 THE EXTREME CHOICES

The choice set is the set of alternatives that are available to the person. For a discrete choice model, the choice set must meet three requirements:

The set of alternatives must be exhaustive, meaning that the set includes all possible alternatives. This requirement implies that the person necessarily does choose an alternative from the set.

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The alternatives must be mutually exclusive, meaning that choosing one alternative means not choosing any other alternatives. This requirement implies that the person chooses only one alternative from the set.

The set must contain a finite number of alternatives. This third requirement distinguishes discrete choice analysis from forms of regression analysis in which the dependent variable can (theoretically) take an infinite number of values.

As an example, the choice set for a person deciding which mode of transport to take to work includes driving alone, carpooling, taking bus, etc. The choice set is complicated by the fact that a person can use multiple modes for a given trip, such as driving a car to a train station and then taking train to work. In this case, the choice set can include each possible combination of modes. Alternatively, the choice can be defined as the choice of "primary" mode, with the set consisting of car, bus, rail, and other (e.g. walking, bicycles, etc.). Note that the alternative "other" is included in order to make the choice set exhaustive.

7.18 DERIVATION OF INDIVIDUAL DEMAND CURVE

A demand curve shows how much quantity of a good will be purchased or demanded at various prices, assuming that tastes and preferences of a consumer, his income, prices of all related goods remain constant.

This demand curve showing explicit relationship between price and quantity demanded can be derived from price consumption curve of indifference curve analysis.

In Marshallian utility analysis, demand curve was derived on the assumptions that utility was cardinally measurable and marginal utility of money remained constant with the change in price of the good. In the indifference curve analysis, demand curve is derived without making these dubious assumptions.

Let us suppose that a consumer has got income of ₹ 300 to spend on goods. In money is measured on the Y-axis, while the quantity of the good X whose demand curve is to be derived is measured on the X-axis. An indifference map of a consumer is drawn along with the various budget lines showing different prices of the good X. Budget line PL_1 shows that price of the good X is ₹ 15 per unit.

As price of good X falls from ₹ 15 to ₹ 10, the budget line shifts to PL_2. Budget line PL_2 shows that price of good X is ₹ 10. With a further fall in price to ₹ 7.5 the budget line takes the position PL_3. Thus PL_3 shows that price of good X is ₹ 7.5. When price of good X falls to ₹ 6, PL_4 is the relevant budget line.

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The various budget lines obtained are shown in the column 2 of the Table 7.7. Tangency points between the various budget lines and indifference curves, which when joined together by a line constitute the price consumption curve shows the amounts of good X purchased or demanded at various prices.

With the budget line PL_1 the consumer is in equilibrium at point Q_1 on the price consumption curve PCC at which the budget line PL_1 is tangent to indifference curve IC_1. In his equilibrium position at Q_1 the consumer is buying OA units of the good X. In other words, it means that the consumer demands OA units of good X at price ₹ 15.

When price falls to ₹ 10 and thereby the budget line shifts to PL_2, the consumer comes to be in equilibrium at point Q_2 the price-consumption curve PCC where the budget line PL_2 is tangent to indifference curve IC_2. At Q_2, the consumer is buying OB units of good X.

In other words, the consumer demands OB units of the good X at price ₹ 10. Likewise, with budget lines PL_3 and PL_4, the consumer is in equilibrium at points Q_3 and Q_4 of price consumption curve and is demanding OC units and OD units of good X at price ₹ 7.5 and ₹ 6 respectively. It is thus clear that from the price consumption curve we can get information which is required to draw the demand curve showing directly the amounts demanded of the good X against various prices.

With the above information we draw up the demand schedule in Table 7.7 given above:

Table 7.7: Demand Schedule

Price of Good X ₹	Budget Line	Quantity Demanded
15	PL_1	OA
10	PL_2	OB
7.5	PL_3	OC
6	PL_4	OD

The above demand schedule which has been derived from the indifference curve diagram can be easily converted into a demand curve with price shown on the V-axis and quantity demanded on the X-axis. It is easier to understand the derivation of demand curve if it is drawn rightly below the indiff-erence curve diagram.

In the diagram at the bottom, where on the X-axis the quantity demanded is shown as in indifference curves diagram in the top pannel, but on the Y- axis in the diagram in the bottom panel price per unit of the good X is shown instead of total money. In order to obtain the demand curve, various points K, L, S and T

representing the demand schedule of the above table are plotted. By joining the points K, L, Sand T we get the required demand curve DD.

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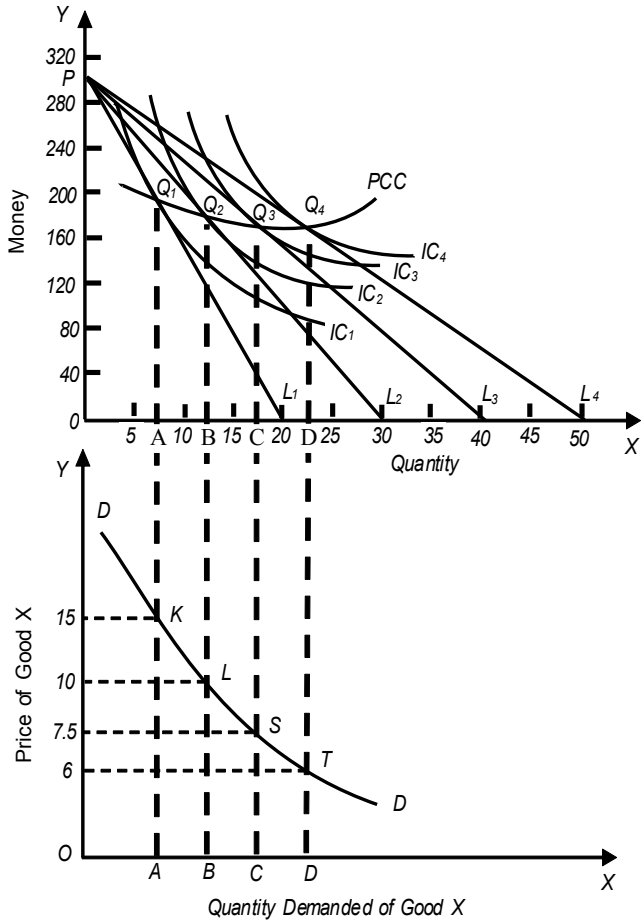

In most cases the demand curve of individuals will slope downward to the right, because as the price of a good falls both the substitution effect and income effect pull together in increasing the quantity demanded of the good. Even when the income effect is negative, the demanded curve will slope downward to the right if the substitution effect is strong enough to overwhelm the negative income effect. Only when the negative income effect is powerful enough to outweigh the substitution effects can the demand curve slope upward to the right instead of sloping downward to the left.

Deriving Demand Curve for a Giffen Good

The demand curve DD in Fig. is sloping downward. The demand curve slopes downward because of two forces, namely, income effect and substitution effect. Both the income effect and substitution effect usually work towards increasing the quantity demanded of the good when its price falls and this makes the demand curve slope downward. But in case of Giffen good,the demand curve slopes upward from left to right.

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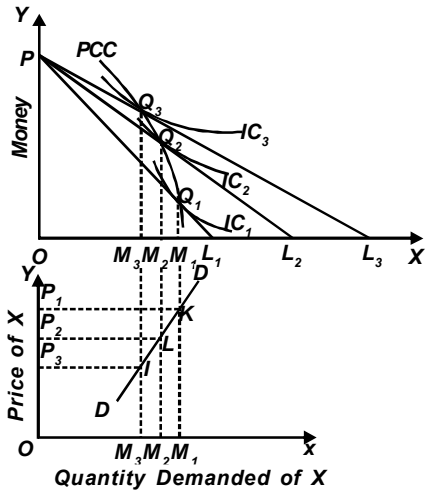
This is because in case of a Giffen good income effect, which is negative and works in opposite direction to the substitution effect, outweighs the substitution effect. This results in the fall in quantity demanded of the Giffen good when its price falls and therefore the demand curve of a Giffen good slopes upward from left to right. In Fig. the derivation of demand curve of a Giffen good from indifferencecurves diagram is explained. In Fig. the Indifference curves of a Giffen good are drawn along with the various budget lines showing various prices of the good. Price consumption curve of a Giffen good slopes backward. In order to simplify the discussion in this figure we have avoided the numerical values of prices and have instead used symbols such as, P_1, P_2, P_3 and $P_4$for various levels of the price of good X.



It is evident from Fig. (the upper portion) that with budget line PL_1 (or price P_1) the consumer is in equilibrium at Q_1 on the price consumption curve PCC and is purchasing OM) amount of the good. With the fall in price from P_1 to P_2 and shifting of budget line from PL_1 to PL_2, the consumer goes to the equilibrium position Q_3 at which he buys OM_2amount of the good. OM_2 is less than OM_1.

Thus with the fall in price from P_1 to P_2 the quantity demanded of the good falls. Likewise, the consumer is in equilibrium at Q_3 with price line PL_3 and is purchasing OM_3 at price P_3. With this information we can draw the demand curve, as is done in the lower portion of Fig. 8.48 It will be seen from Fig. (lower part) that the demand curve of a Giffen good slopes upward to the right indicating that the quantity demanded varies directly with the changes in price. With the rise in price, quantity demanded increases and with the fall in price quantity demanded decreases.

To sum up, in most cases (that is, in case of normal goods) the demand curve of individuals will slope downward to the right, because as the price of a good falls both the substitution effect and income effect pull together in increasing the quantity

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demanded of the good. Even in case of inferior goods for which the income effect is negative, the demand curve will slope downward to the right if the substitution effect is strong enough to overwhelm the negative income effect. Only in case of Giffen goods for which the negative income effect is powerful enough to outweigh the substitution effect, the demand curve slopes upward to the right intend of sloping downward to the left.

7.19 COMPARISON OF ORDINAL AND CARDINAL UTILITY APPROACH

Sl. No.	Cardinal utility Approach	Ordinal utility Approach
1	Cardinal utility is the utility wherein the satisfaction derived by the consumers from the consumption of good or service can be measured numerically.	Ordinal utility states that the satisfaction which a consumer derives from the consumption of product or service cannot be measured numerically.
2	Cardinal utility measures the utility objectively.	There is a subjective measurement of ordinal utility.
3	Cardinal utility is less realistic, as quantitative measurement of utility is not possible.	The ordinal utility is more realistic as it relies on qualitative measurement.
4	Cardinal utility is based on marginal utility analysis.	The concept of ordinal utility is based on indifference curve analysis.
5	The cardinal utility is measured in terms of utils, i.e. units of utility.	The ordinal utility is measured in terms of ranking of preferences of commodity when compared to each other.
6	Cardinal utility approach propounded by Alfred Marshall and his followers.	Ordinal utility approach pioneered by Hicks and Allen.

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7.20 APPLICATION OF INDIFFERENCE CURVE ANALYSIS

The indifference curve technique has come as a handy tool in economic analysis. It has freed the theory of consumption from the unrealistic assumptions of the Marshallian utility analysis. In particular, mention may be made of consumer's equilibrium, derivation of the demand curve and the concept of consumer's surplus.

The indifference curve analysis has also been used to explain producer's equilibrium, the problems of exchange, rationing, taxation, supply of labour, welfare economics and a host of other problems. Some of the important problems are explained below with the help of this technique.

(1) The Problem of Exchange

With the help of indifference curve technique the problem of exchange between two individuals can be discussed. We take two consumers A and Â who possess two goods X and Y in fixed quantities respectively. The problem is how they can exchange the goods possessed by each other. This can be solved by constructing an Edgeworth-Bowley box diagram on the basis of their preference maps and the given supplies of goods.

(2) Effects of Subsidy on Consumers

The indifference curve technique can be used to measure the effects of government subsidy on low income groups. We take a situation when the subsidy is not paid in money but the consumers are supplied cereals at concessional rates, the price-difference being paid by the government. This is actually being done by the various state governments in India.

(3) The Problem of Rationing

The indifference curve technique is used to explain the problem arising from various systems of rationing. Usually rationing consists of giving specific and equal quantities of goods to each individual (we ignore families because equal quantities are not possible in their case).

The other, rather liberal, scheme is to allow an individual more or less quantities of the rationed goods according to his taste. It can be shown with the help of indifference curve analysis that the latter scheme is definitely better and beneficial than the former.

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(4) Index Numbers: Measuring Cost of Living

The indifferent curve analysis is used in measuring the cost of living or standard of living in terms of index numbers. We come to know with the help of index numbers whether the consumer is better off or worse off by comparing two time periods when the income of the consumer and prices of two goods change.

(5) The Supply of Labour

The supply curve of an individual worker can also be derived with the indifference curve technique. His offer to supply labour depends on his preference between income and leisure and on the wage rate. In hours of work and leisure are measured on the horizontal axis and income or money wage on the vertical axis.

(6) The Effect of Income Tax vs. Excise Duty

The indifference curve technique helps in considering the welfare implications of income tax vs. excise duty or sales tax. Whether an income tax hurts the tax payer more or an excise duty of an equal amount? Let us take a taxpayer who is required to pay, say Rs. 4000 annually either as income tax or as excise tax on a commodity X. It is further assumed that he will continue to buy the commodity even after the imposition of the duty when its price goes up.

(7) The Saving Plan of an Individual

The indifference curve technique can also be used to study the saving plan of an individual. An individual's decision to save depends upon his present and future income, his tastes and preferences for present and future commodities, their expected prices, on the current and future rate of interest, and on the stock of his savings.

As a matter of fact, his decision to save is influenced by the intensity of his desire for present goods and future goods. It he wants to save more, he spends less on present goods, other things being equal.

7.21 SUMMARY

The Ordinal Utility approach is based on the fact that the utility of a commodity cannot be measured in absolute quantity, but however, it will be possible for a consumer to tell subjectively whether the commodity derives more or less or equal satisfaction when compared to another.

Indifference curve is defined as the locus of points on the graph each representing a different combination of two substitute goods, which yield the same utility or level of satisfaction to a consumer. The combinations of goods give equal satisfaction to a consumer.

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Therefore, a consumer is indifferent between any two combinations of two goods when it comes to making a choice between them. When these combinations are plotted on the graph, the resulting curve is called indifference curve. This curve is also called as iso-utility curve or equal utility curve.

Monotonic preference means that a rational consumer always prefers more of a commodity as it offers him a higher level of satisfaction. In simple words, monotonic preferences imply that as consumption increases total utility also increases. For instance, a consumer's preferences are monotonic only when between any two bundles, he prefers the bundle which has more of at least one of the goods and no less of the other good as compared to the other bundle.

Indifference Map refers to the family of indifference curves that represent consumer preferences over all the bundles of the two goods. An indifference curve represents all the combinations, which provide same level of satisfaction. However, every higher or lower level of satisfaction can be shown on different indifference curves. It means, infinite number of indifference curves can be drawn.

An indifference curve is convex to the origin because of diminishing MRS. MRS declines continuously because of the law of diminishing marginal utility. As seen in Table 2.6, when the consumer consumes more and more of apples, his marginal utility from apples keeps on declining and he is willing to give up less and less of bananas for each apple. Therefore, indifference curves are convex to the origin. It must be noted that MRS indicates the slope of indifference curve.

An indifference map is the collection of indifference curves possessed by an individual.

We can draw more than one indifference curve on the same diagram. This family of curves is called indifference map. We know that right side curve yield higher utility and it goes on increasing as we move righter, While the curve in the left yield lesser utility and it goes on decreasing as we move towards left.

Budget line is a graphical representation of all possible combinations of two goods which can be purchased with given income and prices, such that the cost of each of these combinations is equal to the money income of the consumer. Alternately, Budget Line is locus of different combinations of the two goods which the consumer consumes and which cost exactly his income.

The term 'equilibrium' is frequently used in economic analysis. Equilibrium means a state of rest or a position of no change. It refers to a position of rest, which provides the maximum benefit or gain under a given situation. A consumer is said to be in equilibrium, when he does not intend to change his level of consumption, i.e., when he derives maximum satisfaction.

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Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure. The consumer has to pay a price for each unit of the commodity. So, he cannot buy or consume unlimited quantity. As per the Law of DMU, utility derived from each successive unit goes on decreasing. At the same time, his income also decreases with purchase of more and more units of a commodity.

Goods which are both purchased less when income rises, are called Inferior Goods. In case of such goods, the income effect is negative or weak and the substitution effect is positive or strong. The ultimate effect on demand for such a commodity is a slow increase or complete stoppages.

For example, a man may buy less (or no) coarse cloth and use more fine cloth in its place as his income rises. The inferior goods depend on the taste of individual buyer. When a commodity has several grades and specific qualities of goods and services, any of the grades can be called inferior goods for somebody or some group of people.

Complementarity thinking thus goes an important step beyond conventional "best practice" approaches. When many strategic or organisational choices are closely related to one another, seeking to optimise one of them without adapting the others may not yield the hoped-for performance gains, or may even backfire. Complementarities also make imitation by competitors more difficult, thus offering an additional competitive advantage to firms.

Substitutability is a construct borrowed from microeconomics that describes a continuum of possible interactions among the reinforcers in a given situation. Highly substitutable reinforcers, which occupy one end of the continuum, are readily traded for each other due to their functional similarity. Complementary reinforcers, at the other end of the continuum, tend to be consumed jointly in fairly rigid proportion, and therefore cannot be traded for one another except to achieve that proportion. At the center of the continuum are reinforcers that are independent with respect to each other; consumption of one has no influence on consumption of another. Psychological research and analyses in terms of substitutability employ standard operant conditioning paradigms in which humans and nonhumans choose between alternative reinforcers.

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The indifference curve technique has come as a handy tool in economic analysis. It has freed the theory of consumption from the unrealistic assumptions of the Marshallian utility analysis. In particular, mention may be made of consumer's equilibrium, derivation of the demand curve and the concept of consumer's surplus.

The indifference curve analysis has also been used to explain producer's equilibrium, the problems of exchange, rationing, taxation, supply of labour, welfare economics and a host of other problems. Some of the important problems are explained below with the help of this technique.

The indifference curve technique can be used to measure the effects of government subsidy on low income groups. We take a situation when the subsidy is not paid in money but the consumers are supplied cereals at concessional rates, the price-difference being paid by the government. This is actually being done by the various state governments in India.

7.22 GLOSSARY

(a) Ordinal Utility Approach: The Ordinal Utility approach is based on the fact that the utility of a commodity cannot be measured in absolute quantity, but however, it will be possible for a consumer to tell subjectively whether the commodity derives more or less or equal satisfaction when compared to another.

(b) Indifference Curve: Indifference curve is defined as the locus of points on the graph each representing a different combination of two substitute goods, which yield the same utility or level of satisfaction to a consumer. The combinations of goods give equal satisfaction to a consumer.

(c) Monotonic Preference: Monotonic preference means that a rational consumer always prefers more of a commodity as it offers him a higher level of satisfaction. In simple words, monotonic preferences imply that as consumption increases total utility also increases.

(d) Indifference Map: Indifference Map refers to the family of indifference curves that represent consumer preferences over all the bundles of the two goods. An indifference curve represents all the combinations, which provide same level of satisfaction. However, every higher or lower level of satisfaction can be shown on different indifference curves. It means, infinite number of indifference curves can be drawn.

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(e) Budget Line: Budget line is a graphical representation of all possible combinations of two goods which can be purchased with given income and prices, such that the cost of each of these combinations is equal to the money income of the consumer. Alternately, Budget Line is locus of different combinations of the two goods which the consumer consumes and which cost exactly his income.

(f) Consumer's Equilibrium: Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure. The consumer has to pay a price for each unit of the commodity. So, he cannot buy or consume unlimited quantity. As per the Law of DMU, utility derived from each successive unit goes on decreasing. At the same time, his income also decreases with purchase of more and more units of a commodity.

7.23 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Indifference curve?
2. What is diminishing marginal rate of substitution?
3. What is Indifference curve map?
4. What is Budget line?
5. What is Consumer's equilibrium?

(B) Extended Answer Questions

1. Discuss in details about Indifference curve analysis.
2. Explain the diminishing marginal rate of substitution.
3. Explain various properties of indifference curves.
4. Discuss consumer's equilibrium with assumptions.
5. Explain about complementarily and substitutability.
6. Distinguish between ordinal and cardinal utility approach.
7. Discuss various applications of indifference curve analysis.

(C) True or False

1. The Cardinal Utility approach is based on the fact that the utility of a commodity cannot be measured in absolute quantity.

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2. Indifference curve is defined as the locus of points on the graph each representing a different combination of two substitute goods.
3. Monotonic preference means that a rational consumer always prefers more of a commodity as it offers him a higher level of satisfaction.
4. Indifference Map refers to the family of indifference curves that represent consumer preferences over all the bundles of the two goods.
5. Budget line is a graphical representation of all possible combinations of two goods which can be purchased with given income and prices.
6. Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure.

(D) Multiple Choice Questions

1. What is based on the fact that the utility of a commodity cannot be measured in absolute quantity?
   (a) The Ordinal Utility approach
   (b) The Cardinal Utility approach
   (c) Indifference curve
   (d) Indifference Map
2. What is defined as the locus of points on the graph each representing a different combination of two substitute goods?
   (a) The Ordinal Utility approach
   (b) The Cardinal Utility approach
   (c) Indifference curve
   (d) Indifference Map
3. What refers to the family of indifference curves that represent consumer preferences over all the bundles of the two goods?
   (a) The Ordinal Utility approach
   (b) The Cardinal Utility approach
   (c) Indifference curve
   (d) Indifference Map

(E) Fill in the Blanks

1. _____ is based on the fact that the utility of a commodity cannot be measured in absolute quantity.

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2. _____ is defined as the locus of points on the graph each representing a different combination of two substitute goods.
3. _____ means that a rational consumer always prefers more of a commodity as it offers him a higher level of satisfaction.
4. Indifference Map refers to the family of indifference curves that represent consumer preferences over all the bundles of the _____.
5. _____ is a graphical representation of all possible combinations of two goods which can be purchased with given income and prices.

7.24 KEY TO CHECK YOUR ANSWER

(C) 1. False, 2. True, 3. True, 4. True, 5. True, 6. True

(D) 1. (a), 2. (c), 3. (d)

(E) 1. The Ordinal Utility approach, 2. Indifference curve, 3. Monotonic preference, 4. Two goods, 5. Budget line

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14. Prof. M.S. BHAT, and mk RAU. Managerial economic and financial analysis. Hyderabad.ISBN 978-81-7800-153-1

7.26 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

7.27 TERMINAL QUESTIONS

1. Discuss about effect of income and price change in consumer's equilibrium.

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2. Explain about income effect and substitution effect of inferior goods.

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UNIT 8 CONSUMER'S SURPLUS

Structure:

Objectives

After reading this unit you will be able to understand:

- The Marshallian Consumer's Surplus
- Hicsian Method of Measuring Consumer Surplus
- Application of consumer's surplus concept

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8.1 INTRODUCTION

Consumer surplus is defined as the difference between the total amount that consumers are willing and able to pay for a good or service (indicated by the demand curve) and the total amount that they actually do pay (i.e. the market price).

8.2 MEANING OF CONSUMER'S SURPLUS

Consumer surplus is an economic measure of consumer benefit, which is calculated by analyzing the difference between what consumers are willing and able to pay for a good or service relative to its market price, or what they actually do spend on the good or service. A consumer surplus occurs when the consumer is willing to pay more for a given product than the current market price.

Explanation

The demand curve is a graphic representation used to calculate consumer surplus. It shows the relationship between the price of a product and the quantity of the product demanded at that price, with price drawn on the y-axis of the graph and quantity demanded drawn on the x-axis. Because of the law of diminishing marginal utility, the demand curve is downward sloping.

Consumer surplus is measured as the area below the downward-sloping demand curve, or the amount a consumer is willing to spend for given quantities of a good, and above the actual market price of the good, depicted with a horizontal line drawn between the y-axis and demand curve. Consumer surplus can be calculated on either an individual or aggregate basis, depending on if the demand curve is individual or aggregated. Consumer surplus always increases as the price of a good falls and decreases as the price of a good rises.

8.3 IMPORTANCE OF CONSUMER'S SURPLUS

It is useful to a Finance Minister in imposing taxes and fixing their rates. He will tax those commodities in which the consumers enjoy much surplus. In such cases, the people would be willing to pay more than they actually pay at present. Such taxes will bring in more revenue to the State. They will also mean comparatively less hardship than if taxes were imposed on commodities which do not yield much consumer's surplus.

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1. To the Businessman and Monopolist

To the businessman also the concept is very useful. He can raise prices of those articles in which there is a large consumer's surplus. In such cases, the consumers are willing to pay more than the prevailing price. The seller will be able to raise price especially if he is a monopolist and controls the supply of the commodity.

2. Comparing Advantages of Different Places

Our knowledge of consumer's surplus proves useful when we compare the advantage of living in two different places. A place where there are greater amenities available at cheaper rates will be better to live in. In these places, the consumers enjoy large surplus of satisfaction. Consumer's surplus thus indicates conjuncture advantages, i.e., the advantages of environment arid opportunities.

3. Distinction between Value-in-Use and Value-in-Exchange

Consumer's surplus draws a clear distinction between value-in-use and value-in-exchange. Commodities like salt and match-box have a great value-in-use but much less value-in-exchange. Being necessaries and cheap things, they yield, however, a large consumer's surplus. The consumer's surplus depends on total utility, whereas price depends on marginal utility.

4. Measuring Benefits from International Trade

Consumer's surplus mea-sures benefits from international trade. We can import things cheaply from abroad. Before importing them, we were paying more for similar home-produced goods. The imports, therefore, yield a surplus of satisfaction. We would have paid for them more than what we actually pay. This is consumer's surplus. The larger this surplus, the more beneficial is the international trade.

8.4 THE MARSHALLIAN CONSUMER'S SURPLUS

The concept of consumer surplus was first formulated by Dupuit in 1844 to measure social benefits of public goods such as canals, bridges, national highways. Marshall further refined and popularised this in his 'Principles of Economics" published in 1890.

The concept of consumer sur-plus became the basis of old welfare economics. Marshall's concept of consumer's surplus was based on the cardinal measurability and interpersonal comparisons of utility. According to him, every increase in consumer's surplus is an indicator of the increase in social welfare. As we shall see below, consumer's surplus is simply the difference between the price that 'one is willing to pay' and 'the price one actually pays' for a particular product.

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Concept of consumer's surplus is a very important concept in economic theory, especially in theory of demand and welfare economics. This concept is important not only in economic theory but also in formulation of economic policies such as taxation by the Government and price policy pur-sued by the monopolistic seller of a product.

The essence of the concept of consumer's surplus is that a consumer derives extra satisfaction from the purchases he daily makes over the price he actually pays for them. In other words, people generally get more utility from the consumption of goods than the price they actually pay for them.

It has been found that people are prepared to pay more price for the goods than they actually pay for them. This extra satisfaction which the consum-ers obtain from buying a good has been called consumer surplus.

Thus, Marshall defines the consumer's surplus in the following words: "excess of the price which a consumer would be willing to pay rather than go without a thing over that which he actually does pay is the economic measure of this surplus satisfaction…. it may be called consumer's surplus."

The amount of money which a person is willing to pay for a good indicates the amount of utility he derives from that good; the greater the amount of money he is willing to pay, the greater the utility he obtains from it.

Therefore, the marginal utility of a unit of a good determines the price a consumer will be prepared to pay for that unit. The total utility which a person gets from a good is given by the sum of marginal utilities (IMU) of the units of a good purchased and the total price which he actually pays is equal to the price per unit of the good multiplied by the number of units of it purchased.

Thus:

Consumer's surplus = What a consumer is willing to pay minus what he actually pays.

= " Marginal utility – (Price x Number of units of a commodity purchased)

The concept of consumer surplus is derived from the law of diminishing marginal utility. As we purchase more units of a good, its marginal utility goes on diminishing. It is because of the diminish-ing marginal utility that consumer's willingness to pay for additional units of a commodity declines as he has more units of the commodity.

The consumer is in equilibrium when marginal utility from a commodity becomes equal to its given price. In other words, consumer purchases the number of units of a commodity at which marginal utility is equal to price. This means that at the margin what a consumer will be willing to pay (i.e., marginal utility) is equal to the price he actually pays.

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But for the previous units which he purchases, his willingness to pay (or the marginal utility he derives from the commodity) is greater than the price he actually pays for them. This is because the price of the commodity is given and constant for him and therefore price of all the units is the same.

Marshall's Measure of Consumer Surplus

Consumer surplus measures extra utility or satisfaction which a consumer obtains from the consumption of a certain amount of a commodity over and above the utility of its market value. Thus the total utility obtained from consuming water is immense while its market value is negligible.

It is due to the occurrence of diminishing marginal utility that a consumer gets total utility from the consumption of a commodity greater than its market value. Marshall tried to obtain the monetary measure of this surplus, that is, how many rupees this surplus of utility is worth to the consumer.

It is the monetary value of this surplus that Marshall called consumer surplus. To determine this mon-etary measure of consumer surplus we are required to measure two things. First, the total utility in terms of money that a consumer expects to get from the consumption of a certain amount of a commodity. Second, the total market value of the amount of commodity consumed by him.

It is quite easy to measure the total market value as it is equal to market price of a commodity multiplied by its quantity purchased (i.e., P.Q.). An important contribution of Marshall has been the way he devised to determine the monetary measure of the total utility a consumer obtained from the commodity.

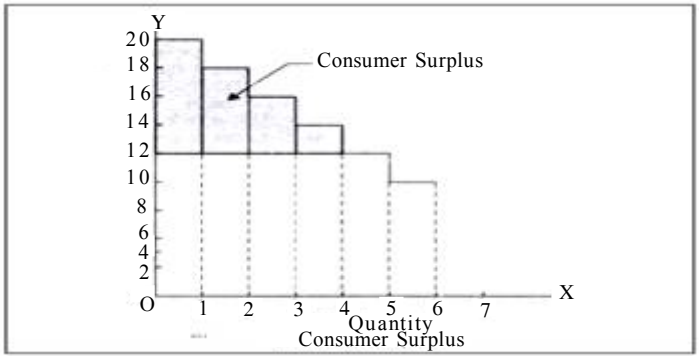

Table: Marginal Utility and Consumer Surplus

No. of Units	*Marginal Utility*	*Price*	*Net Marginal Benefit*
1	₹ 20	₹ 12	₹ 8
2	₹ 18	₹ 12	₹ 6
3	₹ 16	₹ 12	₹ 4

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4	₹ 14	₹ 12	₹ 2
5	₹ 12	₹ 12	₹ 0
6	₹ 10	₹ 12	₹ (– 2)

Total Consumer Surplus (from 5 units) = 20

Suppose for the first unit of the commodity the consumer is prepared to pay ₹ 20. This means that the first unit of the commodity is at least worth ₹ 20 to him. In other words, he derives marginal utility equal to ₹ 20 from the first unit.

For the second unit of the commodity, he is willing to pay ₹ 18, that is, the second unit is at least worth ₹ 18 to him. This is in accordance with the law of diminishing marginal utility. Similarly, the marginal utility of the third, fourth, fifth and sixth units of the commodity fall to ₹ 16, 14, 12 and 10 respectively.

However, actually the consumer has not to pay the sum of money equal to the marginal utility or marginal valuation he places on them. For all the units of the commodity he has to pay the current market price of the commodity.

Suppose the current market price of the commodity is ₹ 12. It will be seen from the Table 1 and Fig. that the consumer will buy 5 units of the commodity at this price because his marginal utility of the fifth unit just equals the market price of ₹12.

This shows that his marginal utility of the first four units is greater than the market price which he actually pays for them. He will therefore obtain surplus or net marginal benefit of ₹ 8 (₹ 20 – 12) from the first unit, ₹ 6 (= ₹18-12) from the second unit, ₹ 4 from the third unit and ₹ 2 from the fourth unit and zero from the fifth unit. He thus obtains total consumer surplus or total net benefit equal to ₹ 20.

Measurement of Consumer Surplus as an Area under the Demand Curve:

The analysis of consumer surplus made above is based on discrete units of the commodity. If we assume that the commodity is perfectly divisible, which is usually made in economic theory, the consumer surplus can be represented by an area under the demand curve.

The measurement of consumer surplus from a commodity from the demand or marginal utility curve is illustrated in Fig. 14.2 in which along the X-axis the amount of the commodity has been measured and on the Y-axis the marginal utility (or willingness to pay for the commodity) and the price of the commodity are mea-sured.

DD' is the demand or marginal utility curve which is sloping downward, indicating that as the consumer buys more units of the commodity falls, marginal utility of the additional units of the commodity. As said above, marginal utility shows the price which a person is willing to pay for the different units rather than go without them.

If OP is the price that prevails in the market, then the consumer will be in equilibrium when he buys OM units of the commodity, since at OM units, marginal utility from

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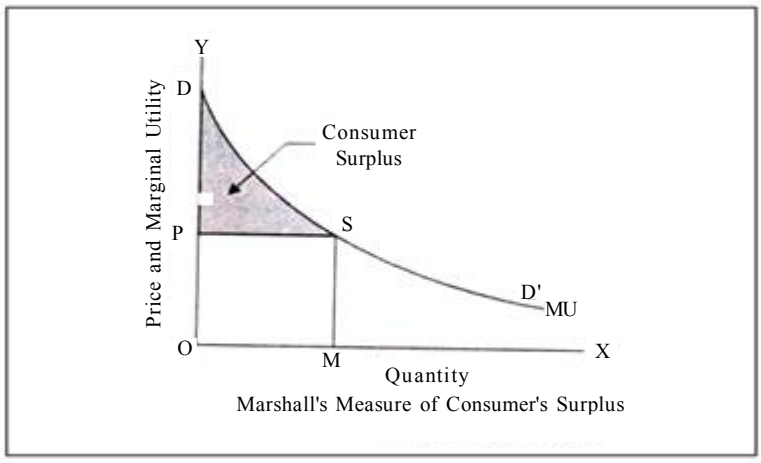
a unit of the commodity is equal to the given price OP. The Mth unit of the commodity does not yield any consumer's surplus to the consumer since this is the last unit pur-chased and for this price paid is equal to the marginal utility which indicates the price that he is prepared to pay rather than go without it. But for the intra-marginal units i.e., units before Mth unit, marginal utility is greater than the price and. therefore, these units yield consumer's surplus to the consumer. The total utility of a certain quantity of a commodity to a consumer can be known by summing up the marginal utilities of the various units purchased.



Marshall's Measure of Consumer's Surplus

In Fig., the total utility derived by the consumer from OM units of the commodity will be equal to the area under the demand or marginal utility curve up to point M. That is, the total utility of OM units in Fig. 14.2 is equal to ODSM.

In other words, for OM units of the good the consumer will be prepared to pay the sum equal to ₹ ODSM. But given the price equal to OP, the consumer will actually pay the sum equal to ₹ OPSM for OM units of the good. It is thus clear that the consumer derives extra utility equal to ODSM minus OPSM = DPS, which has been shaded in Fig. 14.2. To conclude when we draw a demand curve, the monetary measure of consumer surplus can be ob-tained by the area under the demand curve over and above the rectangular area representing the total market value (i.e., PQ. or the area OPSM) of the amount of the commodity purchased.

If market price of the commodity rises above OP, the consumer will buy fewer units of the commodity than OM. As a result, consumer's surplus obtained by him from his purchase will decline. On the other hand, if price falls below OP, the consumer will be in equilibrium when he is purchasing more units of the commodity than OM.

As a result of this, the consumer's surplus will increase. Thus, given the marginal utility curve of the consumer, the higher the price, the smaller the consumer's surplus and the lower the price, the greater the consumer's surplus.

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It worth noting here that in our analysis of consumer's surplus, we have assumed that perfect competition prevails in the market so that the consumer faces a given price, whatever the amount of the commodity he purchases.

But if seller of a commodity discriminates the prices and charges different prices for the different units of the good, some units at a higher price and some at a lower price, then in this case consumer's surplus will be smaller.

Thus, when the seller makes price discrimination and sells different units of a good at different prices, the consumer will obtain smaller amount of consumer's surplus than under perfect competition. If the seller indulges in perfect price discrimination, that is, if he charges price for each unit of the commodity equal to what any consumer will be prepared to pay for it, then in that case no consumer's surplus will acquire to the consumer.

8.5 ASSUMPTIONS OF CONSUMER'S SURPLUS THEORY

The following assumptions base the theory of consumer's surplus or buyer's surplus:

1. Utility as a measurable entity

The theory of consumer's surplus assumes that utility can be measured. Marshall in his cardinal utility theory has assumed that utility is a measurable entity. He claims that utility can be measured in cardinal numbers (1, 2, 3…). The imaginary unit to measure utility is known as 'util'. For instance, the utility derived from a banana is 15 utils, the utility derived from an apple is 10 utils, and so on.

2. No alternative commodities available

The second important assumption is that the commodity under consideration does not have substitutes.

3. Ceteris paribus

This assumption means that the customer's income, tastes, preferences and fashion remain unchanged during the analysis.

4. Marginal utility of money is constant

The theory of consumer's surplus further assumes that the utility derived from the money stock in the hands of the customer is constant. Any change in the quantity of money that is in the hands of customer does not affect the marginal utility derived from it. This assumption is necessary because without it, money cannot perform as a measuring rod.

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5. Concept of diminishing marginal utility

The theory of consumer's surplus is based on the law of diminishing marginal utility. The law of diminishing marginal utility claims that as you consumer more of a commodity, the marginal utility derived from it decreases eventually.

6. Independent marginal utility

This assumption means that marginal utility derived from the commodity under consideration is not influenced by the marginal utilities derived from other commodities. For instance, we are analyzing consumer's surplus for oranges. Though an apple is a fruit, the utility derived from it does not affect the utility derived from oranges.

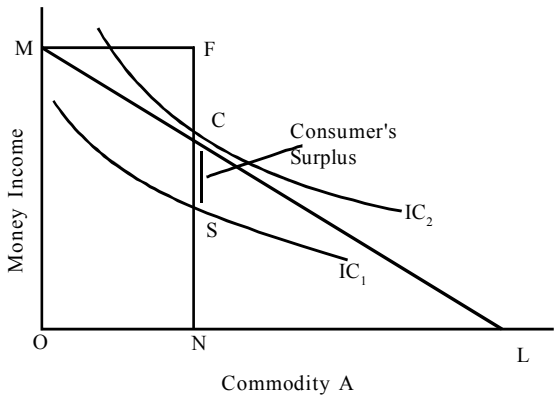
8.6 HICSIAN METHOD OF MEASURING CONSUMER SURPLUS

Prof. J.R. Hicks and R.G.D. Allen have introduced indifference curve approach to measure consumer's surplus. Prof. J.R. Hicks and R.G.D. Allen are unable to accept the assumptions suggested by Marshall in his version of measuring consumer's surplus. According to these economists, the assumptions are impracticable and unrealistic.

According to Prof. J.R. Hicks and R.G.D. Allen,

1. Marginal utility of money is not constant. If the stock of money decreases, the marginal utility of money will increase.
2. Utility is not a measurable entity but subject in nature. Hence, it cannot be measured in cardinal numbers.
3. Utility derived from a unit of a commodity is not independent. Instead, utility is related to previous units consumed.

In figure 4, horizontal axis measures commodity A and vertical axis measures money income.



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Assume that the consumer does not know the price of commodity A. This means that there is no price line or budget line to optimize his consumption. Therefore, he is on the combination S on indifference curve IC_1. At point S, the consumer has ON quantity of commodity A and SN amount of money. This implies that the consumer has spent FS amount of money on ON quantity of commodity A.

Now assume that the consumer knows the price of commodity A. Hence, he can draw his price line or budget line (ML). With the price line (ML), the consumer realizes that he can shift to a higher indifference curve (IC_2). Therefore, the new moves to the new equilibrium (point C), where the price line ML is tangent to the indifference curve IC_2. At point C, the consumer has ON quantity of commodity A and NC amount of money. This implies that the consumer has spent FC amount of money on ON quantity of commodity A. Now the consumer has to spend only FC amount of money instead of FS to purchase ON quantity of commodity A. Therefore, CS is the consumer's surplus.

The Hicks' version of measuring consumer's surplus attains results without Marshall's doubtful assumption. Hence, Hicks' version is considered to be superior to that of Marshall's.

8.7 APPLICATION OF CONSUMER'S SURPLUS CONCEPT

1. Conjectural Advantages:

The concept enables us to compare the advantages of environment and opportunities or conjectural benefits. The conjectural benefits derived by people enable us to compare the standards of living in different parts of the world. If consumers' surplus is more in any country, then living standards of the people are high and vice – versa. For example, the living standards of the people of USA or Japan is certainly more when compared to India because in those countries the national output, national income and per capita income of the people are high Thus, it helps to measure the volume of economic welfare of the people who live in different parts of the world.

2. Use in cost benefit analysis:

Today the concept is extensively used in estimating the cost benefits of various investment projects both in the private and public sectors. Costs and benefits do not merely mean money costs and monetary benefits but also real costs and real benefits in terms of satisfaction and the amount of resource utilization. The quantum of consumers' surplus derived from social projects like railways, roads, bridges, dams, flyovers, parks, libraries, water and electricity supply etc by consumers are

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definitely higher when compared to the amount of money spent on them. For example, a consumer would pay a very little amount of money to travel in a public transport vehicle than what he has to pay if he were to travel in an auto-rickshaw or taxi. The cost savings from these projects are directly derived from consumers' surplus.

3. Use in public Finance:

It is the basis to impose taxes on people. If consumer's surplus is high in case of any product or service, then the finance minister can impose higher taxes on them and vice – versa. This is because people are ready to pay more prices for such products rather than go without them. It is the basis to declare whether taxation policy of a government is good or bad. If the gain to the government on account of tax collection is greater than the losses to the consumers on account of tax payment, it is a good taxation policy and vice – versa.

In this case, the total tax amount collected by the government is greater than that of the total amount of sacrifice made by the people on account of tax payments.

It is the basis to grant subsidy by the government to private entrepreneurs. If the amount of gain to the people on account of subsidy is greater than the financial loss to the government owing to the grant of subsidy, we can justify such subsidy and vice – versa. For example, if government grants subsidy to sugar, market price of sugar declines and consequently, more consumers would buy more quantity of sugar and enjoy greater amount of satisfaction.

4. Pricing of public utilities:

The concept helps in determining prices of public utilities. In case of construction of railway lines, air ports, roads, bridges, generation and supply of electricity, water supply etc, and people enjoy enormous amount of surplus satisfaction. While fixing the prices of these services, or commodities, the government does not look into its production and supply cost. As they are public utilities, the government follows the policy of price discrimination.

5. Helps to resolve the paradox of value:

Generally speaking market value of product depends on its demand and supply. In case of certain essential commodities like water etc supply will be more and as such its market price will be low. In these cases, marginal utility will be low whatever may be the value of total utility. In case, there is scarcity of a product in the market, its price would go up. In this case, marginal utility will be high whatever may be value of total utility.

Commodities which have more value in use give more satisfaction than others which have more value in exchange. For example, in case of salt, match box, news

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paper etc total utility is more but marginal utility is less and as such we pay much less money for them. Value in use in case of such goods is much higher than their value in exchange.

Commodities which have more value in exchange give less satisfaction than others which have more value in use. For example, in case of diamond, value in –exchange is more than value in use because in these cases, marginal utility is higher than total utility. Thus, the concept helps to distinguish between value in use and value in – exchange.

6. Use monopoly Pricing:

It helps the monopolist to practice price discrimination. If consumers' surplus is high, in case of any commodity or service, then the monopolist can charge higher prices and vice – versa.

7. Use in international Trade:

It is the basis to import certain items from other countries. If consumers' surplus is more in case of imported goods than domestically manufactured goods, in that case it is better to import.

Similarly, if consumers' surplus is low with in the country and high in other nations, in that case, it is better to export them to other nations.

8. Use in welfare Economics:

It is used as a tool in welfare economics. The doctrine emphasis the advantages derived due to a fall in the prices of the commodities.

Fall in price leads to rise in the real income of the consumer and this will definitely raise the level of welfare of the people, the level of economic well being of the people is higher in those countries.

According to Dr. Little, the government should adopt those economic policies which promote consumers' surplus. Such policies will certainly help to increase the economic welfare of the people to the maximum extent.

9. Use in introduction of new products:

If consumers' surplus is greater in the case of introduction of a new product than the disappearance of the old product, we can justify the introduction of a new product into the market. This helps the consumers to maximize their satisfaction. Thus the concept of consumers' surplus has great practical application in all most all fields of economic activities.

8.8 SUMMARY

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Consumer surplus is defined as the difference between the total amount that consumers are willing and able to pay for a good or service (indicated by demand curve) and the total amount that they actually do pay (i.e., the market price).

Consumer surplus is an economic measure of consumer benefit, which is calculated by analyzing the difference between what consumers are willing and able to pay for a good or service relative to its market price, or what they actually do spend on the good or service. A consumer surplus occurs when the consumer is willing to pay more for a given product than the current market price.

The demand curve is a graphic representation used to calculate consumer surplus. It shows the relationship between the price of a product and the quantity of the product demanded at that price, with price drawn on the y-axis of the graph and quantity demanded drawn on the x-axis. Because of the law of diminishing marginal utility, the demand curve is downward sloping.

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It is useful to a Finance Minister in imposing taxes and fixing their rates. He will tax those commodities in which the consumers enjoy much surplus. In such cases, the people would be willing to pay more than they actually pay at present. Such taxes will bring in more revenue to the State. They will also mean comparatively less hardship than if taxes were imposed on commodities which do not yield much consumer's surplus.

The concept of consumer surplus was first formulated by Dupuit in 1844 to measure social benefits of public goods such as canals, bridges, national highways. Marshall further refined and popularised this in his 'Principles of Economics" published in 1890.The concept of consumer surplus became the basis of old welfare economics. Marshall's concept of consumer's surplus was based on the cardinal measurability and interpersonal comparisons of utility. According to him, every increase in consumer's surplus is an indicator of the increase in social welfare. As we shall see below, consumer's surplus is simply the difference between the price that 'one is willing to pay' and 'the price one actually pays' for a particular product.

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Consumer surplus measures extra utility or satisfaction which a consumer obtains from the consumption of a certain amount of a commodity over and above the utility of its market value. Thus the total utility obtained from consuming water is immense while its market value is negligible.

Prof. J.R. Hicks and R.G.D. Allen have introduced indifference curve approach to measure consumer's surplus. Prof. J.R. Hicks and R.G.D. Allen are unable to accept the assumptions suggested by Marshall in his version of measuring consumer's surplus. According to these economists, the assumptions are impracticable and unrealistic.

The concept enables us to compare the advantages of environment and opportunities or conjectural benefits. The conjectural benefits derived by people enable us to compare the standards of living in different parts of the world. If consumers' surplus is more in any country, then living standards of the people are high and vice – versa. For example, the living standards of the people of USA or Japan is certainly more when compared to India because in those countries the national output, national income and per capita income of the people are high Thus, it helps to measure the volume of economic welfare of the people who live in different parts of the world.

According to Dr. Little, the government should adopt those economic policies which promote consumers' surplus. Such policies will certainly help to increase the economic welfare of the people to the maximum extent.

If consumers' surplus is greater in the case of introduction of a new product than the disappearance of the old product, we can justify the introduction of a new product into the market. This helps the consumers to maximize their satisfaction. Thus the concept of consumers' surplus has great practical application in all most all fields of economic activities.

8.9 GLOSSARY

(a) Consumer surplus: Consumer surplus is defined as the difference between the total amount that consumers are willing and able to pay for a good or service (indicated by the demand curve) and the total amount that they actually do pay (i.e. the market price).

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(b) Demand Curve: The demand curve is a graphic representation used to calculate consumer surplus. It shows the relationship between the price of a product and the quantity of the product demanded at that price, with price drawn on the y-axis of the graph and quantity demanded drawn on the x-axis.

(c) Consumer surplus measures: Consumer surplus measures extra utility or satisfaction which a consumer obtains from the consumption of a certain amount of a commodity over and above the utility of its market value. Thus the total utility obtained from consuming water is immense while its market value is negligible.

8.10 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Consumer's Surplus?
2. What is Marshallian Consumer's Surplus?
3. What is Demand Curve?
4. State any two assumptions of Consumer's Surplus Theory.

(B) Extended Answer Questions

1. Discuss importance of Consumer's Surplus.
2. Explain about the Marshallian Consumer's Surplus.
3. Discuss Marshall's Measure of Consumer Surplus.
4. State various assumptions of Consumer's Surplus Theory.
5. Discuss about Hicsian Method of Measuring Consumer Surplus.
6. Discuss various application of consumer's surplus concept.

(C) True or False

1. Consumer surplus is an economic measure of consumer benefit which is calculated by analyzing the difference between what consumers are willing and able to pay for a good or service relative to its market price.
2. The demand curve is a graphic representation used to calculate consumer surplus.
3. The concept of consumer surplus was first formulated by Dupuit in 1844.
4. Prof. J.R. Hicks and R.G.D. Allen have introduced indifference curve approach to measure consumer's surplus.

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(D) Multiple Choice Questions

1. What is an economic measure of consumer benefit which is calculated by analyzing the difference between what consumers are willing and able to pay for a good or service relative to its market price?
   (a) Consumer surplus
   (b) Demand curve
   (c) Production surplus
   (d) All the above
2. What is a graphic representation used to calculate consumer surplus?
   (a) Consumer surplus
   (b) Demand curve
   (c) Production surplus
   (d) All the above
3. The concept of consumer surplus was first formulated by Dupuit in the year……..
   (a) 1844
   (b) 1845
   (c) 1846
   (d) 1847

(E) Fill in the Blanks

1. …….is an economic measure of consumer benefit which is calculated by analyzing the difference between what consumers are willing and able to pay for a good or service relative to its market price.
2. The demand curve is a graphic representation used to calculate……...
3. The concept of consumer surplus was first formulated by……...
4. …….have introduced indifference curve approach to measure consumer's surplus.

8.11 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True

(D) 1. (a) 2. (b) 3. (a)

(E) 1. Consumer surplus 2. consumer surplus 3. Dupuit in 1844 4. Prof. J.R. Hicks and R.G.D. Allen

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8.13 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an

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above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

8.14 TERMINAL QUESTIONS

1. How do you implement the consumer's surplus concept for your business? Discuss.

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2. State various assumptions of Consumer's Surplus Theory. Discuss about Hicsian Method of Measuring Consumer Surplus.

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BLOCK II: Supply Side Economics

UNIT 9 THEORY OF PRODUCTION SURPLUS

Structure:

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Objectives

After reading this unit you will be able to understand:

- Production with one variable input
- Meaning of production
- Production related concepts
- Production function
- Law of production
- Production with two variable input
- Isoquants
- Marginal rate of technical substitution
- Properties of Iso-quants
- Isoquant map and economic region
- Other forms of isoquant
- Elasticity of substitution
- Law of returns to scale

9.1 INTRODUCTION

The cost-of-production theory of value is the theory that the price of an object or condition is determined by the sum of the cost of the resources that went into making it. The cost can comprise any of the factors of production (including labor, capital, or land) and taxation.

9.2 INTRODUCTION TO PRODUCTION

Production function is a function that specifies the output of a firm, an industry, or an entire economy for all combinations of inputs. This function is an assumed technological relationship, based on the current state of engineering knowledge; it does not represent the result of economic choices, but rather is an externally given entity that influences economic decision-making. Almost all economic theories presuppose a production function, either on the firm level or the aggregate level. In this sense, the production function is one of the key concepts of mainstream neoclassical theories. Some non-mainstream economists, however, reject the very concept of an aggregate production function.

The relationship of output to inputs is non-monetary; that is, a production function relates physical inputs to physical outputs, and prices and costs are not reflected in the function. But the production function is not a full model of the production

process: it deliberately abstracts from inherent aspects of physical production processes that some would argue are essential, including error, entropy or waste.

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9.3 SHORT RUN AND LONG RUN

Short Run

Short run is a period of time over which at least one factor must remain fixed. For most of the firms the fixed resource or factors which cannot be increased to meet the rising demand of the good is capital i.e., plant and machinery.

Short run is a period of time over which output can be changed by adjusting the quantities of resources such as labor, raw material, fuel but the size or scale of the firm remains fixed.

Long Run

The long run refers to a time period during which full adjustment to a change in environment can be made by the firm by varying all inputs , including capital equipment & factory building.

9.4 THE CONCEPT OF PRODUCTION FUNCTION

The production function is a mathematical expression which relates the quantity of factor inputs to the quantity of outputs that result. We make use of three measures of production/productivity.

(i) Total product is simply the total output that is generated from the factors of production employed by a business. In most manufacturing industries such as motor vehicles, freezers and DVD players, it is straightforward to measure the volume of production from labour and capital inputs that are used. But in many service or knowledge-based industries, where much of the output is "intangible" or perhaps weightless we find it harder to measure productivity

(ii) Average product is the total output divided by the number of units of the variable factor of production employed (e.g. output per worker employed or output per unit of capital employed)

(iii) Marginal product is the change in total product when an additional unit of the variable factor of production is employed. For example marginal product would measure the change in output that comes from increasing the employment of labour by one person, or by adding one more machine to the production process in the short run.

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The rate of output of a commodity functionally depends on the quantity of inputs used per unit of time. The technological-physical relationship between inputs and outputs is referred to as the production function. Basically, production function is an engineering concept, but it is widely used in business economics for studying production behaviour. "The production function is the name given to the relationship between rates of input of productive services and the rate of output of product. It is the economist's summary of technical knowledge".

The concept of production function is a summarized description of technological possibilities. It shows for a given technique of production output that can be obtained from various levels of factor inputs.

9.5 ATTRIBUTES OF PRODUCTION FUNCTION

1. State of technology and inputs:

It implies that the production of a firm depends on the state of technology and inputs. Technology refers to the sum total of knowledge of the means and methods of producing goods and services. It is the society's knowledge concerning the industrial and agricultural arts. It includes methods of organization and techniques of production. Input refers to anything that is used by the firm in the process of production. Thus, inputs include every type of productive resource land, labour, capital, etc., also time and human energy as well as knowledge, which are employed by the firm for producing a commodity. The set of factor inputs in a production function has the following important characteristics.

2. Flow concept:

A production function is a flow concept. It relates to the flow of inputs and the resulting flows of output of a commodity during a period of time. Here, time is taken to be functional or operational time period. Physical production function is a technical relationship between inputs and outputs expressed in physical terms and not in terms of a monetary unit, such as rupee.

3. Inputs are substitutes to one another:

Thus, for example, if a and b are substitutable factors, a may be increased instead of b. The is fixed while b is variable at a time. In practice, however, factors like labour and capital are not perfectly substitutable, but there may be sufficiently high degree of substitutability.

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4. Some inputs may be specific:

Inputs may be specific, particularly, highly specialized factors are of specific use, as they have least degree of substitutability.

5. Factors' combination for the maximum output:

The concept of a production function in economic analysis is viewed to indicate something more than just a technical relationship. It is taken to be the technical relationship.

6. Short run and long run production function:

Fixity or variability of factors depends on the functional time period under consideration. On functional criteria, there are short period and long period. Correspondingly, we have a short run and long run production functions. Short run production function pertains to the given scale of production; long run production function pertains to the changing scale of production.

9.6 PRODUCTION WITH ONE VARIABLE INPUT

The production function for a firm is the relationship between the quantities of inputs per time period and the maximum output that can be produced. It can be calculated for one or more than one variable factors of production. The one variable factor of production function corresponds to the short-run during which at least one factor of production is fixed.

9.7 THE SHORT RUN PRODUCTION FUNCTION

The short run is defined in economics as a period of time where at least one factor of production is assumed to be in fixed supply i.e. it cannot be changed. We normally assume that the quantity of capital inputs (e.g. plant and machinery) is fixed and that production can be altered by suppliers through changing the demand for variable inputs such as labour, components, raw materials and energy inputs. Often the amount of land available for production is also fixed.

The time periods used in textbook economics are somewhat arbitrary because they differ from industry to industry. The short run for the electricity generation industry or the telecommunications sector varies from that appropriate for newspaper and magazine publishing and small-scale production of foodstuffs and beverages. Much depends on the time scale that permits a business to alter all of the inputs that it can bring to production.

In the short run, the law of diminishing returns states that as we add more units of a variable input (i.e. labour or raw materials) to fixed amounts of land and capital,

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the change in total output will at first rise and then fall. Diminishing returns to labour occurs when marginal product of labour starts to fall. This means that total output will still be rising – but increasing at a decreasing rate as more workers are employed. As we shall see in the following numerical example, eventually a decline in marginal product leads to a fall in average product.

What happens to marginal product is linked directly to the productivity of each extra worker employed. At low levels of labour input, the fixed factors of production - land and capital, tend to be under-utilized which means that each additional worker will have plenty of capital to use and, as a result, marginal product may rise. Beyond a certain point however, the fixed factors of production become scarcer and new workers will not have as much capital to work with so that the capital input becomes diluted among a larger workforce. As a result, the marginal productivity of each worker tends to fall this is known as the principle of diminishing returns.

9.8 TOTAL PRODUCT, AVERAGE AND MARGINAL PRODUCTS

An example of the concept of diminishing returns is shown below. We assume, there is a fixed supply of capital (e.g. 20 units) available in the production process to which extra units of labour are added from one person through to eleven.

Total Product, Average and Marginal Products				
Capital Input	**Labour Input**	**Total Product**	**Marginal Product**	**Average Product of Labour**
20	1	5		**5**
20	2	16	**11**	**8**
20	3	30	**14**	**10**
20	4	56	**26**	**14**
20	5	85	**28**	**17**
20	6	114	**29**	**19**
20	7	140	**26**	**20**
20	8	160	**20**	**20**
20	9	171	**11**	**19**
20	10	180	**9**	**18**
20	11	187	**7**	**17**

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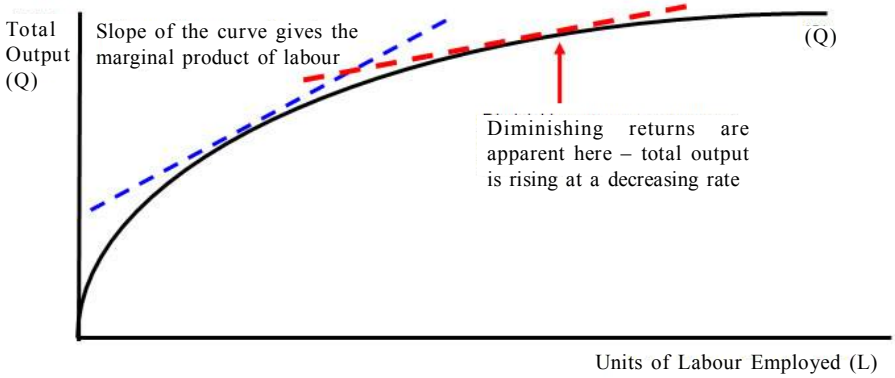
Average product will continue to rise as long as the marginal product is greater than the average for example when the seventh worker is added the marginal gain in output is 26 and this drags the average up from 19 to 20 units. Once marginal product is below the average as it is with the ninth worker employed (where marginal product is only 11) then the average will decline.



This marginal-average relationship is important to understanding the nature of short run cost curves. It is worth going through this again to make sure that you understand it.

9.9 THE LAW OF VARIABLE PROPORTIONS

The law of variable proportions states that as the quantity of one factor is increased, keeping the other factors fixed, the marginal product of that factor will eventually decline. This means that up to the use of a certain amount of variable factor, marginal product of the factor may increase and after a certain stage it starts diminishing. When the variable factor becomes relatively abundant, the marginal product may become negative.

Assumptions: The law of variable proportions holds good under the following conditions:

1. ***Constant State of Technology***: First, the state of technology is assumed to be given and unchanged. If there is improvement in the technology, then the marginal product may rise instead of diminishing.
2. ***Fixed Amount of Other Factors***: Secondly, there must be some inputs whose quantity is kept fixed. It is only in this way that we can alter the factor proportions and know its effects on output. The law does not apply if all factors are proportionately varied.
3. ***Possibility of Varying the Factor proportions***: Thirdly, the law is based upon the possibility of varying the proportions in which the various factors can be combined to produce a product. The law does not apply if the factors must be used in fixed proportions to yield a product.

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Illustration of the Law: The law of variable proportion is illustrated in the following table and figure. Suppose there is a given amount of land in which more and more labour (variable factor) is used to produce wheat.

Units of Labour	Total Product	Marginal Product	Average Product
1	2	2	2
2	6	4	3
3	12	6	4
4	16	4	4
5	18	2	3.6
6	18	0	3
7	14	-4	2
8	8	-6	1

It can be seen from the table that up to the use of 3 units of labour, total product increases at an increasing rate and beyond the third unit total product increases at a diminishing rate. This fact is shown by the marginal product which the addition is made to Total Product as a result of increasing the variable factor i.e. labour.

It can be seen from the table that the marginal product of labour initially rises and beyond the use of three units of labour, it starts diminishing. The use of six units of labour does not add anything to the total production of wheat. Hence, the marginal product of labour has fallen to zero. Beyond the use of six units of labour, total product diminishes and therefore marginal product of labour becomes negative. Regarding the average product of labour, it rises up to the use of third unit of labour and beyond that it is falling throughout.

9.10 THREE STAGES OF THE LAW OF VARIABLE PROPORTION

These stages are illustrated in the following figure where labour is measured on the X-axis and output on the Y-axis.

Stage 1: Stage of Increasing Returns:

In this stage, total product increases at an increasing rate up to a point. This is because the efficiency of the fixed factors increases as additional units of the variable factors are added to it. In the figure, from the origin to the point F, slope of the total product curve TP is increasing i.e. the curve TP is concave upwards up to the point F, which means that the marginal product MP of labour rises. The point F

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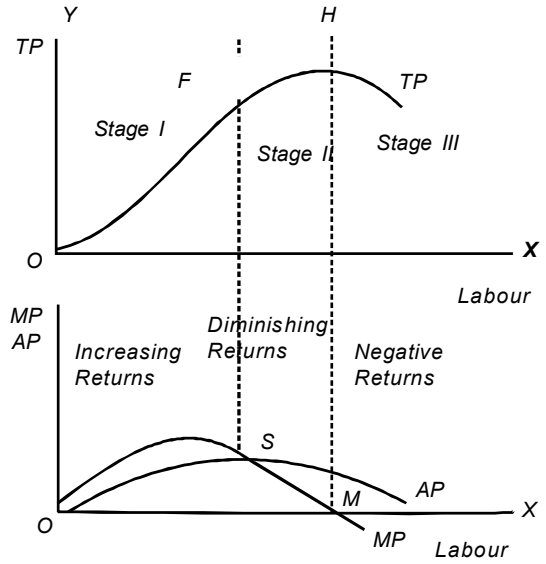
where the total product stops increasing at an increasing rate and starts increasing at a diminishing rate is called the point of inflection. Corresponding vertically to this point of inflection marginal product of labour is maximum, after which it diminishes. This stage is called the stage of increasing returns because the average product of the variable factor increases throughout this stage. This stage ends at the point where the average product curve reaches its highest point.



Stage 2: Stage of Diminishing Returns:

In this stage, total product continues to increase but at a diminishing rate until it reaches its maximum point H where the second stage ends. In this stage both the marginal product and average product of labour are diminishing but are positive. This is because the fixed factor becomes inadequate relative to the quantity of the variable factor. At the end of the second stage, i.e., at point M marginal product of labour is zero which corresponds to the maximum point H of the total product curve TP. This stage is important because the firm will seek to produce in this range.

Stage 3: Stage of Negative Returns:

In stage 3, total product declines and therefore the TP curve slopes downward. As a result, marginal product of labour is negative and the MP curve falls below the X-axis. In this stage the variable factor (labour) is too much relative to the fixed factor.

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9.11 RELATIONSHIP BETWEEN TP, AP AND MP

1. Relationship between MP and TP

From the above table and figure we can identify the following relationship between MP and TP

As long as MP is increasing, TP will increase at increasing rate

When MP starts diminishing, TP will increase but at a decreasing rate

When MP is zero, TP remains unchanged and is at its maximum. Thus

At MP=0, TP is maximum

When MP is negative, TP starts decreasing

2. Relationship between MP and AP

Similar to the relationship between MP and TP, we can also observe the relationship between MP and AP from the table and figure discussed above

AP increases till MP>AP

AP decreases when MP<AP

AP is maximum when AP=MP

MP can be zero or negative, but AP continues to be positive always

Production with two variable input: Isoquants, Marginal rate of technical substitution, Properties of Iso-quants, Isoquant map and economic region, other forms of isoquants, elasticity of substitution, law of returns to scale.

9.12 PRODUCTION WITH TWO VARIABLE INPUTS

The production functions with two inputs, labor and capital:

Q = F (K, L)

This function can be represented graphically using iso-quants. An iso-quant is a curve that shows all the possible combinations of inputs that yields the same output. Diminishing returns are observed by holding one variable fixed and looking at the marginal product of the other.

Iso-quants are typically convex downward sloping curves. Intuitively, this happens because, if output is held constant, it takes less capital to replace one unit of labor when labor is abundant than when it is scarce. The measure of increased output associated with proportional increases in all inputs is fundamental to the long-run nature of the firm's production process:

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- If output more than doubles when inputs is doubled, there are increasing returns to scale. This might happen because the increased scale allows more specialization of both workers and equipment.
- If output doubles when inputs are doubled, there are constant returns to scale. In other words it is the same to have two identical plants or a bigger plant with twice the labor and the capital.
- If output less than doubles when all inputs double, there are decreasing returns to scale. In general, above a certain size, all businesses show decreasing returns to scale because of the complexities of organizing and managing very large operations.

9.13 PRODUCTION FUNCTION THROUGH ISO-QUANT CURVE

In the long run, as all factors are variable, the firm has a wider choice of adopting productive techniques and factor proportions, in relation to employed technology. Again, the basic characteristic of productive resources is that they are substitutable, though imperfectly, by another one to a certain extent. Thus, in a given production function, the variability of different factor inputs also implies their substitutability. In fact, one factor can be substituted for another in a particular manner; so that a constant level of output may be maintained. To elucidate the point, let us assume a production function with two variable inputs, say, labour (L), and capital (K); thus: Q = F (L, K).

An ISO-quant derived from quantity and the Greek word ISO, meaning equal is a contour line drawn through the set of points at which the same quantity of output is produced while changing the quantities of two or more inputs. While an indifference curve mapping helps to solve the utility-maximizing problem of consumers, the Isoquant mapping deals with the cost-minimization problem of producers. Isoquants are typically drawn on capital-labor graphs, showing the technological tradeoff between capital and labor in the production function, and the decreasing marginal returns of both inputs. Adding one input while holding the other constant eventually leads to decreasing marginal output, and this is reflected in the shape of the isoquant. A family of isoquants can be represented by an isoquant map, a graph combining a number of isoquants, each representing a different quantity of output.

9.14 SHAPES OF ISO-QUANTS

If the two inputs are perfect substitutes, the resulting isoquant map generated is represented in fig. A; with a given level of production Q3, input X can be replaced by input Y at an unchanging rate. The perfect substitute inputs do not experience

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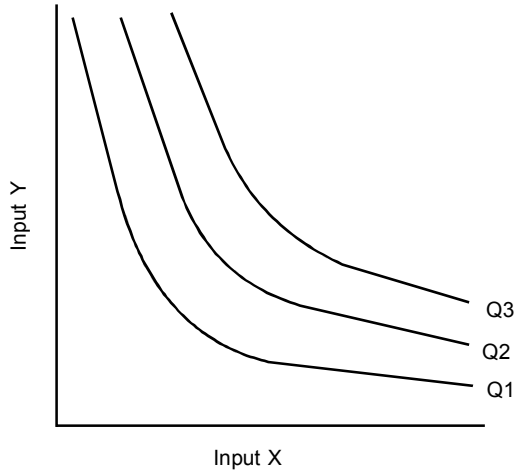
decreasing marginal rates of return when they are substituted for each other in the production function.

If the two inputs are perfect complements, the isoquant map takes the form of fig. B; with a level of production Q3, input X and input Y can only be combined efficiently in the certain ratio occurring at the kink in the isoquant. The firm will combine the two inputs in the required ratio to maximize profit.



Isoquants are typically combined with isocost lines in order to solve a cost-minimization problem for given level of output. In the typical case shown in the top figure, with smoothly curved isoquants, a firm with fixed unit costs of the inputs will have isocost curves that are linear and downward sloped; any point of tangency between an isoquant and an isocost curve represents the cost-minimizing input combination for producing the output level associated with that isoquant. A line joining tangency points of isoquants and iso-costs (with input prices held constant) is called the expansion path.

9.15 PROPERTIES OR CHARACTERISTICS OF ISO-QUANT

The main properties of the isoquants are similar to those of indifference curves. These properties are now discussed in brief:.

(i) An Isoquant Slopes Downward from Left to Right:

This implies that the Isoquant is a negatively sloped curve. This is because when the quantify of factor K (capital) is increased, the quantity of L (labor) must be reduced so as to keep the same level of output.

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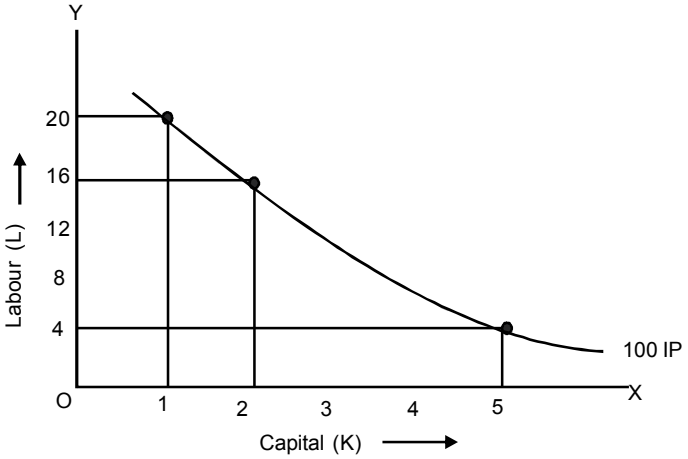

Fig. 9.1

The fig. (9.1) depicts that an isoquant IP is negatively sloped curve. This curve shows that as the amount of factor K is increased from one unit to 2 units, the units of factor L are decreased from 20 to 15 only so that output of 100 units remains constant.

(ii) An Isoquant that lays above and to the Right of another Represents a Higher Output Level:

It means a higher isoquant represents higher level of output.

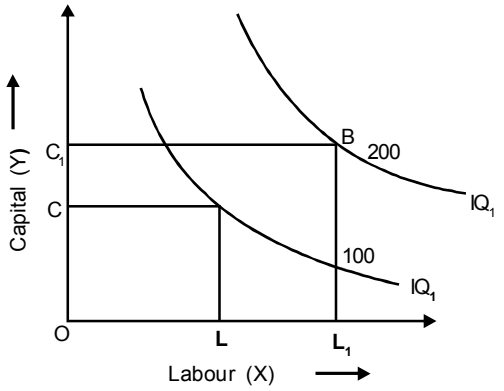

Fig. 9.2

The fig. 9.2 represents this property. It shows that greater output can be secured by increasing the quantity combinations of both the factors X and Y. The producer increases the output from 100 units to 200 units by increasing the quantity combination of both the X and Y. The combination of OC of capital and OL of labor yield 100 units of production. The production can be increased to 200 units by increasing the capital from OC to OC_1 and labor from OL to OL_1.

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(iii) Isoquants Cannot Cut Each Other:

The two isoquants cannot intersect each other.

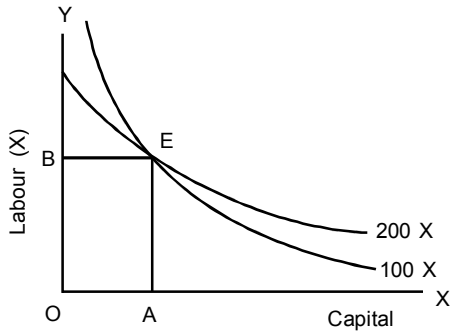

Fig. 9.4

If two isoquant are drawn to intersect each other as is shown in this fig. 9.4, then it is a negation of the property that higher Isoquant represents higher level of output to a lower Isoquant. The intersection at point E shows that the same factor combination can produce 100 units as well as 200 units. But this is quite absurd. How can the same level of factor combination produce two different levels of output, when the technique of production remains unchanged. Hence two isoquants cannot intersect each other.

(iv) Isoquants are Convex to the Origin:

This property implies that the marginal significance of one factor in terms of another factor diminishes along an ISO product curve. In other words, the isoquants are convex to the origin due to diminishing marginal rate of substitution.

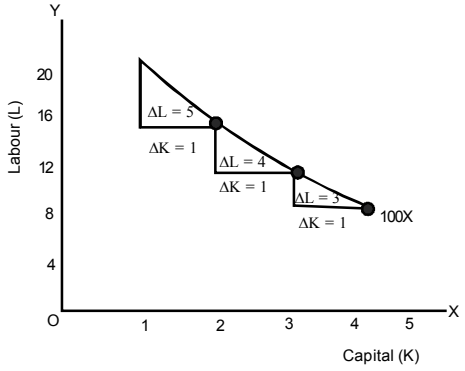

Fig. 9.5

In this fig. 12.6 MRS^{KL} diminishes from 5:1 to 4:1 and further to 3:1. This shows that as more and more units of capital (K) are employed to produce 100 units of the product, lesser and lesser units of labor (L) are used. Hence diminishing marginal rate of technical substitution is the reason for the convexity of an isoquant.

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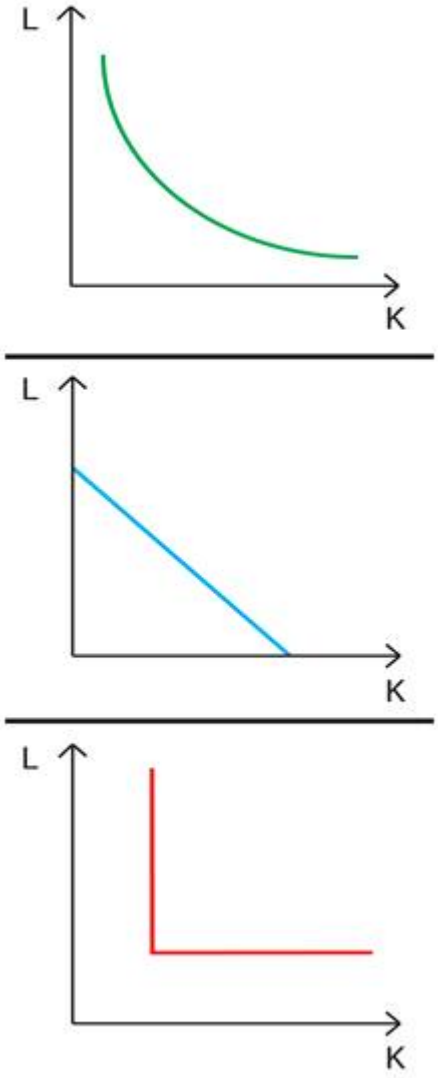
(v) Each Isoquant is Oval Shaped:

The ISO product curve is elliptical. This means that the firm produces only those segments of the ISO-product curves which are convex to the origin and lie between the ridge lines. This is the economic region of production.

9.16 MARGINAL RATE OF TECHNICAL SUBSTITUTION (MRTS)

The marginal rate of technical substitution (MRTS) can be defined as, keeping constant the total output, how much should input 1 decrease if input 2 increases by one extra unit. In other words, it shows the relation between inputs, and the trade-offs amongst them, without changing the level of total output. When using common inputs such as capital (K) and labour (L), the MRTS can be obtained using the following formula:



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$$MRTS_L^K \quad \frac{dL}{dK} \quad \frac{MgP_L}{MgP_K}$$

The MRTS is equal to the slope of isoquants. In the adjacent figure you can see three of the most common kinds of isoquants.

The first one has a MRTS those changes along the curve, and will tend to zero when diminishing the quantity of L and to infinite when diminishing the quantity of K.

In the second graph, both inputs are perfect substitutes, since the lines are parallel and the MRTS = 1, that is the slope has an angle of 45º with each axis. When considering different substitutes inputs, the slope will be different and the MRTS can be defined as a fraction, such as 1/2 ,1/3, and so on. For perfect substitutes, the MRTS will remain constant.

Lastly, the third graph represents complementary inputs. In this case the horizontal fragment of each indifference curve has a MRTS = 0 and the vertical fractions a MRTS = ".

9.17 THE LAW OF RETURNS TO SCALE

The law of returns to scale is concerned with the scale of production. The scale of production of a firm is determined by the amount of factors units. In the long run all factors are variable. The firm therefore can expand its production by using more of all inputs. When there is increase in the quantity of all factors in the long period, keeping the factor proportion constant, there is increase in the scale of production.

The concept of returns to scale explains the behavior of output when changes are made in the scale of production. Thus, the relationship between quantities of output and the scale of production in the long run when all inputs are increased in the same proportion, is called law of returns to scale. In case all inputs are increased in the same proportion and the scale of production is expanded, the effect on output may take three forms or stages, such as increasing, constant and diminishing returns to scale.

The law of returns to scale examines the relationship between output and the scale of inputs in the long-run when all the inputs are increased in the same proportion.

This law of returns to scale is based on the following assumptions;

(i) All factors are variable but the enterprise is fixed.

(ii) There is no change in technology.

(iii) Perfect competition prevails in the market.

(iv) Returns are measured in physical terms.

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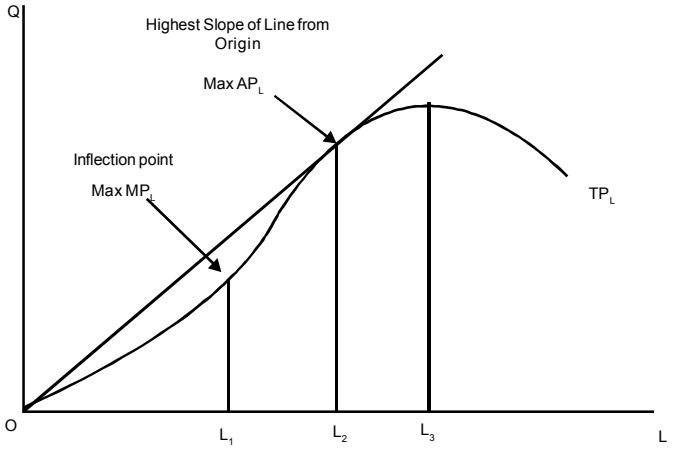
9.18 PHASES OF THE LAW OF RETURNS TO SCALE

Dr. Marshall states the law thus "An increase in the capital and labour applied in the cultivation of land causes in general a less than proportionate increase in the amount of the produce raised, unless it happens to coincide with an improvement in the art of agriculture.



Stage-1: Law of increasing returns:

As the proportion of one factor in a combination other factors is increased up to a point, the marginal product will increase or the total product will increase with increasing roofs. Here the rate of increase us represented by Marginal Product (MP). MP is defined as change in total product resulting from unit change in input. In agriculture, the initial state of production shows increasing rate. But in non-agricultural sector (industry) generally this law operates.

Stage-2: Law of constant returns:

The law of constant returns is said to be operated when retunes (MP) remains the same as the business is expanded. The constant return however is observed for a short period.

Stage-3: Law of decreasing returns:

The law of decreasing returns is the, opposite to the law of increasing returns. Here MP is declining continuously. The total product is increasing but with decreasing rate, and eventually it 1so declines and the MP becomes negative. This law is generally operates in agriculture.

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9.19 SUMMARY

Production function expresses in physical terms the relationship between factor input and the resulting output. Average product of labour is the ratio of total product to the units of labour input. Marginal product of labour is the addition to the total product resulting from a unit increase in the employment of labour.

In the production process, a firm combines various inputs in different quantities and proportions to produce different levels of outputs.

The relationship between input and output flows in manufacturing is determined by the technology employed and by the economic behaviour of the producers.

A production function is a flow concept. It relates to the flow of inputs and the resulting flows of output of a commodity during a period of time. Here, time is taken to be functional or operational time period.

The functional relationship between changes in input and consequent changes in output depends on the time element short run and long run time periods. This time element considered here is the functional or operational time period.

The term "short run" is defined as a period of time over which the inputs of some factors of production cannot be varied. Factors which cannot be altered in the short run are called fixed factors. Thus, by definition, in the short period, some factors are fixed and some are variable. Elements of capital such as plant, machinery and equipment are generally fixed in the short run. But a fixed factor can also be land or the manager or administrative staff. In the short period, thus, the output is produced with a given scale of production, i.e., the size of plant or firm remaining unchanged.

The law of variable proportions is based upon the fact that all factors of production cannot be substituted for one another. And it is a noted economic fact that "the elasticity of substitution between different factors is not infinite."

Total Product (TP): Total number of units of output produced per unit of time by all factor inputs is referred to as total product. In the short run however, the total output obviously increases with an increase in the variable factor input. Thus TP = F(QVF), where TP denotes total produce and QVF denotes the quantity of the variable factor.

Average Product (AP): The average product refers to the total product per unit of a given variable factor. Thus, by dividing the total product by the quantity of the variable factor, we get average product.

The law of diminishing returns becomes evident in the marginal product column. Initially, the marginal product of the variable input (labour) rises. The total product

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rises at an increasing rate (= marginal product). Average product also rises. This is analytically described as the stage of increasing returns.

The law of returns to scale is concerned with the scale of production. The scale of production of a firm is determined by the amount of factors units. In the long run all factors are variable. The firm therefore can expand its production by using more of all inputs. When there is increase in the quantity of all factors in the long period, keeping the factor proportion constant, there is increase in the scale of production.

Iso-quants are typically convex downward sloping curves. Intuitively, this happens because, if output is held constant, it takes less capital to replace one unit of labor when labor is abundant than when it is scarce. The measure of increased output associated with proportional increases in all inputs is fundamental to the long-run nature of the firm's production process:

In the long run, as all factors are variable, the firm has a wider choice of adopting productive techniques and factor proportions, in relation to employed technology. Again, the basic characteristic of productive resources is that they are substitutable, though imperfectly, by another one to a certain extent.

An ISO-quant derived from quantity and the Greek word ISO, meaning equal is a contour line drawn through the set of points at which the same quantity of output is produced while changing the quantities of two or more inputs.

The ISO product curve is elliptical. This means that the firm produces only those segments of the ISO-product curves which are convex to the origin and lie between the ridge lines. This is the economic region of production.

The marginal rate of technical substitution (MRTS) can be defined as, keeping constant the total output, how much should input 1 decrease if input 2 increases by one extra unit. In other words, it shows the relation between inputs, and the trade-offs amongst them, without changing the level of total output.

The law of returns to scale is concerned with the scale of production. The scale of production of a firm is determined by the amount of factors units. In the long run all factors are variable. The firm therefore can expand its production by using more of all inputs. When there is increase in the quantity of all factors in the long period, keeping the factor proportion constant, there is increase in the scale of production.

9.20 GLOSSARY

(a) Production function: Production function expresses in physical terms the relationship between factor input and the resulting output. Average product of labour is the ratio of total product to the units of labour input. Marginal product of labour is the addition to the total product resulting from a unit increase in the employment of labour.

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(b) Short Run: The term "short run" is defined as a period of time over which the inputs of some factors of production cannot be varied. Factors which cannot be altered in the short run are called fixed factors. Thus, by definition, in the short period, some factors are fixed and some are variable. Elements of capital such as plant, machinery and equipment are generally fixed in the short run.

(c) The law of variable proportions: The law of variable proportions is based upon the fact that all factors of production cannot be substituted for one another. And it is a noted economic fact that "the elasticity of substitution between different factors is not infinite."

(d) Total Product (TP): Total number of units of output produced per unit of time by all factor inputs is referred to as total product. In the short run however, the total output obviously increases with an increase in the variable factor input. Thus TP = F(QVF), where TP denotes total produce and QVF denotes the quantity of the variable factor.

(e) Average Product (AP): The average product refers to the total product per unit of a given variable factor. Thus, by dividing the total product by the quantity of the variable factor, we get average product.

(f) The law of returns to scale: The law of returns to scale is concerned with the scale of production. The scale of production of a firm is determined by the amount of factors units. In the long run all factors are variable. The firm therefore can expand its production by using more of all inputs. When there is increase in the quantity of all factors in the long period, keeping the factor proportion constant, there is increase in the scale of production.

(g) ISO-quant: An ISO-quant derived from quantity and the Greek word ISO, meaning equal is a contour line drawn through the set of points at which the same quantity of output is produced while changing the quantities of two or more inputs.

9.21 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Production?
2. What is Production Function?
3. What is Law of production?
4. What is Isoquant?

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5. What is Elasticity of substitution?
6. What is Law of returns to scale?

(B) Extended Answer Questions

1. Explain the Production Function.
2. What is short run and long run?
3. Discuss production with One Variable Input.
4. Give an example of Total Product, Average and Marginal Products.
5. Explain Law of Variable proportions.
6. Discuss the relationship between TP, AP and MP.
7. Explain production with two Variable Inputs.
8. Discuss production Function through ISO-Quant Curve.
9. Explain the shapes of ISO-Quants.
10. Discuss the properties or Characteristics of ISO-Quant.
11. Explain the marginal Rate of Technical Substitution (MRTS)
12. Discuss the Law of Returns to Scale
13. Explain the phases of the Law of Returns to Scale.

(C) True or False

1. Production implies provision of goods and services, often described as 'commodities.
2. The production function is the relationship between rates of input of productive services and the rate of output of product.
3. Output can be produced by keeping one factor or some factors fixed while other factors are varied.
4. Average number of units of output produced per unit of time by all factor inputs is referred to as total product.
5. The law of returns to scale is concerned with the scale of production.
6. The scale of production of a firm is determined by the amount of factors units.

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(D) Multiple Choice Questions

1. An input that being changed in the process of production during a given time period is called as…..
   (a) Variable inputs (b) Fixed inputs
   (c) None of them (d) Both i and ii
2. Marginal product of labour is the addition to the total product resulting from a unit increase in the employment of……
   (a) Labour (b) Engineer
   (c) Expert (d) None of them
3. The scale of production of a firm is determined by the amount of……..
   (a) Factors units (b) Fixed units
   (c) Both of them (d) None of the above
4. An ISO-quant derived from quantity and the Greek word …….
   (a) IGO (b) ISD
   (c) ISO (d) None of the above
5. The ISO product curve is……...
   (a) Elliptical (b) Direct
   (c) Straight (d) All the above

(E) Fill in the Blanks

1. The technological-physical relationship between inputs and outputs is referred to as the……..
2. Production process involves the transformation of all inputs into…….
3. The average product refers to the total product per unit of a given ……..factor.
4. Iso-quants are typically convex downward…….
5. The measure of increased output associated with proportional increases in all inputs is fundamental to the long-run nature of the firm's……...

9.22 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. False, 5. True, 6. True

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

(E) 1. Production function, 2. Output, 3. Variable, 4. Sloping curves, 5. Production process

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13. Maria Moschandreas (2000). Business Economics, 2nd Edition, Thompson Learning. Description and chapter-preview links.
14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

9.24 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an

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above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

9.25 TERMINAL QUESTIONS

1. Prepare a report on market demand of Honda Activa.

2. Discuss production Function through ISO-Quant Curve. Explain the shapes of ISO-Quants. Discuss the properties or Characteristics of ISO-Quant.

3. The students are required to identify various types of demand for different services.

*****

UNIT 10 OPTIMUM COMBINATION OF INPUTS

Structure:

Objectives

After reading this unit you will be able to understand:

- ISO cost line
- Optimum combination of inputs
- Choice of optimum expansion path
- Change in input prices and input combinations

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10.1 INTRODUCTION

Isocost curve is a producer's budget line while isoquant is his indifference curve. Isoquant is also called as equal product curve or production indifference curve or constant product curve. Isoquant indicates various combinations of two factors of production which give the same level of output per unit of time.

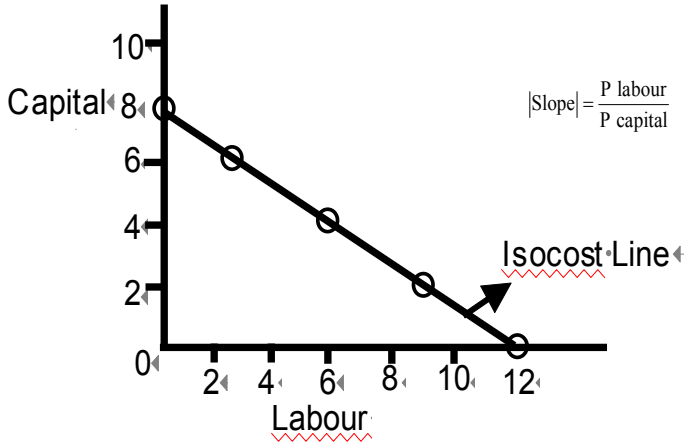
10.2 INTRODUCTION TO ISO COST LINE

An isocost line shows all combinations of inputs which cost the same total amount. Although similar to the budget constraint in consumer theory, the use of the isocost line pertains to cost-minimization in production, as opposed to utility-maximization.

The isocost line is an important component when analysing producer's behaviour. The isocost line illustrates all the possible combinations of two factors that can be used at given costs and for a given producer's budget. In simple words, an isocost line represents a combination of inputs which all cost the same amount.

Now suppose that a producer has a total budget of ₹ 120 and and for producing a certain level of output, he has to spend this amount on 2 factors A and B. Price of factors A and B are ₹ 15 and ₹ 10 respectively.

Combinations	Units of Capital Price = 150 ₹	Units of Labour Price = 100 ₹	Total expenditure (in Rupees)
A	8	0	120
B	6	3	120
C	4	6	120
D	2	9	120
E	0	12	120



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10.3 OPTIMUM COMBINATION OF INPUTS

An important problem facing an entrepreneur is to decide about a particular combination of factors which should be employed for producing a product. There are various technical possibilities open to a firm from which it has to choose, that is, there are various combinations of factors which can yield a given level of output and from among which a producer has to select one for production.

An isoquant or iso-product map represents various technical possibilities of producing different levels of output. It is assumed that the entrepreneur aims at maximising his profits. A profit maximising entre-preneur will seek to minimise his cost for producing a given output, or to put it in another way, he will maximise his output for a given level of outlay.

The choice of a particular combination of factors by an entrepreneur depends upon:

(a) Technical possibilities of production, and

(b) The prices of factors used for the production of a particular product.

Technical possibilities of production are represented by the isoquant map. Before explaining how a producer will arrive at the optimum or least-cost combination of factors, we shall first explain how the price of factors can be introduced into the study.

The Economic Region of Production and Ridge Lines:

Before explaining which factor combination a firm will use for production, it will be useful to demonstrate the region in which the optimal factor combination will lie. The traditional economic theory focuses on only those combinations of factors which are technically efficient and the marginal products of factors are diminishing but positive.

According to this isoquants are sloping downward (i.e. their slope is negative) and convex to the origin, however, there are regions in a production function, where isoquants may have positively sloped segments that is, bend backwards.

We represent a production function through isoquants and measure labour along the X- axis and capital along the Y-axis.

It will be seen from this figure that above the line OA and below the line OB slope of the isoquants is positive which means that increases in both capital and labour are required to produce a given fixed quantity of output. Obviously, the production techniques (that is, factor combinations) lying on these positively sloping segments of the isoquants are technically inefficient.

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It may be recalled that a technique or factor combination is technically inefficient if it requires more quantity of both the factors for producing a given level of output. The positively sloping segments of isoquants implies that marginal product of one of the factors has become nega-tive.

Thus, above the line OA, marginal product of capital has become negative, which means output can be increased by using less capital, while the amount of labour is held constant. On the other hand, below the line OB, marginal product of labour becomes negative, which means output can be increased by using less labour, keeping capital constant.

The lines OA and OB are called the ridge lines which bound a region in which marginal products of the two factors are positive. The ridge line OA connects those points of the isoquants where marginal product of capital is zero (MPL = 0). On the other hand, the ridge line OB connects those points of the isoquants where marginal product of labour is zero (MPL = 0). Thus, the ridge lines are the locus of points of isoquants where marginal product of one of the factors is zero.

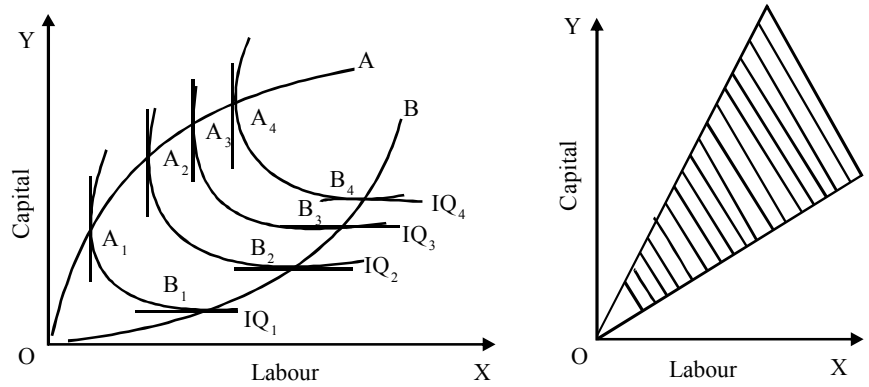
No rational entrepreneur will operate at a point outside the ridge lines since marginal product of one of the factors is negative and production is technically inefficient. In other words, production outside the ridge lines is inefficient, because same output can be produced with less quantity of the factors which must be cheaper.

Consider point R on isoquant Q2, R is the point where the isoquant is positively sloping and therefore lies outside the ridge line. It will be seen from fig. 18.1 that production at point R to produce output Q2 requires more of both capital and labour than some other points, such as point H, on the same isoquant. Since, both capital and labour have to paid positive prices; it will be cheaper to produce a given quantity of output at point H than at point R.

Thus, since production outside the ridge lines are technically inefficient and marginal product of one or the other factor is negative, no rational entre-preneur will like to operate outside the ridge lines if he aims at minimising cost to produce a given output. Thus, regions outside the ridge lines are called regions of economic nonsense.

A rational producer will produce in the region bounded by the two ridge lines OA and OB where the isoquants are negatively sloping, marginal products of factors are diminishing but positive. Therefore, the region bounded by the two ridge lines, OA and OB is called the region of economic production which has been shaded by us.

Exactly at what point in the economic region, a firm will operate depends on the outlay it has to make on purchas-ing the factors and also on prices of the factors. In what follows we now turn to explain this choice by a firm. We will first explain the concept of iso- cost line which is used in the study of optimum factor combination.



Ridge Lines and Economic Region

The above analysis also shows that there is a limit to which one factor can be substituted for another. As the substitution of one factor for another is carried out more and more, it becomes progressively more difficult unit a point is reached beyond which substitution between factors becomes impossible. As a result, the marginal product of the increasing fassctor first becomes zero and then it becomes negative so that isoquant becomes positively sloping.

Iso-Cost Line

The prices of factors are represented by the iso-cost line. The iso-cost line plays an important part in determining what combination of factors the firm will choose for production. An iso-cost line shows various combinations of two factors that the firm can buy with a given outlay.

How the iso- cost line is drawn where on the X-axis we measure units of labour and on the Y- axis we measure units of capital. We assume that prices of factors are given and constant for the factor.

In other words, we are considering a firm which is working under perfect competition in the factor markets. Further suppose that a firm has ₹ 300 to spend on the factors, labour and capital and price of labour is ₹ 4 per labour hour and the price of capital is ₹ 5 per machine hour. With outlay of ₹ 300, he can buy 75 units of labour or 60 units of machine hours (i.e., capital). OB represent 75 units of labour and OA represent 60 units of capital.

In other words, if the firm spends its entire outlay of ₹ 300 on factor X, it buys 75 units or OB of labour hours and if it spends its entire outlay of ₹ 300 on capital it buys 60 units or OA of machine hours. The straight line AB which joins points A and B will pass through all combinations of labour and capital which the firm can buy with outlay of ₹ 300, if it spends the entire sum on them at the given prices.

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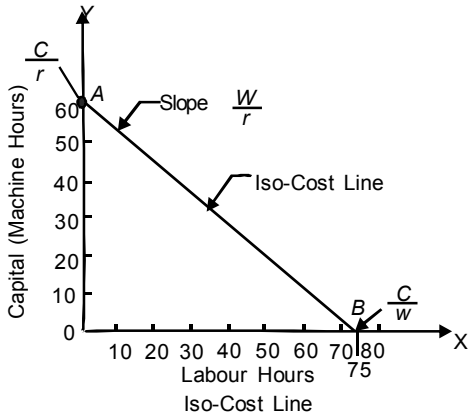
This line AB is called iso-cost line, for whichever combination laying on it the firm buys it has to incur the same cost or outlay at the given prices. An iso-cost line is defined as the locus of various combinations of factors which a firm can buy with a constant out-lay. The iso-cost line is also called the price line or outlay line.



The equation of the iso-cost line:

The total cost incurred on the factors of production for producing a commodity is equal to the sum of the payments made to labour and capital. Now, payment to labour used is equal to the wage rate (w) multiplied by amount of labour used (L).

Thus W.L represents the total payment made to labour. Similarly, rK is the total payment made for capital where r is the price per unit of capital and K is the quantity of capital used.

The total cost equation can therefore be written as follows:

$$C = wL + rK$$

Where C is the total cost incurred by the firm on purchasing the quantities of factors used for produc-tion.

Given the prices of factors, the iso-cost equation can be rearranged as under to express it in the intercept-slope form:

$$C = wL + rK$$

$$rK = C - w.L$$

$$K = C/r\text{-}w/r.L$$

Where C/r represents the intercept of the iso-cost line on the Y-axis and w/r represents the factor price ratio and is equal to the slope of the iso-cost line.

Slope of the iso-cost line:

The slope of the iso-cost line can be proved to be equal to the ratio of price of labour (w) and price of capital (r). Let, according to the iso-cost line AB, which

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given the factor prices, represents the total outlay or cost incurred on the two factors, labour and capital, the total cost equals C.

As explained above, the vertical intercept OA that represents the quantity of capital if entire cost-outlay is spent on it is equal to C/r. Similarly, the horizontal intercept OB representing the quantity of labour purchased if entire cost is incurred on purchasing it is equal to.

Now, the slope of the iso-cost line is:

$$OA/OB = C/r \div C/w = C/r \,.w/C = w/r$$

Thus, the slope of the iso-cost line is equal to the ratio of factor-prices (w/r).

10.4 OPTIMUM OR LEAST-COST COMBINATION OF FACTORS

An equal product map or isoquant map represents the various factor combinations which can yield various levels of output, every equal product curve or isoquant showing those factor combina-tions each of which can produce a specified level of output.

Thus, an equal product map represents the production function of a product with two variable factors. Therefore, an equal product map represents the technical conditions of production for a product. On the other hand, a family of iso- cost line represents the various levels of total cost or outlay, given the prices of two factors.

The entrepreneur may desire to minimize his cost for producing a given level of output, or he may desire to maximize his output level for a given cost or outlay. Let us suppose that the entrepreneur has already decided about the level of output to be produced.

Then the question is with which factor combination the entrepreneur will try to produce a given level of output. To produce a given level of output, the entrepreneur will choose the combination of factors which minimizes his cost of pro-duction, for' only in this way he will be maximizing his profits.

Thus a producer will try to produce a given level of output with least-cost combination of factors. This least-cost combination of factors will be optimum for him that can be purchased for a particular outlay. The higher the outlay, the higher the corre-sponding iso-cost line.

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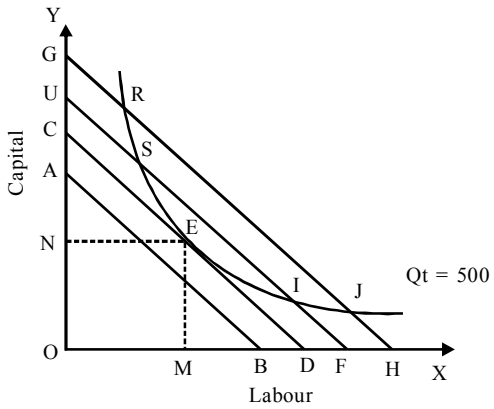
Minimising Cost for a Given Level of Output



Minimising Cost for a Given Level of Output

Which will be the least-cost combination of factors can be understood from considering Fig. Suppose the entrepreneur has decided to produce 500 units of output which is represented by isoquant Q. The 500 units of output can be produced by any combination of labour and capital such as R, S, E, T and J lying on the isoquant.

Now, a glance will reveal that for producing the given level of output (500 units) the cost will be minimum at point E at which the iso cost line CD is tangent to the given isoquant. At no other point such as R, S, T and J, lying on the isoquant Q the cost is minimum. It will be seen from that all other points on isoquant Q, such as R, S, T, J lie on higher iso cost lines than CD and which will therefore mean greater total cost or outlay for producing the given output.

Therefore, the entrepreneur will not choose any of the combinations R, S, T and J. We thus see that factor combination E is the least cost combination of labour and capital for producing a given output. Factor combination E is therefore an optimum combination for him under the given circumstances.

Hence we conclude that the entrepreneur will choose factor combi-nation E (that is, OM units of labour and ON units of capital) to produce 500 units of output. It is thus clear that the tangency point of the given isoquant with an iso-cost line represents the least-cost combination of factors for producing a given output.

How an entrepreneur arrives at the least-cost factor combination can also be explained with the help of the concept of marginal rate of technical substitution (MRTS) and the price ratio of the two factors. The marginal rate of technical substitution (MRTS) is given by the slope of the isoquant at its various points. On the other hand, the price ratio of the factors is given by the slope of the iso-cost line.

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The entrepreneur will not choose to produce a given output at point R because at point R marginal rate of technical substitution of labour for capital is greater than the price ratio of the factors (at point R the slope of the isoquant Q is greater than the slope of the iso-cost line GH).

Therefore, if he is at point R he will use more of labour in place of capital and go down on the isoquant. Likewise, he will not stop at point since the marginal rate of technical substitution of labour for capital is still greater than the price ratio of the factors; slope of the isoquant at point S being greater than the slope of the iso-cost line UF. Therefore, the entrepreneur will further substitute labour for capital and will go down further on the isoquant Q.

When the entrepreneur reaches point E, marginal rate of technical substitution of labour for capital is here equal to the price ratio of the factors, since the slopes of the isoquant and the iso-cost; line CD are equal to each other.

The entrepreneur will have no incentive to go further down, for he will not be lowering his cost in this way, but in fact he will be reaching higher iso-cost lines. At points J and T on the isoquant Q marginal rate of technical substitution of labour for capital is smaller than the price ratio of the factors and the entrepreneur will try to substitute capital for labour and move upward on the isoquant Q until he reaches the point of tangency E, where marginal rate of technical substitution is equal to the price ratio of the factors.

It is thus clear that the entrepreneur will be minimising his cost when the factor combination for which marginal rate of technical substi-tution is equal to the price ratio of the factors. Thus at his equilibrium point E.

$$MRTSLK = w/r$$

Where w stands for the wages rate of labour and r for the price of capital

But, the marginal rate of technical substitution of labour for capital is equal to the ratio of the marginal physical products of the two factors.

Therefore,

$$MRTSLK = MPL/MPK = w/r$$

$$MPL/MPK = w/r$$

We can rearrange the above equation to have

$$MPL/w = MPK/r$$

We therefore reach an important conclusion about the entrepreneur's choice of the quantities of the two factors. The entrepreneur will be in equilibrium in regard to his use and purchases of the two factors when he is using such quantities of the two factors that the marginal physical products of the two factors are proportional to the factor prices.

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If, for instance, the price of labour is twice as much as that of capital, then the entrepreneur will purchase and use such quantities of the two factors that the marginal physical product of labour is twice the marginal physical product of capital.

10.5 OUTPUT MAXIMIZATION FOR A GIVEN LEVEL OF OUTLAY (I.E. COST)

The condition for minimization of cost to produce a given level of output, namely, marginal rate of technical substitution between factors should be equal to the ratio of factor prices (MRTSLK = w/r).

The dual of cost-minimization problem for a given level of output is of output maximization for a given level of cost or outlay. Suppose the firm has decided upon an outlay which it has to incur for the production of a commodity. With a given level of outlay, there will be a single iso-cost line that represents the outlay that firm has decided to spend.

The firm will have to choose a factor com-bination lying on the given iso-cost line. Obvi-ously, with a given cost or outlay, a rational pro-ducer will be interested in maximising output of the commodity. Suppose the firm has decided to incur an outlay of Rs. 200 on labour and capital which is represented by the iso-cost line AB.

The firm has a choice to use any factor combination of labour and capital such as R, S, E, T, J etc. lying on the given iso-cost line AB to produce the product. An isoquant map show-ing a set of isoquants that represents various lev-els of output (200, 300, 400, 500 units) has been superimposed on the given iso-cost line AB.

A glance reveals that the firm will choose the factor combination E consisting of ON of labour and OH of capital. This is because of all the factor combinations that lie on the given iso-cost line AB, only the factor combination E enables the firm to reach the highest possible isoquant Q3 and thus produce 400 units of output. All other combinations of labour and capital that lie on the given iso-cost line AB such as R, S, T, J etc., lie on lower isoquants showing lower levels of output than 400 units.

Output-Maximization for a Given Cost

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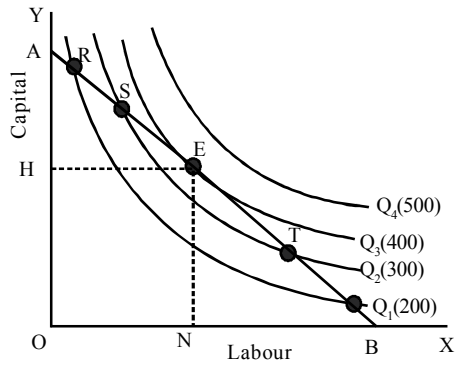
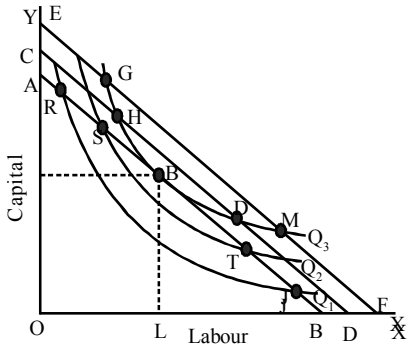


Output-maximisation for a givben cost.

At point E, MRTSLK= w/r

Cost-Minimisation for a Given Output and Output-Maximization for a Given Cost-Out- lay yield same results:

Suppose AB is the given iso-cost line depicting the given cost constraint. Maximisation of output subject to this cost-constraint is achieved at point E which lies on the highest pos-sible isoquant Q3, while other points on the iso- cost line AB such as R, S, T or J lie on lower iso-quants. Hence E represents maximum-output fac-tor combination. Now, given the output level Q3, point E also represents the least-cost factor com-bination as other points on isoquant Q3 such as G, H, D, M lie on higher iso-cost curves.



Cost Minimisation for a Given Output and Output Maximisation for a Given Cost.

It is quite clear from above that the entrepreneur's behaviour in choosing the quantities of factors is exactly symmetrical with the behaviour of the consumer. Both the entrepreneur and the consumer purchase things in such quantities as to equate marginal rate of substitution with their price ratio.

The consumer, to be in equilibrium, equates marginal rate of substitution (or the ratio of the marginal utilities of two goods) with the price-ratio of the goods. The

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entrepreneur equates marginal rate of technical substitution (or, the ratio of the marginal physical products of the two factors) with the price-ratio of the two factors.

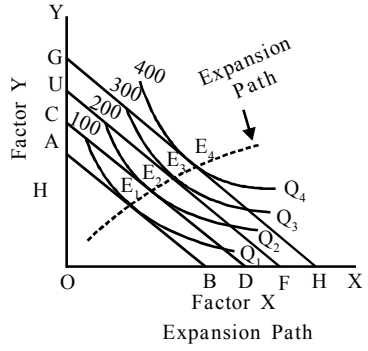
10.6 EXPANSION PATH

A curve connecting the tangency points is called the expansion path because it shows how the input usages expand as the chosen level of output expands. In economics, an expansion path (also called a scale line) is a curve in a graph with quantities of two inputs, typically capital and labor, plotted on the axes.

The factor combination a firm will choose to produce a specified level of output, given the prices of the two factors. We are now interested to study how the entrepreneur will change his factor combination as he ex-pands his output, given the factor prices. To begin with, suppose the prices of the two factors X and Y, are such that are rep-resented by the slope of the iso-cost line AB.

The four iso-cost lines, AB, CD, UF, and -GH are drawn which show different levels of total cost or outlay. All iso-cost lines are parallel to one another indicating that prices of the two factors remain the same. If the firm wants to pro-duce the output level denoted by Q1 (= 100 units of output), it will choose the fac-tor combination E1 which minimises cost of production; E1 is the point of tangency between the equal product curve Q1 and the iso-cost line AB.

Now, if a firm wants to produce a higher level of output as de-noted by the equal product curve Q2, then it will choose the factor combination E2 which is the least-cost combination for new output. Like-wise, for still higher output levels as denoted by Q3 and Q4, the firm will respectively choose tan-gency combination E3 and E4 which minimise cost for the given outputs.



Expansion Path

The line joining the minimum cost combinations such as E1, E2, E3, E4 is called the expansion path because it shows how the factor combination with which the firm produces will alter as the firm expands its level of output.

Thus the expansion path may be defined as the locus of the points of tangency between the isoquants and the iso-cost lines. The expansion path is also known as

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scale- line because it shows how the entrepreneur will change the quantities of the two factors when it increases the scale of production.

The expansion path can have different shapes and slopes depend-ing upon the relative prices of the productive factors used and the shape of the isoquants (i.e. equal product curves). As we shall prove below, when production function exhibits constant returns to scale, the expansion path will be a straight line through the origin. Further, for a given equal product map there will be different expansion paths for different relative prices of the factors.

Since expansion path represents the minimum-cost combinations for various levels of output, it shows the cheapest way of producing each level of output, given the relative prices of the factors. When two factors are variable; the entrepreneur will choose to produce at some point on the expan-sion path.

One cannot say exactly at which particular point on the expansion path the entrepreneur will in fact be producing unless one knows either the output which he wants to produce or the size of the cost or outlay it wants to incur. But this is certain that where both factors are variable and the prices of factors are given, a rational entrepreneur will seek to produce at one point or the other on the expansion path.

10.7 EXPANSION PATH OF A LINEAR HOMOGENOUS PRODUCTION FUNCTION

Whether expansion path is linear or non-linear depends on the nature of technology involved in the production function. An important property of a linear homogeneous production function is that its expansion path is straight line from the origin. As we saw above expansion path represents optimal factor combinations as firm expands its output, given the prices of factors. At an optimal factor combination, MRTSLK is equal to factor price ratio (MRTSLK = w/r).

Since the factor prices remain constant along an expansion path, this implies that MRTSLK will also remain constant.

Now, expansion path being a straight line from the origin implies that factor ratio (K/L) remains the same throughout on the expansion path. To prove that expansion path of a linear homogenous production function is a straight line from the origin we take Cobb-Douglas production function (Q = AK-1/2 L1/2) which is an important example of homogenous production function of the first degree.

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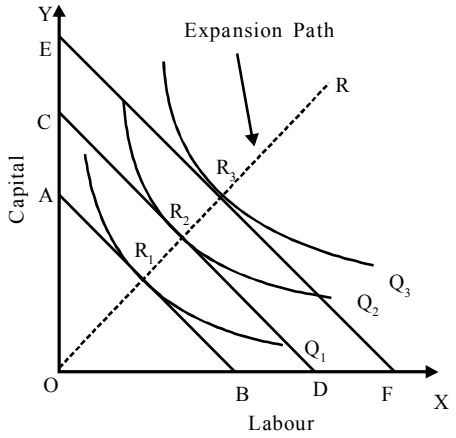

Expansion path of a linear homogeneous production function is a straight line from the origin.

Expansion path of linear homogeneous production function is a straight line from the origin.

Thus, MRTSLK in the given linear homogenous Cobb-Douglas production function is equal to K/L. As explained above, at optimal factor combinations on the expansion path, MRTSLK equals w/r and, therefore, given the factor prices, MRTSLK remains constant along an expansion path. Thus K/L which is equal MRTSLK in a linear homogenous Cobb-Douglas production will remain constant.

Constant factor ratio K/L along the expansion path implies that it is a straight line from the origin.

10.8 FACTOR SUBSTITUTION AND CHANGES IN FACTOR PRICES

The cost-minimising factor combination depends on the relative prices of factors used. As shown above, given the prices of factors, the cost of producing a level of output is minimised by using a factor combination at which

$$\text{MRTSLK: } w0/r0$$

$$\text{or } MPL/w0 = MPk/r0$$

Where w0 is the price of labour i.e. wages rate and r0 is the price of capital.

Now, if either the price of labour (w) or the price of capital (r) changes, the producer will respond to this change in factor prices as their cost-minimisation state will be disturbed. For example, if the wage rate rises from w0 to w1, then at the initial equilibrium position,

$$MPL/w1 < MPk/r0 \text{ or, } MPK/r0 > MPL/w1$$

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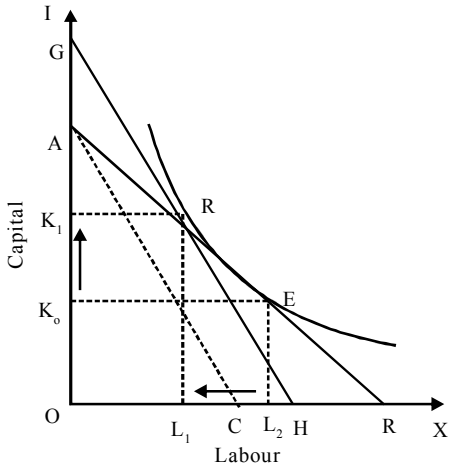
This will induce a rational pro-ducer to substitute capital for rela-tively more expensive labour. That is, he will try to use more capital and less labour and continue substituting capital for labour until

MRTSLK = w1/r or MPL/w1 = MPK/r.

Rise in Wage Rate (Price) of Labour Causes Substitution of Capital for Labour



Rise in wage rate (price) of labour canvex substitution of capital for labour

The substitution of one factor for another is graphically illustrated by using isoquants, where with factor prices w0and r0 respectively of labour and capital, AB, which is the iso- cost line for a given amount of outlay, is tangent to the isoquant Q0 at point E.

In this equilibrium situation, he is using OL0 of labour and OK0 of capital. Now suppose the price of labour (i.e., the w age rate) rises so that the iso-cost line, price of capital (r) and outlay remaining constant, rotates to the new position AC. It will be seen that none of the factor combinations lying on the iso-cost line AC will be sufficient to produce the level of output Q0 as the iso-cost line AC lies at a lower level than the isoquant Q0.

In other words, with higher wage rate w1 the given amount of outlay is not enough to buy the required amounts of the two factors to produce the level of output 00- Thus, if the producer wants to produce the same level of output Q0, it will have to increase its outlay. The increase in outlay on factors implies moving to a higher iso-cost line that will be paral-lel to the new iso-cost line A C. Now, with new relative prices of labour and capital, the iso-cost line GH is drawn parallel to AC so that it is tangent to the isoquant Q0.

It will be observed from that the new iso-cost line GH will not be tangent at the initial equilibrium point E since its slope reflecting the new relative factor prices differs from the slope of the initial iso-cost line AB. Thus, the initial point E no longer minimises cost in the context of new relative factor prices.

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Now that the wage rate is higher, that is, the labour is relatively more expensive, to produce the initial level of output, a producer will substitute capital for labour by moving upward along the isoquant Q0. It will be observed from the new iso-cost line GH which is parallel to AC and therefore reflects the relatively higher wage rate as compared to the iso-cost line AB, is tangent to the isoquant Q0 at point R showing that in order to minimise cost at the new relative factor prices, the producer has substituted K0K1 amount of capital for L0L1 amount of labour to reach the new cost-minimising factor combination R where he uses smaller amount OL1 of labour and larger quantity of OK1 of capital.

It may be noted again that substitution of capital for labour and thereby changing the factor- proportion used to reach equilibrium point R for producing a given level of output Q0 involves the increase in cost of production resulting from the rise in the price of labour (iso-cost line GH lies further away from the iso-cost line AC when viewed from the origin).

However, if with the new higher price of labour, the producer had used the factor combination E, he would have incurred still higher cost or expenditure for producing the output level Q0. If iso-cost line is drawn parallel to AC reflecting new relative factor prices that passes through the original factor combination point E it will lie still further away from GH indicating that if with new relative prices of labour and capital the firm uses the same labour-capital combination E to produce that initial level of output Q0, it will involve still higher cost.

Thus by changing the factor combination from E to R following the rise in price of labour by substituting capital for now relatively more expensive labour, the firm has suc-ceeded in lowering its cost than it would have incurred if it had continued to use the same factor combination E even after the change in the factor-price situation.

From the foregoing analysis we arrive at the conclusion that change in relative factor prices causes a substitution of a factor that has become relatively more expensive by a factor that has become relatively. In the real world there are several examples of factor substitution in response to changes in relative factor prices.

When price of petroleum increased many countries tried to substi-tute other types of energy resources using inputs such as coal, electricity to reduce costs of produc-tion. Again, in the United States the firms use more machines (i.e. capital) and relatively less labour as labour there is very costly than is the case in some developing countries where wages are com-paratively low.

Further, recently when prices of computers have fallen, there has been substitution of manual labour for doing such work as book-keeping, making architectural maps, composing books and journals by computers (i.e. capital).

10.9 SUMMARY

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Isocost curve is a producer's budget line while isoquant is his indifference curve. Isoquant is also called as equal product curve or production indifference curve or constant product curve. Isoquant indicates various combinations of two factors of production which give the same level of output per unit of time.

An isocost line shows all combinations of inputs which cost the same total amount. Although similar to the budget constraint in consumer theory, the use of the isocost line pertains to cost-minimization in production, as opposed to utility-maximization.

The isocost line is an important component when analysing producer's behaviour. The isocost line illustrates all the possible combinations of two factors that can be used at given costs and for a given producer's budget. In simple words, an isocost line represents a combination of inputs which all cost the same amount.

An important problem facing an entrepreneur is to decide about a particular combination of factors which should be employed for producing a product. There are various technical possibilities open to a firm from which it has to choose, that is, there are various combinations of factors which can yield a given level of output and from among which a producer has to select one for production.

An isoquant or iso-product map represents various technical possibilities of producing different levels of output. It is assumed that the entrepreneur aims at maximising his profits. A profit maximising entre-preneur will seek to minimise his cost for producing a given output, or to put it in another way, he will maximise his output for a given level of outlay.

The prices of factors are represented by the iso-cost line. The iso-cost line plays an important part in determining what combination of factors the firm will choose for production. An iso-cost line shows various combinations of two factors that the firm can buy with a given outlay.

An equal product map or isoquant map represents the various factor combinations which can yield various levels of output, every equal product curve or isoquant showing those factor combina-tions each of which can produce a specified level of output.

A curve connecting the tangency points is called the expansion path because it shows how the input usages expand as the chosen level of output expands. In economics, an expansion path (also called a scale line) is a curve in a graph with quantities of two inputs, typically capital and labor, plotted on the axes.

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Thus, an equal product map represents the production function of a product with two variable factors. Therefore, an equal product map represents the technical conditions of production for a product. On the other hand, a family of iso- cost line represents the various levels of total cost or outlay, given the prices of two factors. The entrepreneur may desire to minimize his cost for producing a given level of output, or he may desire to maximize his output level for a given cost or outlay.

10.10 GLOSSARY

(a) Isocost: Isocost curve is a producer's budget line while isoquant is his indifference curve. Isoquant is also called as equal product curve or production indifference curve or constant product curve. Isoquant indicates various combinations of two factors of production which give the same level of output per unit of time.

(b) Expansion path: A curve connecting the tangency points is called the expansion path because it shows how the input usages expand as the chosen level of output expands. In economics, an expansion path (also called a scale line) is a curve in a graph with quantities of two inputs, typically capital and labor, plotted on the axes.

(c) Equal product map: An equal product map represents the production function of a product with two variable factors. Therefore, an equal product map represents the technical conditions of production for a product. On the other hand, a family of iso- cost line represents the various levels of total cost or outlay, given the prices of two factors. The entrepreneur may desire to minimize his cost for producing a given level of output, or he may desire to maximize his output level for a given cost or outlay.

10.11 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is ISO cost line?
2. What is Optimum combination of input?
3. What is Optimum or Least-Cost Combination of Factor?
4. What is Expansion Path?

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(B) Extended Answer Questions

1. Give an introduction to ISO cost line.
2. Explain about optimum combination of inputs.
3. Discuss about optimum or Least-Cost Combination of Factors.
4. Explain about output Maximization for a Given Level of Outlay.
5. Write note on: Expansion Path.
6. Discuss expansion Path of a Linear Homogenous Production Function.
7. Explain about factor Substitution and Changes in Factor Prices.

(C) True or False

1. Isoquant curve is a producer's budget line while isoquant is his indifference curve.
2. Isoquant is also called as equal product curve or production indifference curve or constant product curve.
3. An isocost line shows all combinations of inputs which cost the same total amount.
4. A profit maximising entre-preneur will seek to minimise his cost for producing a given output, or to put it in another way, he will maximise his output for a given level of outlay.
5. A curve connecting the tangency points is called the expansion path.

(D) Multiple Choice Questions

1. What is a producer's budget line while isoquant is his indifference curve?
   (a) Isocost curve
   (b) Isoquant curve
   (c) Both a and b
   (d) None of the above
2. Isoquant is also called as ……
   (a) Equal product curve
   (b) Production indifference curve
   (c) Constant product curve
   (d) All the above

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(E) Fill in the Blanks

1. ……curve is a producer's budget line while isoquant is his indifference curve.
2. ……is also called as equal product curve or production indifference curve or constant product curve.
3. An isocost line shows all combinations of inputs which cost the same……..
4. A profit maximising entre-preneur will seek to minimise his cost for producing a given output, or to put it in another way, he will maximise his output for a given……...
5. A curve connecting the tangency points is called the…….

10.12 POSSIBLE ANSWERS TO SELF ASSESSMENT QUESTIONS

(C) 1. False, 2. True, 3. True, 4. True, 5. True

(D) 1. (a) 2. (d)

(E) 1. Isocost, 2. Isoquant, 3. Total amount, 4. Level of outlay, 5. Expansion path

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10.14 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

10.15 TERMINAL QUESTIONS

1. How an equal product map represents the production function? Discuss.

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2. Discuss expansion Path of a Linear Homogenous Production Function.

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3. Explain about factor Substitution and Changes in Factor Prices.

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UNIT 11 THEORY OF PRODUCTION COST

Structure:

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Objectives

After reading this unit you will be able to understand:

- Cost Concepts
- Short-run Cost-output relation
- Long-run Cost-Output relation
- Economies of Scale
- Diseconomies of Scale
- Cost function and cost curves

11.1 INTRODUCTION

The theory of production decisions in the short run, as just outlined, leads to two conclusions of fundamental importance throughout the field of economics about the responses of business firms to the market prices of the commodities they produce and the factors of production they buy or hire.

11.2 INTRODUCTION TO COST

Cost is the value that must be given up to acquire a good or service. In a business where selling and distribution expenses are quite nominal the cost of an article may be calculated without considering the selling and distribution overheads. At the same time, in a business where the nature of a product requires heavy selling and distribution expenses, the calculation of cost without taking into account the selling and distribution expenses may prove very costly to a business. The cost may be factory cost, office cost, and cost of sales and even an item of expense. For example, prime cost includes expenditure on direct materials, direct labour and direct expenses. Money spent on materials is termed as cost of materials just like money spent on labour is called cost of labour and so on. Thus, the use of term cost without understanding the circumstances can be misleading.

Different costs are found for different purposes. The work-in-progress is valued at factory cost while stock of finished goods is valued at office cost.

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Numerous other examples can be given to show that the term "cost" does not mean the same thing under all circumstances and for all purposes. Many items of cost of production are handled in an optional manner which may give different costs for the same product or job without going against the accepted principles of cost accounting. Depreciation is one of such items. Its amount varies in accordance with the method of depreciation being used. However, endeavour should be, as far as possible, to obtain an accurate cost of a product or service.

11.3 MEANING OF COST

Cost refers to the expenditure of funds or use of property to acquire or produce a product or service. There are various types of cost such as average cost, fixed cost, historical cost, marginal cost, replacement cost, variable cost etc.

In business, cost is usually a monetary valuation of (1) effort, (2) material, (3) resources, (4) time and utilities consumed, (5) risks incurred, and (6) opportunity forgone in production and delivery of a good or service. All expenses are costs, but not all costs (such as those incurred in acquisition of an income-generating asset) are expenses.

11.4 TYPES OF COST

The various types of costs are as follows:

1. Fixed Cost

Fixed costs are expenses that do not change in proportion to the activity of a business, within the relevant period or scale of production. For example, a retailer must pay rent and utility bills irrespective of sales.

2. Variable Cost

Variable costs are expenses that change in proportion to the activity of a business. Along with fixed costs, variable costs make up the two components of total cost. Direct Costs, however, are costs that can be associated with a particular cost object. Not all variable costs are direct costs, however; for example, variable manufacturing overhead costs are variable costs that are not a direct costs, but indirect costs.

Variable costs by contrast change in relation to the activity of a business such as sales or production volume. In the example of the retailer, variable costs may primarily be composed of inventory (goods purchased for sale), and the cost of goods is therefore almost entirely variable.

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3. Marginal cost

Marginal cost is the change in total cost that arises when the quantity produced changes by one unit. In general terms, marginal cost at each level of production includes any additional costs required to produce the next unit. So, the marginal costs involved in making one more wooden table are the additional materials and labour cost incurred.

11.5 COST CONCEPT

Cost concepts consist of real cost, opportunity cost, incremental cost, money cost, implicit costs, explicit cost, economic costs and accounting costs. Cost analysis is currently a somewhat controversial set of methods in program evaluation. One reason for the controversy is that these terms cover a wide range of methods, but are often used interchangeably. At the most basic level, cost allocation is simply part of good program budgeting and accounting practices, which allow managers to determine the true cost of providing a given unit of service. At the most ambitious level, well-publicized cost-benefit studies of early intervention programs have claimed to show substantial long-term social gains for participants and cost savings for the public. Because these studies have been widely cited and credited with convincing legislators to increase their support for early childhood programs, some practitioners advocate making more use of cost-benefit analysis in evaluating social programs. Others have cautioned that good cost-benefit or cost-effectiveness studies are complex, require very sophisticated technical skills and training in methodology and in principles of economics, and should not be undertaken lightly. Whatever position you take in this controversy, it is a good idea for program evaluators to have some understanding of the concepts involved, because the cost and effort involved in producing change is a concern in most impact evaluations.

Consequences of Cost Concept

The impact of using Cost Concept is as follows:

1. The assets are valued at cost or book value or at the cost derived amounts
2. Items which have no cost are ignored, that is, if the business entity does not pay anything for an asset, it would appear in the books of account. The goodwill would appear in the accounts only when the enterprise has purchased the intangible asset for a price.
3. Unrealized gains, i.e., gains on unsold assets are to be ignored
4. The real value of the capital employed is not available in the Balance Sheet

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Justification of Cost Concept

The justification for the cost concept lies in the following arguments:

1. The acquisition cost is highly objective because it is derived from an independent transaction between two parties i.e. the business entity and the vendor
2. The details of the original transaction can be easily verified from the documents that are exchanged at the time of purchase such as purchase invoice, title of ownership, property deed, and check books and so on.
3. When the assets are to be recorded at market value, difficulties may arise regarding which value of which market to be taken into account.
4. The going concern assumes that the business entity will continue its activities indefinitely and thus eliminate the necessity of using current values or liquidation values of asset valuation.

Limitations of Cost Concept

The limitations or drawbacks of this principle are as follows:

1. The items which do not have any cost are ignored. Thus the knowledge and technical skill built inside the enterprise, a favourable location, brand name and reputation of the business as time goes would find no place in the assets of the business entity.
2. The money-measurement assumption which assumes that purchasing power of rupee is stable is a major limitation of the cost concept.
3. The actual information needed by the management, investors, creditors etc. may be current values of assets therefore values based upon historical cost may not be useful for their purposes.

11.6 TYPES OF COST CONCEPTS

(i) Real Cost

The term "real cost of production" refers to the physical quantities of various factors used in producing a commodity. For example, real cost of a table is composed of a carpenter's labour, two cubic feet of wood, a dozen of nails, half a bottle of varnish paint, depreciation of carpenter's tools etc., which go into the making of the table. Real cost, thus, signifies the aggregate of real productive resources absorbed in the production of a commodity or service.

The real cost of production of a commodity refers to the exertion of labour, sacrifice involved in the abstinence from present consumption by the savers to supply capital, and social effects of pollution, congestion, and environmental distortions.

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In a much philosophical way, Marshall (1920), describes "real cost" as follows: "The production of a commodity generally requires many different kinds of labour and the use of capital in many forms. The exertions of all the different kinds of labour that are directly or indirectly involved in making it together with the abstinences or rather the waiting required for saving the capital used in making it all these efforts and sacrifices together will be called the real cost of production of commodity."

According to Marshall, thus, the real cost of production signifies toils, troubles, sacrifice on account of loss of consumption for savings, social effects of pollution caused by factory smoke, automobiles, etc. Evidently, the concept of real cost is an abstract idea. Its exact measurement is not possible.

(ii) Opportunity Cost

The concept of opportunity cost is based on the scarcity and versatility characteristics of productive resources. It is the most fundamental concept in economics.

It is a known economic fact that our wants are multiple, while our resources are scarce but capable of alternative uses. So the problem of choice is involved. We have to choose the use of a given resource for a particular purpose out of its alternative applicability. When we choose the resource in one use to have one commodity for satisfying a particular want, it is obvious that its other use as some other commodity that can be produced by it cannot be available simultaneously. This means, the second alternative use of the resources is to be sacrificed to have the resource employed in one particular way, i.e., to get a particular commodity because the same resource cannot be employed in two ways at the same time. Apparently, the employment of factors in producing a commodity always involves the loss of opportunity of production of some other commodity. The sacrifice or loss of alternative use of a given resource is termed as "opportunity cost." Thus, the opportunity cost is measured in terms of the forgone benefits from the next best alternative use of a given resource. In other words, the opportunity cost of producing a certain commodity is the value of the other commodity that the resources used in its production could have produced instead. It should be noted that opportunity cost of anything is just the next best alternative forgone in the use of productive resources and not all alternative possible uses.

Importance of Opportunity Cost

The concept of opportunity cost has a great economic significance.

(a) Helps to determine of relative prices of goods: The concept of opportunity cost is useful in explaining the determination of relative prices of different

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goods. For instance, if the same group of factors can produce either one car or six scooters, then the price of one car will tend to be at least six times more than that of one scooter.

(b) Assists to determine of normal remuneration to a factor: The opportunity cost sets the value of a productive factor for its best alternative use. It implies that if a productive factor is to be retained in its next best alternative use, it must be compensated for or paid at least what it can earn from its next best alternative use. For instance, if a college Professor can get an alternative employment in a bank as an officer at a salary of Rs. 20,000 per month, the college has to pay at least Rs. 20,000 salary to retain him in the college.

(c) Support for decision making and efficient resource allocation: The concept of opportunity cost is essential in rational decision making by the producer. This can be explained with the help of an example. Suppose, a producer in the automobile industry has to decide as to whether he should produce motor cars or scooters out of his given resources. He can arrive at a rational decision by measuring the opportunity costs of producing cars and scooters and making a comparison with the prevailing market prices of these goods. The concept of opportunity cost serves as a useful economic tool in analyzing optimum resource allocation and rational decision making.

(iii) Incremental cost

Incremental cost is the overall change that a company experiences by producing one additional unit of goods. Incremental cost is the composition of total cost from the surrogate of contributions, where any increment is determined by the contribution of the cost. If the good being produced is infinitely divisible, so the size of a marginal cost will change with volume, as a non-linear and non-proportional cost function includes the following:

(i) Variable terms dependent to volume,

(ii) Constant terms independent to volume and occurring with the respective lot size,

(iii) Jump fix cost increase or decrease dependent to steps of volume increase.

(iv) Money Cost

Cost of production measured in terms of money is called the money cost. Money cost is the monetary expenditure on inputs of various kinds' raw materials, labour, etc., required for the output. It is the money spent on purchasing the different units of factors of production needed for producing a commodity. Money cost is,

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obviously the payment made for the factors in terms of money. Money cost is the outlay cost, i.e., actual financial expenditure of the firm.

The following items of a firm's expenditure are explicit money costs:

(i) Costs of raw materials;

(ii) Wages and salaries;

(iii) Power charges;

(iv) Rent of business or factory premises;

(v) Interest payments of capital invested;

(vi) Insurance premiums;

(vii) Taxes like property tax, duties, license fees etc.

(viii) Miscellaneous business expenses like marketing and advertising expenses, transport cost, etc.

(v) Implicit costs

Implicit costs are the opportunity costs of the use of factors which a firm does not buy or hire but already owns. Implicit costs 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 imputed or estimated on the bases 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 imputed payment which is 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 have 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 imputed and regarded as implicit money cost.

Implicit costs are as follows:

(i) Wages of labour rendered by the entrepreneur himself.

(ii) Interest on capital supplied by him.

(iii) Rent of land and premises belonging to the entrepreneur himself and used in his production.

(iv) Normal returns (profits) of entrepreneur, compensation needed for his management and organizational activity.

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(vi) Explicit Cost

An explicit cost is a direct payment made to others in the course of running a business, such as wage, rent and materials, as opposed to implicit costs, which are those where no actual payment is made. It is possible still to underestimate these costs, however: for example, pension contributions and other "perks" must be taken into account when considering the cost of labour. Explicit costs are taken into account along with implicit ones when considering economic profit. Accounting profit only takes explicit costs into account.

(vii) Economic Costs

In economics, the cost of production consists of remuneration to all the factors of production, viz., wages to labour, rent to land, interest to capital and normal profits to the entrepreneur.

The economic cost of a decision depends on both the cost of the alternative chosen and the benefit that the best alternative would have provided if chosen. Economic cost differs from accounting cost because it includes opportunity cost.

Example: Consider the economic cost of attending college. The accounting cost of attending college includes tuition, room and board, books, food, and other incidental expenditures while there. The opportunity cost of college also includes the salary or wage that otherwise could be earning during the period. So for the two to four years an individual spends in school, the opportunity cost includes the money that one could have been making at the best possible job. The economic cost of college is the accounting cost plus the opportunity cost.

(viii) Accounting Costs

An accountant, cost would include in the cost of production only the cash payments to the factors of production, made by the entrepreneur, for the services rendered by these factors in the productive process. These cash payments are called the explicit costs. Thus, an accountant will include only explicit costs in his cost calculations. Thus, the accountant's concept of cost includes wage, interest and rent payment but not the profits made by the entrepreneur because no entrepreneur even makes cash payment to himself. In common practice also, we do not tend to regard profits as part of a firm's cost of production. But in economic theory, however, normal profits form a part of business firm's cost of production.

11.7 COST OF PRODUCTION

Cost of production is the cost related to making or acquiring goods and services that directly generates revenue for a firm. It comprises of direct costs and indirect

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costs. Direct costs are those that are traceable to the creation of a product and include costs for materials and labour whereas indirect costs refer to those costs that cannot be traced to the product such as overhead.

11.8 NATURE OF COST CURVES IN THE SHORT RUN

Short run is a period of time over which at least one factor must remain fixed. For most of the firms the fixed resource or factors which cannot be increased to meet the rising demand of the good is capital i.e., plant and machinery.

Short run is a period of time over which output can be changed by adjusting the quantities of resources such as labour, raw material, fuel but the size or scale of the firm remains fixed.

The total cost of a firm in the short run is divided into two categories (1) Fixed cost and (2) Variable cost. The two types of economic costs are now discussed in brief.

Short run costs of a firm are now explained with the help of a schedule and diagrams.

Output	TFC	TVC	TC	AFC	AVC	AC	MC
0	1000	0	1000	0	0	0	0
1	1000	60	1060	1000	60	1060	60
2	1000	100	1100	500	50	550	40
3	1000	150	1150	333.33	50	383.33	50
4	1000	200	1200	250	50	300	50
5	1000	400	1400	200	80	280	200
6	1000	700	1700	166.67	116.67	283.34	300
7	1000	1100	2100	142.86	157.14	300	400

The short run cost data of the firm shows that total fixed cost TFC remains constant at Rs.1000/- regardless of the level of output.

1. Total Cost (TC)

Total cost is the aggregate of expenditures incurred by the firm in producing a given level of output. Total cost is measured in relation to the production function by multiplying factor prices with their quantities.

If the production functions 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 a 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

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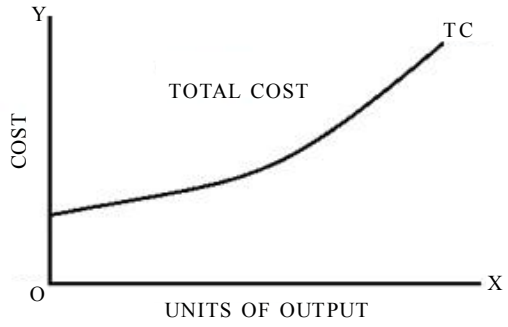
profit is also included in total cost. Normal profit is an implicit cost, it is a normal reward made to the entrepreneur for his organizational services. It is just a minimum payment essential to retain the entrepreneur in a given line of production. If this normal return is not realized by the entrepreneur in the long run, he will stop his present business and will shift his resources to some other industry. Thus, total cost may be viewed as the sum of total fixed cost and total variable cost at each level of output.

$$TC = TFC + TVC$$

Total Cost Curve/Diagram



In the above figure, total cost curve which is the sum of the total fixed cost and variable cost at various levels of output has nearly the same shape. The difference between the two is by only a fixed amount of Rs.1,000. The total variable cost curve and the total cost curve begin to rise more rapidly as production is increased. The reason for this is that after a certain output, the business has passed its most efficient use of its fixed costs machinery, building etc., and its diminishing return begins to set in.

Behaviour of Total Costs

(i) 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.

(ii) TVC varies with the output. It is nil when there is no output. Variable costs are, thus, direct costs of the output.

(iii) 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 of 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

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point when the diminishing phase operates, variable factors, are to be employed in a greater proportion to increase the same 'level' of output.

(iv) 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, remain constant.

2. Total Fixed Cost (TFC)

Total fixed cost corresponds to fixed inputs in the short run production function.

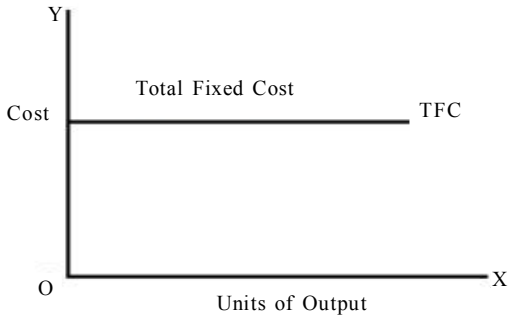
It is obtained by summing up the product of quantities of the fixed factors multiplied by their respective unit prices. TFC remains the same at all levels of output in the short run.

TFC = TC - TVC or AFC x Q

Suppose a small furniture shop proprietor starts his business by hiring a shop at a monthly rent of ₹ 1,000 borrowing ₹ 50,000 from a bank at an interest rate of 10% and buys capital equipment worth ₹ 2,000. Then his monthly total fixed cost is estimated to be:

1,000 + 2,000 + 500 = 3,500

Total Fixed Cost Curve/Diagram:



In this diagram, the total fixed cost of a firm is assumed to be Rs.1000 at various levels of output. It remains the same even if the firm's output is zero.

3. 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.

TVC = TC - TFC or AVC x Q

Total Variable Cost Curve/Diagram:

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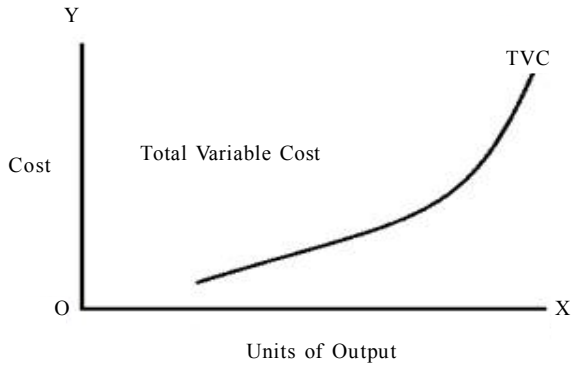


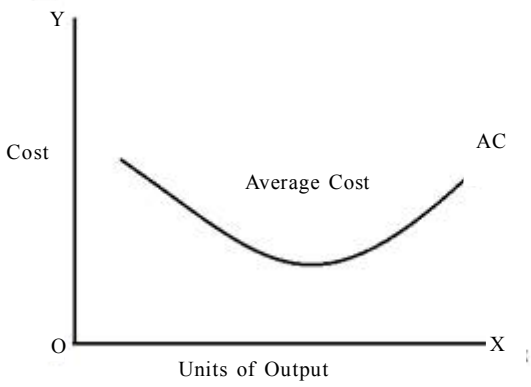
In the diagram, the total variable cost curve (TVC) increases with the higher level of output. It starts from the origin. This increases at a diminishing rate up to the 4th units of output. It then begins to rise at an increasing rate.

4. Average Cost (AC) or Average Total Cost (ATC)

Average cost is total cost divided by total units of output. Hence, average total cost can be computed simply by adding average fixed cost and average variable cost at each level of output. Average cost is per unit cost i. e. money spending to produce a unit of total output.

AC = AFC + AVC or TC/ Q

Average cost is distinct from the price, and depends on the interaction with demand through elasticity of demand and elasticity of supply. In cases of perfect competition, price may be lower than average cost due to marginal cost pricing. Short-run average cost will vary in relation to the quantity produced unless fixed costs are zero and variable costs constant. A cost curve can be plotted, with cost on the y-axis and quantity on the x-axis. Marginal costs are often shown on these graphs, with marginal cost representing the cost of the last unit produced at each point; marginal costs are the first derivative of total or variable costs.



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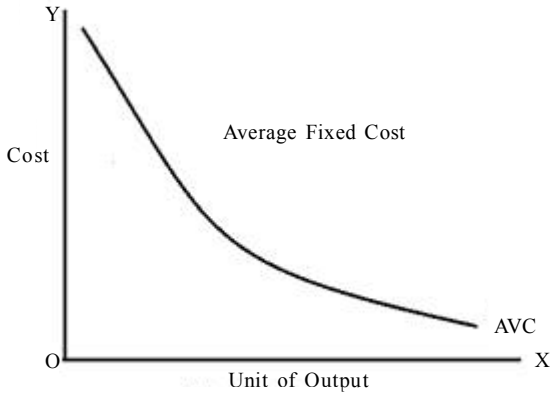
A typical average cost curve will have a U-shape, because fixed costs are all incurred before any production takes place and marginal costs are typically increasing, because of diminishing marginal productivity. In this "typical" case, for low levels of production marginal costs are below average costs, so average costs are decreasing as quantity increases. An increasing marginal cost curve will intersect a U-shaped average cost curve at its minimum, after which point the average cost curve begins to slope upward. For further increases in production beyond this minimum, marginal cost is above average costs, so average costs are increasing as quantity increases. An example of this typical case would be a factory designed to produce a specific quantity of widgets per period: below a certain production level, average cost is higher due to under-utilized equipment, while above that level, production bottlenecks increase the average cost.

5. Average Fixed Cost (AFC)

Average fixed cost is total fixed cost divided by total units of output. Thus, average fixed costs are the fixed cost per unit of output.

AFC = AC - AVC or TFC/Q

Average Fixed Cost is the fixed cost per unit of output.



It is a negative sloping curve which goes very close of X axis but it will never touch X axis i.e. AFC will never become zero because TFC is a positive amount.

6. Average Variable Cost (AVC)

Average variable cost is total variable cost divided by total units of output. Thus, average variable cost is variable cost per unit of output.

AVC = AC - AFC or TVC/Q

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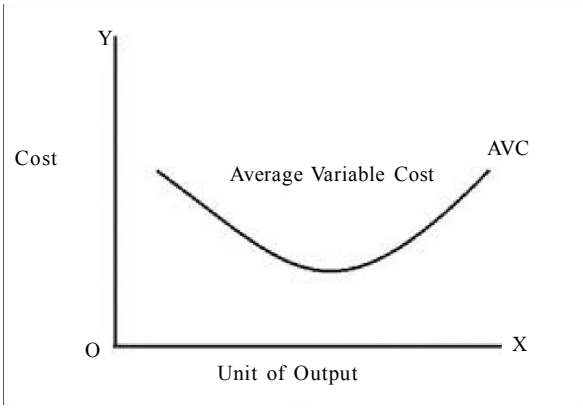

AVC curve is a U shaped curve. AVC curve will come down in the beginning and then rises as more units of output are produced with a given plant. When the producer adds more units of variable factors in a fixed plant, the efficiency of inputs first increases and then it decreases.

7. Marginal Cost (MC)

The marginal cost is also per unit cost of production. It is the addition made to the total cost by producing one more unit of output.

MCn = TCn - TCn - 1

The marginal cost of the nth 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.

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 cost 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 dependent of fixed cost and is directly related to the variable cost. Hence, the MC curve can also be derived from the TVC 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.

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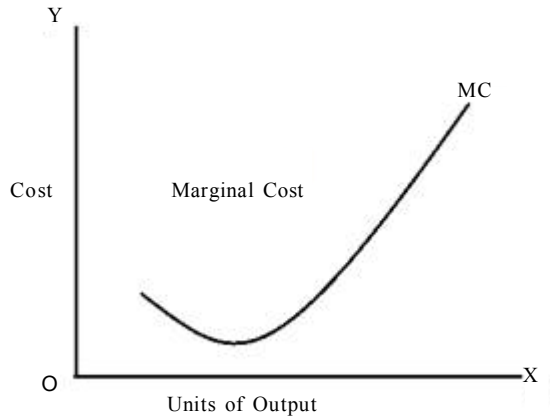
Thus, the AVC curve is exactly the reverse of AP, whereas MC curve is exactly the reverse of MP curve. The marginal cost curve, the graphical relation between marginal cost and output, is U-shaped. Marginal cost is relatively high at small quantities of output, then as production increases, it declines, reaches a minimum value, then rises once again.

This U shape is directly attributable to increasing, then decreasing marginal returns. As marginal produce increases for relatively small output quantities, marginal cost declines. Then as marginal product decreases with the law of diminishing marginal returns for relatively large output quantities, marginal cost increases.



The marginal cost curve takes center stage in the analysis of a firm's short-run production. In particular, a profit-maximizing firm equates the marginal revenue received from selling a good with the marginal cost of producing it. For a firm operating under perfect competition, its marginal cost curve becomes its supply curve. The marginal cost curve, because it measures the incremental opportunity cost of producing one more unit of a good plays, an important role in analyzing the efficient allocation of resources.

11.9 THE RELATIONSHIP BETWEEN MARGINAL COST AND AVERAGE COST

The marginal cost and average cost curves are both normally drawn u-shaped due to increasing and then diminishing returns. Marginal cost will always intersect the average cost at the minimum point of the average cost curve.

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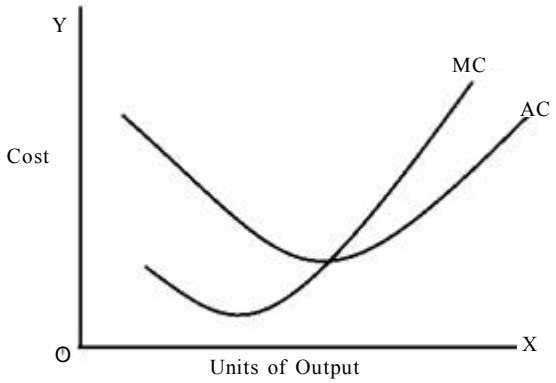

Both these curves are short run curves. The firm will be constrained in the short run by their fixed factors. As these cannot be changed, they can only alter their variable factors. As they do this, they will initially experience increasing returns and so MC and AC will both fall. However, eventually they will experience diminishing returns and MC and AC will start to rise again.

Focusing 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 failing, 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.
4. Initially, both MC and AC curves are sloping downward. When, AC curve is falling MC curve lies below it.
5. When AC curve is rising, after the point of intersection, MC curve lies above it.
6. 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.

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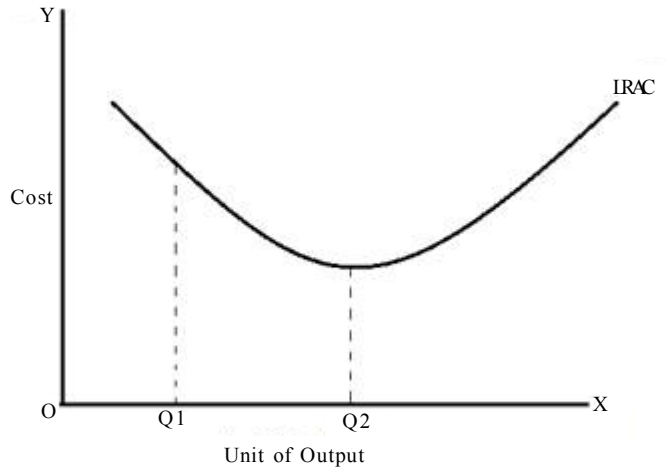
11.10 NATURE AND BEHAVIOUR OF LONG RUN COST CURVES

The long run refers to a time period during which full adjustment to a change in environment can be made by the firm by varying all inputs , including capital equipment & factory building.

Long-run Average Cost curve (LAC)

The long-run average cost curve depicts the cost per unit of output in the long run that is, when all productive inputs' usage levels can be varied. All points on the line represent least-cost factor combinations; points above the line are attainable but unwise, while points below are unattainable given present factors of production. The behavioral assumption underlying the curve is that the producer will select the combination of inputs that will produce a given output at the lowest possible cost. Given that LRAC is an average quantity, one must not confuse it with the long-run marginal cost curve, which is the cost of one more unit. The LRAC curve is created as an envelope of an infinite number of short-run average total cost curves, each based on a particular fixed level of capital usage. The typical LRAC curve is U-shaped, reflecting increasing returns of scale where negatively-sloped, constant returns to scale where horizontal and decreasing returns where positively sloped. The envelope is not created by the minimum point of each short-run average cost curve.



In a long-run perfectly competitive environment, the equilibrium level of output corresponds to the minimum efficient scale, marked as Q2 in the diagram. This is due to the zero-profit requirement of a perfectly competitive equilibrium. This result, which implies production is at a level corresponding to the lowest possible average cost. All points along the LRAC are productively efficient, by definition, but not all are equilibrium points in a long-run perfectly competitive environment. In some

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industries, the bottom of the LRAC curve is large in comparison to market size. This means that the largest firm tends to have a cost advantage, and the industry tends naturally to become a monopoly, and hence is called a natural monopoly. Natural monopolies tend to exist in industries with high capital costs in relation to variable costs, such as water supply and electricity supply.

Features of the LAC Curve

Following are the main features of the LAC curve:

1. 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 MC is a tangent. In other words, the long run average cost curve is the locus of all these points of tangency.

2. 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. The LAC curve is enveloping or tangential to a number of plant sizes and the related SACs. This is a much simplified assumption. Normally, however, the firm may come across with a choice among a large variety of plants.

3. Planning Curve:

LAC curve is regarded as the long run planning device, as it denotes the least unit cost of producing each possible level 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 a SAC is tangent to the LAC, such that both the curves have the minimum point of tangency.

4. Minimum cost combinations:

Since LAC is derived as the tangent to various SAC curves under consideration, the cost levels be presented by the LAC curve for different levels of output reflect minimum cost combinations of resource inputs to be adopted by the firm at each long run level of output.

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5. Flatter U-shaped:

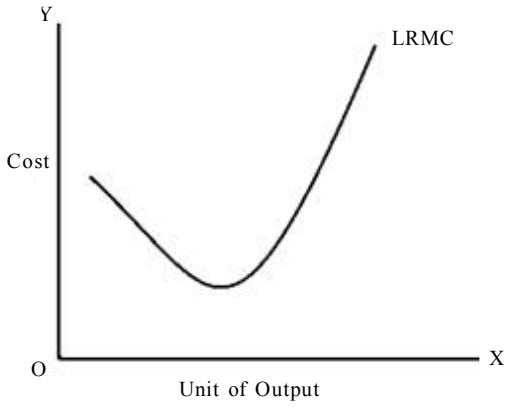
LAC curve is less U-shaped or rather dish-shaped. This means that in the beginning it gradually slopes downwards and then, after reaching a certain point, it gradually begins to slope upwards. This implies that in the long run when the firm adopts a larger scale of output, its long run average cost in 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 laws of returns to scale. Increasing returns in the beginning cause decreasing costs, constant returns, constant costs, and then decreasing returns, increasing costs.

Run Marginal Cost Curve (LMC)

Long-run marginal cost is the incremental cost incurred by a firm in production when all inputs are variable. In particular, it is the extra cost that results as a firm increases in the scale of operations by not only adding more workers to a given factory but also by building a larger factory.

In the long run, when all inputs under the control of the firm are variable, there are no fixed inputs. With no fixed inputs, increasing and decreasing marginal returns and the law of diminishing marginal returns are not relevant to long-run marginal cost. There are, however, two similar influences, economies of scale and diseconomies of scale.

In the long run, there are no fixed inputs. As such, marginal returns and especially the law of diminishing marginal returns do not operate and thus do not guide production and cost. Instead long-run marginal cost is affected by increasing and decreasing returns to scale, which translates into economies of scale and diseconomies of scale. Long-run marginal cost is the incremental cost incurred by a firm in production when all inputs are variable. In particular, it is the extra cost that results as a firm increases in the scale of operations by not only adding more workers to a given factory but also by building a larger factory.



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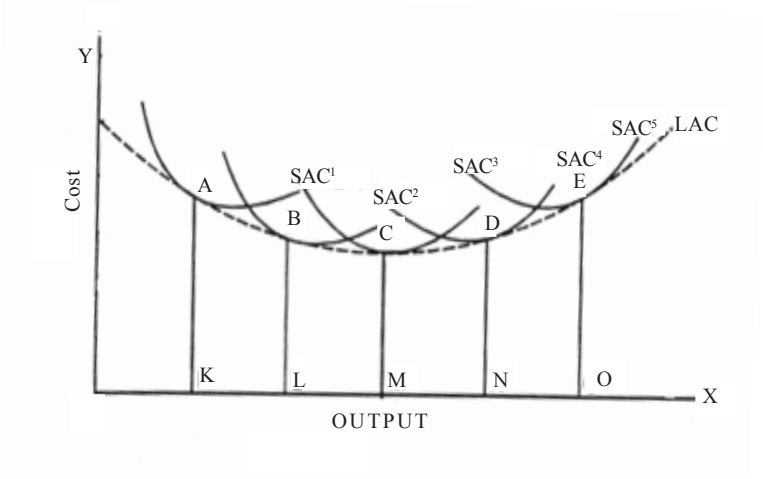
Scale economies and returns to scale generally produce a U-shaped long-run marginal cost curve, such as the one displayed to the right. For relatively small quantities of output, the curve is negatively sloped. Then for large quantities the curve is positively sloped.

While the shape of the long-run marginal cost curve looks surprisingly like that of a short-run marginal cost curve, the underlying forces are different. This U-shape is NOT the result of increasing, then decreasing marginal returns that surface in the short run when a variable input is added to a fixed input.

The negatively-sloped portion of this long-run marginal cost curve reflects economies of scale and increasing returns to scale. The positively-sloped portion reflects diseconomies of scale or marginal returns to scale.

11.11 RELATIONSHIP BETWEEN LAC AND SAC

In the long run, all costs of a firm are variable. The factors of production can be used in varying proportions to deal with an increased output. The firm having time-period long enough can build larger scale or type of plant to produce the anticipated output. The shape of the long run average cost curve is also U-shaped but is flatter that the short run curve as is illustrated in the following diagram:



In the diagram given above, there are five alternative scales of plant SAC^1 SAC^2, SAC^3, SAC^4 and, SAC^5. In the long run, the firm will operate the scale of plant which is most profitable to it.

If the anticipated output rate is 1000 per unit of time the firm would build the scale of plant given by SAC^5 and operate it at point E. If we draw a tangent to each of the short run cost curves, we get the long average cost (LAC) curve. The LAC is U-shaped but is flatter than tile short run cost curves. Mathematically expressed, the long-run average cost curve is the envelope of the SAC curves.

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Average Fixed Cost Curve (AFC Curve)

As the output increases, the total fixed costs get spread over a larger 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.

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, and then it remains constant for a while and again starts increasing. There are, thus, three phases of AVC curve: (i) decreasing phase, (ii) Constant phase and (iii) increasing phase. These stages in the AVC curves correspond to 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 average fixed and 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 cost decreases 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 ATC 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.

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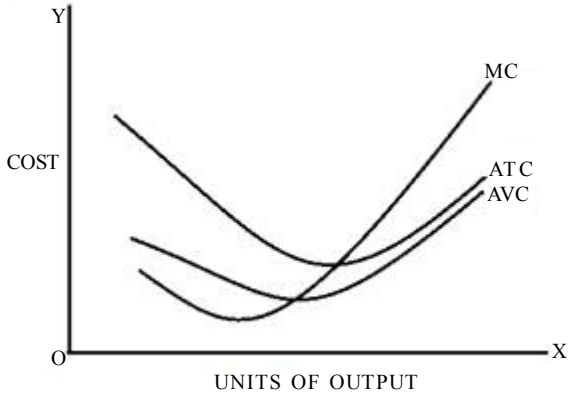
Since the falling effect of AFC curve is stronger than the rising effect of AVC curve at this stage, the net effect causes ATC to fall. But, as the output expands further to a higher level, the AVC curve tends to rise sharply due to the operation of the law of diminishing returns. Now, the rising effect of AVC being predominant, it more than discounts the falling effect of AFC curve, so the net 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.



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.

11.12 RELATIONSHIP BETWEEN SHORT RUN AND LONG RUN COST CURVES

The quantity of output there is one cost minimizing level of capital and a unique short run average cost curve associated with producing the given quantity.

(i) Each STC curve can be tangent to the LRTC curve at only one point. The STC curve cannot cross (intersect) the LRTC curve. The STC curve can lie wholly "above" the LRTC curve with no tangency point.

(ii) One STC curve is tangent to LRTC at the long-run cost minimizing level of production. At the point of tangency LRTC = STC. At all other levels of production STC will exceed LRTC.

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(iii) Average cost functions are the total cost function divided by the level of output. Therefore, the SATC curves also tangent to the LRATC curve at the cost-minimizing level of output. At the point of tangency LRATC = SATC. To the left of the point of tangency the firm is using too much capital and fixed costs are too high. To the right of the point of tangency the firm is using too little capital and diminishing returns to labor are causing costs to increase.

(iv) The slope of the total cost curves equals marginal cost. Therefore when STC is tangent to LTC, SMC = LRMC.

(v) At the long run cost minimizing level of output LRTC = STC; LRATC = SATC and LRMC = SMC.

(vi) The long run cost minimizing level of output may be different from minimum SATC.

(vii) With fixed unit costs of inputs, if the production function has constant returns to scale, then at the minimal level of the SATC curve we have SATC = LRATC = SMC = LRMC.

(viii) With fixed unit costs of inputs, if the production function has increasing returns to scale, the minimum of the SATC curve is to the right of the point of tangency between the LRAC and the SATC curves. Where LRTC = STC, LRATC = SATC and LRMC = SMC.

(ix) With fixed unit costs of inputs and decreasing returns the minimum of the SATC curve is to the left of the point of tangency between LRAC and SATC. Where LRTC = STC, LRATC = SATC and LRMC = SMC.

(x) With fixed unit input costs, a firm that is experiencing increasing (decreasing) returns to scale and is producing at its minimum SAC can always reduce average cost in the long run by expanding (reducing) the use of the fixed input.

11.13 ECONOMIES OF SCALE

Economies of scale are the cost advantages that enterprises obtain due to size, with cost per unit of output generally decreasing with increasing scale as fixed costs are spread out over more units of output. Often operational efficiency is also greater with increasing scale, leading to lower variable cost as well.

Economies of scale apply to a variety of organizational and business situations and at various levels, such as a business or manufacturing unit, plant or an entire enterprise. For example, a large manufacturing facility would be expected to have

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a lower cost per unit of output than a smaller facility, all other factors being equal, while a company with many facilities should have a cost advantage over a competitor with fewer.

This gives them a competitive advantage over smaller companies. For example, they can produce things more cheaply per unit because they make so many. Economies of scale are the increase in efficiency of production as the number of goods being produced increases. Typically, a company that achieves economies of scale lowers the average cost per unit through increased production since fixed costs are shared over an increased number of goods.

11.14 ECONOMIES OF SCALE AND RETURNS TO SCALE

Economies of scale are related to and can easily be confused with the theoretical economic notion of returns to scale. Where economies of scale refer to a firm's costs, returns to scale describe the relationship between inputs and outputs in a long-run (all inputs variable) production function. A production function has constant returns to scale if increasing all inputs by some proportion results in output increasing by that same proportion.

Returns are decreasing if, say, doubling inputs results in less than double the output, and increasing if more than double the output. If a mathematical function is used to represent the production function, and if that production function is homogeneous, returns to scale are represented by the degree of homogeneity of the function. Homogeneous production functions with constant returns to scale are first degree homogeneous, increasing returns to scale are represented by degrees of homogeneity greater than one, and decreasing returns to scale by degrees of homogeneity less than one.

If the firm is a perfect competitor in all input markets, and thus the per-unit prices of all its inputs are unaffected by how much of the inputs the firm purchases, then it can be shown that at a particular level of output, the firm has economies of scale if and only if it has increasing returns to scale, has diseconomies of scale if and only if it has decreasing returns to scale, and has neither economies nor diseconomies of scale if it has constant returns to scale. In this case, with perfect competition in the output market the long-run equilibrium will involve all firms operating at the minimum point of their long-run average cost curves (i.e., at the borderline between economies and diseconomies of scale).

If, however, the firm is not a perfect competitor in the input markets, then the above conclusions are modified. For example, if there are increasing returns to scale in some range of output levels, but the firm is so big in one or more input

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markets that increasing its purchases of an input drives up the input's per-unit cost, then the firm could have diseconomies of scale in that range of output levels. Conversely, if the firm is able to get bulk discounts of an input, then it could have economies of scale in some range of output levels even if it has decreasing returns in production in that output range.

The literature assumed that due to the competitive nature of reverse auction, and in order to compensate for lower prices and lower margins, suppliers seek higher volumes to maintain or increase the total revenue. Buyers, in turn, benefit from the lower transaction costs and economies of scale that result from larger volumes. In part as a result, numerous studies have indicated that the procurement volume must be sufficiently high to provide sufficient profits to attract enough suppliers, and provide buyers with enough savings to cover their additional costs.

Economies of scale give big companies access to a larger market by allowing them to operate with greater geographical reach. For the more traditional (small to medium) companies, however, size does have its limits. After a point, an increase in size (output) actually causes an increase in production costs. This is called "diseconomies of scale".

Long-run marginal cost is guided by scale economies and returns to scale.

For relatively small levels of production, a firm tends to experience economies of scale and increasing returns to scale. These result because an increase in the scale of operations (a proportional increase in all inputs under the control of the firm) causes a decrease in marginal cost.

Economies of scale are the cost advantages that a business can exploit by expanding their scale of production. The effect of economies of scale is to reduce the average (unit) costs of production.

11.15 EXAMPLES OF HOW ECONOMIES OF SCALE WORK

1. Technical economies of scale

Large-scale businesses can afford to invest in expensive and specialist capital machinery. For example, a supermarket chain such as Tesco or Sainsbury's can invest in technology that improves stock control. It might not, however, be viable or cost-efficient for a small corner shop to buy this technology.

2. Specialization of the workforce

Larger businesses split complex production processes into separate tasks to boost productivity. By specializing in certain tasks or processes, the workforce is able to produce more output in the same time.

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3. Marketing economies of scale

A large firm can spread its advertising and marketing budget over a large output and it can purchase its inputs in bulk at negotiated discounted prices if it has sufficient negotiation power in the market. A good example would be the ability of the electricity generators to negotiate lower prices when negotiating coal and gas supply contracts. The major food retailers also have buying power when purchasing supplies from farmers and other suppliers.

4. Financial economies of scale

Larger firms are usually rated by the financial markets to be more 'credit worthy' and have access to credit facilities, with favourable rates of borrowing. In contrast, smaller firms often face higher rates of interest on overdrafts and loans. Businesses quoted on the stock market can normally raise fresh money (i.e. extra financial capital) more cheaply through the issue of shares. They are also likely to pay a lower rate of interest on new company bonds issued through the capital markets.

11.16 TYPES OF ECONOMIES OF SCALE

There are two main types of economies of scale: internal and external. Internal economies are, as the name implies, internal to the company itself and is controllable by management. External economies are supported by external factors, such as the industry, geographic location or government.

1. Internal Economies of Scale

Internal economies result from the sheer size of the company, no matter what industry it's in or market it sells to. For example, large companies have the ability to buy in bulk, thus lowering the cost per unit of the materials they need to make their products. They can either use the savings to increase profits, or pass the savings to consumers and compete on price. There are five generally recognized types of internal economies of scale.

Technical economies of scale result from efficiencies in the production process itself. Research shows that manufacturing costs can fall 70%-90% every time the business doubles its output. For example, larger companies can take advantage of efficient equipment, such as sophisticated data mining software that allows the firm to target its customers more effectively. Large shipping companies can cut costs by using super-tankers, such as the post-Panamax ships that carry as much as 16 trains. Finally, large companies achieve technical economies of scale because they learn by doing, putting them far ahead of the competition on the learning curve.

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Monophony power is when a company buys so much of a product that it can negotiate a lower price than its smaller competitors.

Managerial economies of scale arise when firms can hire specialists, such as seasoned sales executives, to manage specific areas of the company.

Financial economies of scale mean the company has cheaper access to cash. A larger company can get funded from the stock market with an initial public offering. Big firms usually have higher credit ratings, meaning they get lower interest rates on their bonds.

Network economies of scale occur primarily in online businesses. That's because it costs virtually nothing to support each additional customer with existing infrastructure, so any revenue from the new customer is all profit for the business. A great example is eBay.

Types of internal economies of scale

Five main types of internal economies of scale:

1. Technical economies. They are found mostly in plants and arise mostly because neither the capital cost nor the running cost of plants increase in proportion to their size. The main idea is to spread the fixed costs over as large output as possible, so AFC decreases.
2. Managerial or administrative economies arise because the same people can usually manage with bigger output, so average administrative cost decreases when production increases. Large firms can employ specialists, which leads to the increase in efficiency.
3. Financial economies arise because e.g. the interest rate for getting a loan is higher for smaller firm that for larger one. This is because large firms have large assets and bank trusts them more. It is also relatively easier for large firms to raise their share-capital by issuing shares.
4. Marketing economies. They are available both in purchases of raw material and in selling of the product. A large firm may have a bulk discount when purchasing raw materials. In terms of promotion, to large firms the average cost is smaller, because the prices of advertisements are the same for all firms.
5. Social economies. They may be developed into two groups: those which build up the goodwill of the community and so attract customer (sponsorship), and those that develop the loyalty of the firm's employers.

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2. External Economies of Scale

External economies of scale mean a large company receives preferential treatment from government or other external sources simply because of its size. For example, most states will lower taxes to attract large companies since they will provide jobs for their residents. A large real estate developer can often convince a city to build roads and other infrastructure, saving those costs. Large companies can also take advantage of joint research with universities, lowering their own research expenses.

Small companies just don't have the leverage to take advantage of external economies of scale, and thus may find it harder or at least more expensive to compete. However, they can band together and take advantage of geographic economies of scale by clustering similar businesses in a small area. For example, artist lofts, galleries and restaurants in a downtown art district benefit from being near each other.

External economies of scale arise when there is a growth in the size of the industry and are available for many firms in it. There are three main types of external economies.

1. Economies related to a particular industry. They are derived from the concentration of the industry in one place and differ between industries. They might involve cheaper training facilities if many firms want to train their employers or marketing economies when several firms want the same kind of raw material. They can be realized through trade associations which are producers' unions, which can e.g. advertise the industry generally, thus raising the revenue of all the firms included.
2. Economies related to industrialization. If there is a great concentration in specific place, e.g. many people come to look for job there. Usually the communication expenses (maintenance of roads) can be shared. The activities of the essential services sector multiply, providing more advantages to firms in the industrialized area.
3. Economies related to society. The provision of roads, schools etc. is largely the responsibility of the state. Industrialization increases the provision of these items increases giving further advantages to firms in the area.

11.17 REASONS FOR ECONOMIES OF SCALE

The Economies of Scale occur for various reasons such as:

1. Specialization and division of labour:

In large scale operations workers can do more specific tasks. With little training they can become very proficient in their task, this enables greater efficiency. A good example is an assembly line with many different jobs.

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2. Technical:

Some production processes require high fixed costs e.g. building a large factory. If a car factory was then only used on a small scale it would be very inefficient to run. By using the factory to full capacity average costs will be lower.

3. Bulk buying:

If you buy a large quantity then the average costs will be lower. This is because of lower transport costs and less packaging. This is why supermarkets get lower prices from suppliers than local corner shops.

4. Spreading overheads:

If a firm merged it could rationalize its operational centres. E.g. it could have one head office rather than two.

5. Risk bearing economies:

Some investments are very expensive and perhaps risky, therefore only a large firm will be able and willing to undertake the necessary investment. E.g. pharmaceutical industry needs to take risks in developing new drugs

6. Marketing Economies of scale:

There is little point a small firm advertising on a national TV campaign because the return will not cover the high sunk costs

7. The container principle:

To increase capacity 8 fold it is necessary to increase surface area only 4 fold.

8. Financial economies:

A bigger firm can get a better rate of interest than small firms.

11.18 DISECONOMIES OF SCALE

Diseconomies of scale refer to an economic concept referring to a situation in which economies of scale no longer function for a firm. Rather than experiencing continued decreasing costs per increase in output, firms see an increase in marginal cost when output is increased. These are the forces that cause larger firms and governments to produce goods and services at increased per-unit costs.

11.19 CAUSES OF DISECONOMIES OF SCALE

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The causes of diseconomies of scale are as follows:

1. Complexity

The Economist magazine states that complexity in big organizations can negate cost savings, causing diseconomy of scale. Such complexity also dissuades passion in business, according to the famous professor of management Frederick Herzberg, who said such passion was more important than sheer numbers. Herzberg implied that innovation and interest in one's work was more valuable than size.

2. Coordination

Managerial problems are often specific to diseconomies of scale. Specifically, managers have a harder time coordinating tasks and processes. This leads to a loss of competitive advantage that might otherwise be gained by a large corporation. Inefficiencies may be hidden from management or may be a result of mismanagement or inexperience with scale.

3. Miscommunication

Miscommunication at big firms can be common simply because of the sheer number of employees. Multiple locations create communications and supply-chain difficulties. Diseconomy of scale also occurs when large amounts of information must be distributed among many employees, where the company's message or business plan can be diluted.

4. Labor Intensity

Corporations are not the only entities to encounter diseconomies of scale. In a Harvard Kennedy School study, Chris Pineda found that because city governments engage in labor-intensive services, economies of scale are harder to reach than in a pure production environment. Pineda found that services such as police and fire protection and public works were not easily replicated, and thus can be the source of diseconomies of scale in proposed local government consolidations.

5. Worker Dissatisfaction

Workers may lose their sense of self in a large company. If workers are unhappy, this can cause or at the very least aggravate diseconomies of scale. Worker dissatisfaction may be due to repeated miscommunications or inefficiencies common to the big firm.

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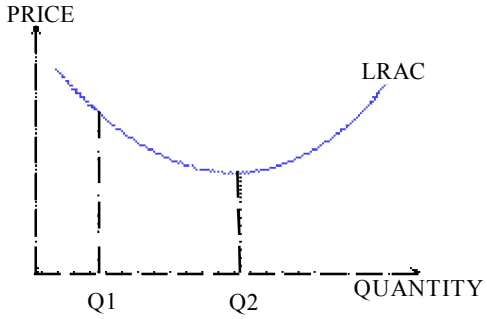
6. Bureaucracy

Pineda also notes that government bureaucrats may be particularly ill-equipped to manage large organizations. This means that diseconomies of scale occur when public officials miss clues about residents' needs or budgetary inefficiencies. Pineda thus infers that diseconomies of scale are particularly likely in the public sector.

11.20 ECONOMIES OF SCALE AND THE LAC

The LAC curve is the mirror image of the returns to the scale in the long run. It is apparent that since returns to the scale are based on the internal economies and diseconomies of scale, the long run average cost curve traces these economies of scale. As a matter of fact, increasing returns to scale can be largely traced to the economies which become available to a firm when it expands its scale of operations.



As a result of these economies, the firm enjoys a number of cost advantages and return in terms of total output. Thus, economies of scale explain the falling segment of the LAC curve. This shows that the declining average cost of output in the long run is due to economies of large scale enjoyed by the firm. Increasing LAC is attributed to the diseconomies of scale after a certain point of further expansion.

In short, economies and diseconomies of large scale play a significant role in determining the shape of the LAC curve. Again the structure of an industry is also affected by the cost consideration which is conditioned by the economies and diseconomies of scale. Of the many determinants of the number and size of firms in an industry, the, cost consideration and relevant economies and diseconomies are a significant determining factor.

11.21 INTERNAL ECONOMIES-DISECONOMIES AND THE LAC CURVE

Increasing average costs in the long run, attributed to the growing diseconomies of scale, set a limit to the further expansion of the firm. Economies and diseconomies of scale reflect upon the behaviour of the LAC curve. Analytically speaking, the downward slope of the LAC curve may be attributed to the internal economies of

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scale. Similarly, the upward slope of the LAC curve is caused by the internal diseconomies of scale and the horizontal slope of the LAC curve may be explained in terms of the balance between internal economies and diseconomies. Internal economies cause LAC curve to fall. It remains constant when economies equal diseconomies of scale. Net diseconomies cause LAC to rise. In short, the internal economies and diseconomies have their significance in determining the shape of the LAC curve of a firm. However, the shift in the LAC curve may be attributed to the external economies and diseconomies. External economies reflect in reducing the overall cost function of the firm.

11.22 LONG RUN AVERAGE COST CURVE

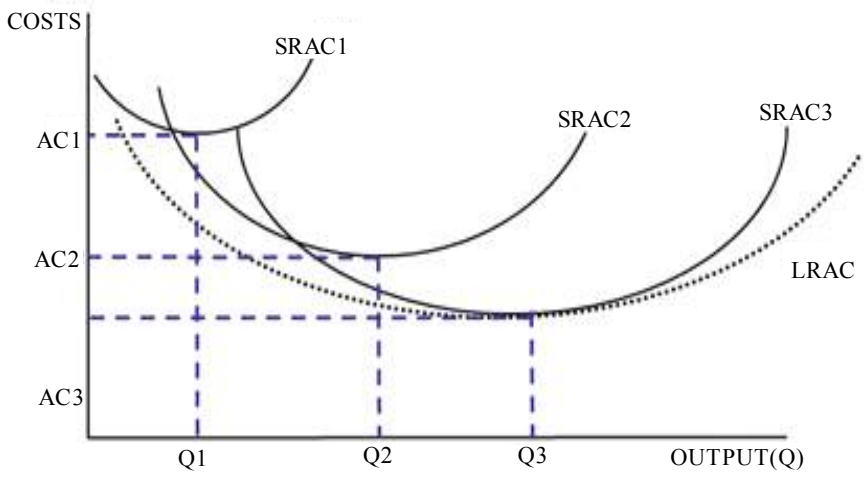
The long run average cost curve (LRAC) is known as the 'envelope curve' and is usually drawn on the assumption of their being an infinite number of plant sizes – hence its smooth appearance in the next diagram below.

The points of tangency between LRAC and SRAC curves do not occur at the minimum points of the SRAC curves except at the point where the minimum efficient scale (MES) is achieved.

If LRAC is falling when output is increasing then the firm is experiencing economies of scale. For example a doubling of factor inputs might lead to a more than doubling of output.

Conversely, When LRAC eventually starts to rise then the firm experiences diseconomies of scale, and, If LRAC is constant, then the firm is experiencing constant returns to scale

The working assumption is that a business will choose the least-cost method of production in the long run. Moving down the LRAC means there are cost advantages from a bigger scale of operations.



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11.23 COST FUNCTION

The cost function is a function of input prices and output quantity. Its value is the cost of making that output given those input prices. A common form: c (w1, w2, y) is the cost of making output quantity y using inputs that cost w1 and w2 per unit.

The relationship between output and costs is expressed in terms of cost function. By incorporating prices of inputs into the production function, one obtains the cost function since cost function is derived from production function. However, the nature of cost function depends on the time horizon. In microeconomic theory, we deal with short run and long run time.

A cost function may be written as:

$$C_q = f(Q_f P_f)$$

Where C_q is the total production cost, Q_f is the quantities of inputs employed by the firm, and P_f is the prices of relevant inputs. This cost equation says that cost of production depends on prices of inputs and quantities of inputs used by the firm.

11.24 IMPORTANCE OF COST FUNCTION

The study of business behaviour concentrates on the production process—the conversion of inputs into outputs—and the relationship between output and costs of production.

We have already studied a firm's production technology and how inputs are combined to produce output. The production function is just a starting point for the supply decisions of a firm. For any business decision, cost considerations play a great role.

Cost function is a derived function. It is derived from the production function which captures the technology of a firm. The theory of cost is a concern of managerial economics. Cost analysis helps allocation of resources among various alternatives. In fact, knowledge of cost theory is essential for making decisions relating to price and output.

Whether production of a new product is a wiser one on the part of a firm greatly depends on the evaluation of costs associated with it and the possibility of earning revenue from it. Decisions on capital investment (e.g., new machines) are made by comparing the rate of return from such investment with the opportunity cost of the funds used.

The relevance of cost analysis in decision-making is usually couched in terms of short and long periods of time by economists. In all market structures, short run costs are crucial in the determination of price and output. This is due to the fact that the basis for cost function is production and the prices of inputs that a firm pays.

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On the other hand, long run cost analysis is used for planning the optimal scale of plant size. In other words, long run cost functions provide useful information for planning the growth as well as the investment policies of a firm. Growth of a firm largely depends on cost considerations.

The position of the U-shaped long run AC of a firm is suggestive of the direction of the growth of a firm. That is to say, a firm can take a decision whether to build up a new plant or to look for diversification in other markets by studying its existence on the long run AC curve. Further, it is the cost that decides the merger and takeover of a sick firm.

Non-profit sector or the government sector must also have knowledge of cost function for decision-making. Whether the Narmada Dam is to be built or not, it should evaluate the costs and benefits **'flowing'** from the dam.

11.25 COST CURVES

Curves can be drawn to represent costs. The marginal cost (MC) and the average cost (AC) are shown in the following diagram.

OX and OY are two axes, along OX is shown the quantity produced and along OY the cost.

It will be seen that as output is increased, both average cost (AC) and marginal cost (MC) fall, but MC is below AC, i.e., marginal cost is less than average cost.

The fall is due to the economies of scale. But beyond a point (M), i.e., when output is expanded too much, both AC and MC start rising and now MC is above AC, i.e., the marginal cost is greater than the average cost. That is why MC cuts AC from below at its lowest point.

There are two types of other cost curves. They are the Average Variable Cost Curve and the Average Fixed Cost Curve. The average variable cost is obtained by dividing the total variable cost by the number of units produced. Average fixed cost is obtained by dividing the total fixed cost by the total units of output. The total fixed cost being fixed for all units of output, AFC is a falling curve in the shape of a rectangular hyperbola.

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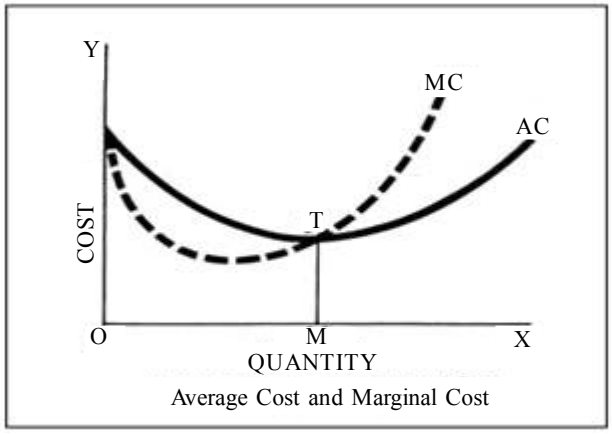
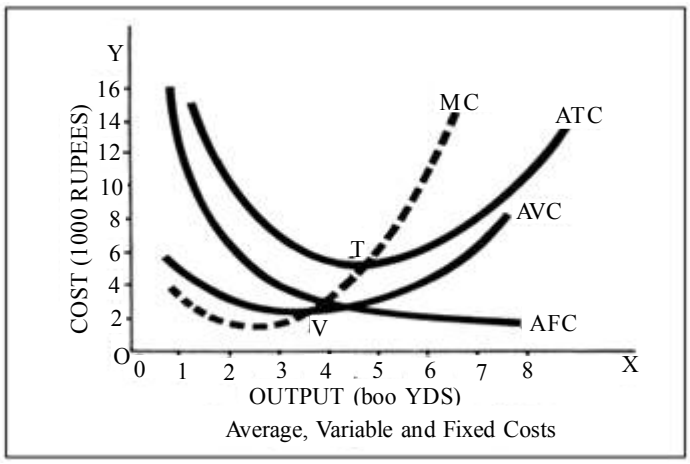


Average Cost and Marginal Cost

The average variable and average fixed cost curves can be represented as below. OX and OY are the two axes. The output is represented along OX and cost along OY; AFC curve represents average fixed cost. AVC curve represents average variable cost, ATC curve represents average total cost (i.e., total of AFC and AVC and is called AC, i.e., average cost). MC curve represents marginal cost.

It is clear that as output is increased, the cost per unit decreases due to various internal economies. That is why AFC, AVC and hence ATC all start falling. But if the output is expanded beyond proper limit, diseconomies will result, and all these costs will go up, which is shown by the rising portions of these curves. This is the third stage of the Law of Variable Proportions.



Average, Variable and Fixed Costs

It will be seen that AFC continues to fall, it never rises, and rather it helps AVC to fall too for some time, but after some time AVC starts rising quickly and raises ATC too. MC and AVC fall and rise at the same time. But it is to be carefully noticed that when MC and AVC are falling, MC is below AVC, but when they rise, MC is above AVC. When AVC is constant, MC is equal to it. In other words, MC cuts AVC and ATC at their lowest points.

11.26 SUMMARY

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Cost refers to the expenditure of funds or use of property to acquire or produce a product or service. There are various types of cost such as average cost, fixed cost, historical cost, marginal cost, replacement cost, variable cost etc.

Fixed costs are expenses that do not change in proportion to the activity of a business, within the relevant period or scale of production. For example, a retailer must pay rent and utility bills irrespective of sales.

Variable costs are expenses that change in proportion to the activity of a business. Along with fixed costs, variable costs make up the two components of total cost. Direct Costs, however, are costs that can be associated with a particular cost object. Not all variable costs are direct costs, however; for example, variable manufacturing overhead costs are variable costs that are not a direct costs, but indirect costs.

Marginal cost is the change in total cost that arises when the quantity produced changes by one unit. In general terms, marginal cost at each level of production includes any additional costs required to produce the next unit. So, the marginal costs involved in making one more wooden table are the additional materials and labour cost incurred.

Short run is a period of time over which at least one factor must remain fixed. For most of the firms the fixed resource or factors which cannot be increased to meet the rising demand of the good is capital i.e., plant and machinery.

Short run is a period of time over which output can be changed by adjusting the quantities of resources such as labour, raw material, fuel but the size or scale of the firm remains fixed.

The total cost of a firm in the short run is divided into two categories (1) Fixed cost and (2) Variable cost. The two types of economic costs are now discussed in brief.

Total cost is the aggregate of expenditures incurred by the firm in producing a given level of output. Total cost is measured in relation to the production function by multiplying factor prices with their quantities.

Total fixed cost corresponds to fixed inputs in the short run production function.

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.

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.

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Average cost is total cost divided by total units of output. Hence, average total cost can be computed simply by adding average fixed cost and average variable cost at each level of output. Average cost is per unit cost i. e. money spending to produce a unit of total output.

Average fixed cost is total fixed cost divided by total units of output. Thus, average fixed costs are the fixed cost per unit of output.

Average variable cost is total variable cost divided by total units of output. Thus, average variable cost is variable cost per unit of output.

AVC curve is a U shaped curve. AVC curve will come down in the beginning and then rises as more units of output are produced with a given plant. When the producer adds more units of

The marginal cost is also per unit cost of production. It is the addition made to the total cost by producing one more unit of output.

The marginal cost of the nth 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.

The long run refers to a time period during which full adjustment to a change in environment can be made by the firm by varying all inputs , including capital equipment & factory building.

The long-run average cost curve depicts the cost per unit of output in the long run that is, when all productive inputs' usage levels can be varied. All points on the line represent least-cost factor combinations; points above the line are attainable but unwise, while points below are unattainable given present factors of production.

Long-run marginal cost is the incremental cost incurred by a firm in production when all inputs are variable. In particular, it is the extra cost that results as a firm increases in the scale of operations by not only adding more workers to a given factory but also by building a larger factory.

Economies of scale are an economics term that means large entities, whether businesses, non-profits or governments, can reduce costs simply because of their size. This gives them a competitive advantage over smaller companies. For example, they can produce things more cheaply per unit because they make so many.

Large-scale businesses can afford to invest in expensive and specialist capital machinery. For example, a supermarket chain such as Tesco or Sainsbury's can invest in technology that improves stock control. It might not, however, be viable or cost-efficient for a small corner shop to buy this technology.

Larger businesses split complex production processes into separate tasks to boost productivity. By specializing in certain tasks or processes, the workforce is able to produce more output in the same time.

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A large firm can spread its advertising and marketing budget over a large output and it can purchase its inputs in bulk at negotiated discounted prices if it has sufficient negotiation power in the market. A good example would be the ability of the electricity generators to negotiate lower prices when negotiating coal and gas supply contracts. The major food retailers also have buying power when purchasing supplies from farmers and other suppliers.

11.27 GLOSSARY

(a) Cost: Cost refers to the expenditure of funds or use of property to acquire or produce a product or service. There are various types of cost such as average cost, fixed cost, historical cost, marginal cost, replacement cost, variable cost etc.

(b) Fixed costs: Fixed costs are expenses that do not change in proportion to the activity of a business, within the relevant period or scale of production. For example, a retailer must pay rent and utility bills irrespective of sales.

(c) Variable costs: Variable costs are expenses that change in proportion to the activity of a business. Along with fixed costs, variable costs make up the two components of total cost.

(d) Marginal cost: Marginal cost is the change in total cost that arises when the quantity produced changes by one unit. In general terms, marginal cost at each level of production includes any additional costs required to produce the next unit. So, the marginal costs involved in making one more wooden table are the additional materials and labour cost incurred.

(e) Economies of scale: Economies of scale are an economics term that means large entities, whether businesses, non-profits or governments, can reduce costs simply because of their size. This gives them a competitive advantage over smaller companies. For example, they can produce things more cheaply per unit because they make so many.

11.28 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. Define the term Cost.
2. What is Cost Concept?
3. What is Real Cost?

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4. What is Opportunity Cost?
5. What is Money Cost?
6. What is Economies of Scale?
7. What is Diseconomies of Scale?
8. What is Cost function?

(B) Extended Answer Questions

1. Discuss various Cost Concepts.
2. Discuss various types of Cost.
3. Explain Short-run Cost-output relation.
4. Discuss Long-run Cost-Output relation.
5. Explain the economies of scale and returns to scale.
6. Discuss various types of Economies of Scale.
7. Explain the causes of Diseconomies of Scale.
8. Discuss Economies of Scale and the LAC.

(C) True or False

1. Cost refers to the expenditure of funds or use of property to acquire or produce a product or service.
2. Fixed costs are expenses that do not change in proportion to the activity of a business, within the relevant period or scale of production.
3. Marginal cost is the change in total cost that arises when the quantity produced changes by one unit.
4. Marginal cost of production refers to the physical quantities of various factors used in producing a commodity.
5. Cost of production measured in terms of money is called the money cost.

(D) Multiple Choice Questions

1. "A retailer must pay rent and utility bills irrespective of sales" is an example of.....
   (a) Fixed cost
   (b) Variable cost
   (c) Marginal Cost
   (d) None of the above

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2. Which of the following costs are expenses that change in proportion to the activity of a business?
   (a) Variable cost
   (b) Fixed cost
   (c) Material cost
   (d) All the above
3. Which of the followings is the cost concept?
   (a) Real Cost
   (b) Opportunity Cost
   (c) Money Cost
   (d) All of them
4. Which cost refers to the physical quantities of various factors used in producing a commodity?
   (a) Real cost
   (b) Opportunity cost
   (c) Money cost
   (d) None of them.
5. Short run is a period of time over which at least one factor must.....
   (a) Remain flexible
   (b) Remain fixed
   (c) Variable
   (d) None of the above
6. Which of the following is the correct equation?
   (a) TVC = F (Q)
   (b) TVC = E (Q)
   (c) TVC = G (Q)
   (d) TVC = D (Q)

(E) Fill in the Blanks

1. .....refers to the output of goods and services produced by businesses within a market.
2. Production involves the things which are essential for the manufacture of.....

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3. .....production refers to the manufacturing facility that produces several different products in smaller batches.
4. Money cost is the outlay cost, i.e., actual ……..of the firm.
5. Fixed costs are those costs that are incurred as a result of the use of……...
6. Total …….corresponds to fixed inputs in the short run production functions.

11.29 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. False, 5. True

(D) 1. (a) 2. (a) 3. (d) 4. (a) 5. (b) 6. (a)

(E) 1. Production, 2. Products, 3. Job shop, 4. Financial expenditure, 5. Fixed factor inputs, 6. Fixed cost

11.30 BIBLIOGRAPHY

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14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

11.31 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

11.32 TERMINAL QUESTIONS

1. Select a manufacturer company and explain that company's production system.

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2. Select any company and discuss the relationship between Marginal Cost and Average Cost with reference to that company.

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MS 103

Managerial Economics

Volume II

Block III: Market System

Block IV: Basics of Macro Economics

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SYLLABUS

Course Name: Managerial Economics

Course Code: MS 103

Course Objective:

The objective is to give students grounding in the basic understanding of economic environment and tools for better analysis of economic situations and thus helping in decision making.

BLOCK I: Introduction to Managerial Economics

Unit I **Basics of Managerial Economics**

Meaning, Scope and Nature of Managerial Economics.

Unit II **The Economy and its Basic Problems: Scarcity and Choices**

Economy and its Working, Kinds of Economic System, Production Possibility of an Economy, How Market Mechanism Works?, Efficiency and Reasons for Failure of Market System, Role of Government in an Economy.

Unit III **Law of Demand and Supply**

Law of Demand, Demand Function, Law of Supply, Supply Function, Equilibrium of Demand and Supply, Determination of Equilibrium Price and Quantity.

Unit IV **Elasticity of Demand and Supply**

Price Elasticity of Demand and its Determination, Price Elasticity and Marginal Revenue, Price Elasticity and Consumption Expenditure, Income Elasticity of Demand, Cross Elasticity of Demand, Elasticity of Price Expectation, Use of Elasticity, Price Elasticity of Supply.

Unit V **Failure of the Market Economy and Role of the Government**

Imperfect Market Information and Market Failure, Growth of Monopolies and Market Failure, Market Failure in Case of Public Goods, Public Provision of Public Goods, Externalities and Government Intervention.

Unit VI **Cardinal Utility Theory**

Cardinal Utility Theory, Law of Diminishing Marginal Utility, Consumer's Equilibrium, Derivation of Demand Curve, Drawbacks of Cardinal Approach.

Unit VII **Ordinal Utility Approach**

Indifference Curve Analysis, Diminishing Marginal Rate of Substitution, Properties of Indifference Curves, Indifference Curve Map, Budget Line, Consumer's Equilibrium, Effect of Income and Price Change in Consumer's Equilibrium, Income Effect and Substitution Effect of Inferior Goods, Complementarity and Substitutability, the Extreme Choices, Derivation of Individual Demand Curve, Comparison of Ordinal and Cardinal Utility Approach, Applications of Indifference Curve Analysis.

Unit VIII **Consumer's Surplus**

The Marshallian Consumer's Surplus, Hicsian Method of Measuring Consumer Surplus, Application of Consumer's Surplus Concept.

BLOCK II: Supply Side Economics

Unit IX **Theory of Production**

Production with One Variable Input

Meaning of Production, Production Related Concepts, Production Function, and Law of Production.

Production with Two Variable Input

Iso-quants, Marginal Rate of Technical Substitution, Properties of Iso-quants, Isoquant Map and Economic Region, Other Forms of Iso-quants, Elasticity of Substitution, Law of Returns to Scale.

Unit X **Optimum Combination of Inputs**

Isocost Line, Optimum Combination of Inputs, Choice of Optimum Expansion Path, Changes in Input Prices and Input Combinations.

Unit XI **Theory of Production Cost**

Cost Concepts, Short-run Cost-Output Relation, Long-run Cost-Output Relation, Economies of Scale, Diseconomies of Scale, Cost Function and Cost Curves.

BLOCK III: Market System

Unit XII **Business Firms and Market Structure**

Objectives of Business Firms, Profit Maximization, Alternative Objectives of Business Firms, the Market Structure.

Unit XIII **Perfect Competition Market**

Perfect Competition Market and its Features, Perfect v/s Pure Competition, Equilibrium of the Firm, Derivation of the Supply Curve of the Firm, Derivation of the Supply Curve of the Industry, Price and Output Determination under Perfect Competition, Price and Output Determination in Long Run, Long-run Supply Curve of a Competitive Industry.

Unit XIV **Monopoly Market**

Monopoly Market, its Source and Features, Demand and Revenue Curve under Monopoly, Cost and Supply Curves under Monopoly, Profit Maximization under Monopoly, Absence of Supply Curve under Monopoly, Monopoly v/s Perfect Competition: Comparison of Long-run Price and Output, Equilibrium of Multiplant Monopoly, Price Determination by Monopoly, Measures of Monopoly Power.

Unit XV **Monopolistic Competition Market**

Monopolistic Competition Market and its Features, Foundation of Monopolistic Competition Model, Price and Output Determination under Monopolistic Competition, Analysis of Selling Cost and Firm's Equilibrium, Critical Appraisal of Chamberlin's Theory of Monopolistic Competition.

Unit XVI **Oligopoly Market**

Oligopoly Market – its Meaning and Characteristics, Duopoly Model, Oligopoly Models, Game Theory Approach to Oligopoly.

BLOCK IV: Basics of Macro Economics

Unit XVII **The Circular Flow Model of the Economy**

Circular Flow in a Simple Economy Model, Circular Flow of Goods and Money in a Three Sector Economy, Circular Flows in a Four Sector Model: A Model with Foreign Sector.

Unit XVIII **National Income: Concept and Measurement**

Measure of National Income, Methods of Measuring National Income, Choice of Methods, Measurement of National Income in India, Growth and Composition of India's National Income.

Unit XIX **Theory of National Income Determination**

Determination of National Income: Two Sector Model, The Consumption Function, Derivation of Saving Function, A Formal Model of National Income Determination, Shifts in Aggregate Demand Function and Multiplier.

Unit XX **Income Determination with Government and Foreign Trade**

Income Determination Model with Government: The Three Sector Model, Income Determination with Foreign Trade: A Four Sector Model.

Unit XXI **Theories of Aggregate Consumption**

The Absolute Income Hypothesis, The Relative Income Hypothesis, The Permanent Income Hypothesis, The Life Cycle Hypothesis.

Unit XXII **Keynesian Theory of Interest**

Money Demand and Supply: The Keynesian Approach, The Keynesian Theory of Interest, Drawbacks of the Keynesian Theory of Interest.

Unit XXIII **Investment Theory and Acceleration Principle**

Basic Concepts, Investment Decisions, Change in Interest Rates, MFC and Capital Accumulation, The Acceleration Principle.

Unit XXIV **Money and Banking**

Money: Definitions and Function, Types of Money, M1, M2, M3 and M4, High Powered Money.

Banks: Banking in India, Reserve Bank of India and its Functions, Repo, Reverse Repo, CRR, SLR, MSF, Credit Creation by Banks.

CONTENTS

BLOCK III: Market System

BLOCK IV: Basics of Macro Economics

BLOCK III: Market System

UNIT 12 BUSINESS FIRMS AND MARKET STRUCTURE

Structure:

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Objectives

After reading this unit you will be able to understand:

- Objective of Business Firms
- Profit maximization
- Alternative objectives of Business firms
- The market structure

12.1 INTRODUCTION

Business firm is a commercial organization that operates on a for-profit basis and participates in selling goods or services to consumers. The management of a business firm will typically develop a set of organizational objectives and a strategy for meeting those goals to help employees understand where the company is headed and how it intends to get there. Market structure refers to the nature and degree of competition in the market for goods and services.

12.2 INTRODUCTION TO FIRM

A firm is the smallest unit of production or sale. Microeconomic theory is an equilibrium analysis which is concerned with the behaviour of demand and supply forces of a firm. Firms may have different organizational forms. A firm may be an individual enterprise, a partnership, a joint stock company, a corporate body, a cooperative enterprise or a public utility agency. Again a firm may be a producer, seller, trader, exporter or a financier. In any one of these capacities, firms show similar basic tendencies. In order to maximize its profits a firm has to maintain as large a difference between what it spends on resources or cost of production and what it earns by selling goods in the form of revenue or returns. The difference between the two is the firm's profit. So the firm has to keep its cost of production as low as possible. On other hand, it has to charge a high price and sell as much quantity of products as possible. In this respect, firm's actions are related to the behaviour of consumers. Besides, limitation of cost of production, the capacity of a firm to charge a suitable price is restricted by the consumer's willingness to pay.

12.3 MEANING OF FIRM

Firm refers to a unit or entity carrying a portion of the business. It is a business organization, such as a corporation, limited liability company or partnership. Firms are associated with business organizations that practice law, but the term can be used for a wide variety or business operation units.

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"A firm is a centre of control where the decision about what to produce and how to produce are taken."

A firm is understood as an organization which converts input into output. **Inputs are:** Plants, machinery, tools, inventories which include unsold finished and semi-finished goods and raw-material. **Outputs are:** Goods and services they produce.

12.4 TYPES OF FIRM

1. Sole Proprietorship firm

The sole proprietor is an unincorporated business with one owner who pays personal income tax on profits from the business. With little government regulation, they are the simplest business to set up or take apart, making them popular among individual self contractors or business owners. Many sole proprietors do business under their own names because creating a separate business or trade name isn't necessary. There is no separate legal entity created by a sole proprietorship, unlike corporations and limited partnerships. Consequently, the sole proprietor is not safe from liabilities incurred by the entity. The debts of the sole proprietorship are also the debts of the owner. However, all profits flow directly to the owner of a sole proprietorship.

2. Partnership firm

Partnership is a nominate contract between individuals who, in a spirit of cooperation, agree to carry on an enterprise; contribute to it by combining property, knowledge or activities; and share its profit. Partners may have a partnership agreement or declaration of partnership and in some jurisdictions such agreements may be registered and available for public inspection. In many countries, a partnership is also considered to be a legal entity, although different legal systems reach different conclusions on this point.

3. Cooperative Societies

A co-operative society is a voluntary association started with the aim of service of its members. It is a form of business where individuals belonging to the same class join their hands for the promotion of their common goals. These are generally formed by the poor people or weaker section people in the society. It reflects the desire of the poor people to stand on their own legs or own merit. The philosophy of the formation of co-operative society is "all for each and each for all".

4. Joint Stock Companies

A joint-stock company (JSC) is a type of corporation or partnership involving two or more individuals that own shares of stock in the company. Certificates of

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ownership ("shares") are issued by the company in return for each financial contribution, and the shareholders are free to transfer their ownership interest at any time by selling their shareholding to others.

In modern corporate law, the existence of a joint-stock company is often synonymous with incorporation and limited liability. And as a consequence joint-stock companies are commonly known as corporations or limited companies.

12.5 OBJECTIVES OF BUSINESS FIRM

It is generally believed that a business has a single objective, that is, to make profit. But it cannot be the only objective of business. While pursuing the objective of earning profit, business units do keep the interest of their owners in view. However, any business unit cannot ignore the interests of its employees, customers, the community, as well as the interests of society as a whole.

A business unit can prosper only if it enjoys the support and goodwill of people in general. Business objectives also need to be aimed at contributing to national goals and aspirations as well as towards international well-being.

The important goals or objectives of a business firm can be summarized as follows:

1. Economic Objectives
2. Social Objectives
3. Human Objectives
4. National Objectives
5. Business Objectives
6. Global Objectives

1. Economic Objectives

Economic objectives of business refer to the objective of earning profit and also other objectives that are necessary to be pursued to achieve the profit objective, which includes creation of customers, regular innovations and best possible use of available resources.

(i) Profit earning

Profit is the lifeblood of business, without which no business can survive in a competitive market. In fact profit making is the primary objective for which a business unit is brought into existence. Profits must be earned to ensure the survival of business, its growth and expansion over time. Profits help businessmen not only to earn their living but also to expand their business activities by reinvesting a part of the profits.

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(ii) Creation of customers

A business unit cannot survive unless there are customers to buy the products and services. Again a businessman can earn profits only when he/she provides quality goods and services at a reasonable price. For this it needs to attract more customers for its existing as well as new products. This is achieved with the help of various marketing activities.

(iii) Regular innovations

Innovation means changes, which bring about improvement in products, process of production and distribution of goods. Business units, through innovation, are able to reduce cost by adopting better methods of production and also increase their sales by attracting more customers because of improved products. Reduction in cost and increase in sales gives more profit to the businessman. Use of power-looms in place of handlooms, use of tractors in place of hand implements in farms etc. are all the results of innovation.

(iv) Best possible use of resources

To run any business you must have sufficient capital or funds. The amount of capital may be used to buy machinery, raw materials, employ men and have cash to meet day-to-day expenses. Thus, business activities require various resources like men, materials, money and machines. The availability of these resources is usually limited. Thus, every business should try to make the best possible use of these resources. This objective can be achieved by employing efficient workers, making full use of machines and minimizing wastage of raw materials.

(v) Sales Maximization

Sales maximization is an approach to business where the company's primary objective is to generate as much revenue as possible. Sales or revenue is the generation of cash flow through the sale of goods and services. A goal of maximizing revenue does not necessarily produce profits, because companies often sell products at a loss to generate revenue.

2. Social Objectives

Social objectives are those objectives of business, which are desired to be achieved for the benefit of the society. Since business operates in a society by utilizing its scarce resources, the society expects something in return for its welfare. No activity of the business should be aimed at giving any kind of trouble to the society. If business activities lead to socially harmful effects, there is bound to be public reaction against the business sooner or later.

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Social objectives of business include production and supply of quality goods and services, adoption of fair trade practices and contribution to the general welfare of society and provision of welfare amenities.

(i) Production and supply of quality goods and services

Since the business utilizes the various resources of the society, the society expects to get quality goods and services from the business. The objective of business should be to produce better quality goods and supply them at the right time and at a right price. It is not desirable on the part of the businessman to supply adulterated or inferior goods which cause injuries to the customers. They should charge the price according to the quality of the goods and services provided to the society. Again, the customers also expect timely supply of all their requirements. So it is important for every business to supply those goods and services on a regular basis.

(ii) Adoption of fair trade practices

In every society, activities such as hoarding, black-marketing and over-charging are considered undesirable. Besides, misleading advertisements often give a false impression about the quality of products. Such advertisements deceive the customers and the businessmen use them for the sake of making large profits. This is an unfair trade practice.

The business unit must not create artificial scarcity of essential goods or raise prices for the sake of earning more profits. All these activities earn a bad name and sometimes make the businessmen liable for penalty and even imprisonment under the law. Therefore, the objective of business should be to adopt fair trade practices for the welfare of the consumers as well as the society.

(iii) Contribution to the general welfare of the society

Business units should work for the general welfare and upliftment of the society. This is possible through running of schools and colleges for better education, opening of vocational training centers to train the people to earn their livelihood, establishing hospitals for medical facilities and providing recreational facilities for the general public like parks, sports complexes etc.

3. Human Objectives

Human objectives refer to the objectives aimed at the well-being as well as fulfillment of expectations of employees as also of people who are disabled, handicapped and deprived of proper education and training. The human objectives of business may thus include economic well-being of the employees, social and psychological satisfaction of employees and development of human resources.

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(i) Economic well being of the employees

In business employees must be provided with fair remuneration and incentives for performance, benefits of provident fund, pension and other amenities like medical facilities, housing facilities etc. By this they feel more satisfied at work and contribute more for the business.

(ii) Social and psychological satisfaction of employees

It is the duty of business units to provide social and psychological satisfaction to their employees. This is possible by making the job interesting and challenging, putting the right person in the right job and reducing the monotony of work. Opportunities for promotion and advancement in career should also be provided to the employees. Further, grievances of employees should be given prompt attention and their suggestions should be considered seriously when decisions are made. If employees are happy and satisfied they can put their best efforts in work.

(iii) Development of human resources

Employees as human beings always want to grow. Their growth requires proper training as well as development. Business can prosper if the people employed can improve their skills and develop their abilities and competencies in course of time. Thus, it is important that business should arrange training and development programmes for its employees.

(iv) Well being of socially and economically backward people

Business units being inseparable parts of society should help backward classes and also people those are physically and mentally challenged. This can be done in many ways. For instance, vocational training programme may be arranged to improve the earning capacity of backward people in the community. While recruiting it staff, business should give preference to physically and mentally challenged persons. Business units can also help and encourage meritorious students by awarding scholarships for higher studies.

4. National Objectives

Being an important part of the country, every business must have the objective of fulfilling national goals and aspirations. The goal of the country may be to provide employment opportunity to its citizen, earn revenue for its exchequer, become self-sufficient in production of goods and services, promote social justice, etc. Business activities should be conducted keeping these goals of the country in mind, which may be called national objectives of business. The following are the national objectives of business.

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(i) Creation of employment

One of the important national objectives of business is to create opportunities for gainful employment of people. This can be achieved by establishing new business units, expanding markets, widening distribution channels, etc.

(ii) Promotion of social justice

As a responsible citizen, a businessman is expected to provide equal opportunities to all persons with whom he/she deals. He is also expected to provide equal opportunities to all the employees to work and progress. Towards this objective special attention must be paid to weaker and backward sections of the society.

(iii) Production according to national priority

Business units should produce and supply goods in accordance with the priorities laid down in the plans and policies of the Government. One of the national objectives of business in our country should be to increase the production and supply of essential goods at reasonable prices.

(iv) Contribute to the revenue of the country

The business owners should pay their taxes and dues honestly and regularly. This will increase the revenue of the government, which can be used for the development of the nation.

(v) Self-sufficiency and Export Promotion

To help the country to become self-reliant, business units have the added responsibility of restricting import of goods. Besides, every business units should aim at increasing exports and adding to the foreign exchange reserves of the country.

5. Organizational Objectives

Organizational goals are the general aims of an organization as expressed in the corporate charter, annual reports, public statements and mission statements. Their purpose is to give the organization a favorable public image, provide legitimacy, and justify its activities.

(i) Business Growth

Business growth is defined as an innovation that delivers solutions to customers while adding value both internally and externally to our processes as well as increasing customer value while increasing profits.

Professors Penrose and Marris, consider growth maximisation to be the primary goal of managers. This is because the firm increases the employment of managerial staff at a rate which maximizes growth. With the growth of firm, the complexities of organization increases, so the firm requires greater managerial services. Further,

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managers' salaries, perks, prestige, etc., are also linked with the growth of their firms.

(ii) Wealth Maximization

Wealth maximization is a process that increases the current net value of business or shareholder capital gains, with the objective of bringing in the highest possible return. The wealth maximization strategy generally involves making sound financial investment decisions which take into consideration any risk factors that would compromise or outweigh the anticipated benefits.

(iii) Staff Maximization

Employee empowerment means giving employees the freedom to be actively involved in decisions that involve their functions within the company. The goal of employee empowerment is to engage employees so that they feel valued and more motivated to perform their duties to a high standard in order to contribute to the company's overall well being.

In modern businesses, when large corporations are basically run by the professional managers, there is a separation of the ownership from the control. According to Berle and Means, when the managers control the business, instead of satisfying the profitability interest of the owners the shareholders, they may seek to satisfy or justify their own utility or worth for the concern by having a more than necessary larger staff to be employed in the organization. When the firm possesses a degree of monopoly power in the market, the manager may trade off some profits for an expansion in the size of staff. This is referred to as the utility-maximization theory of managerial behaviour.

6. Global Objectives

Sustainability, an agronomic perm culture, is global objectives and need to be changing lives now. Earlier India had a very restricted business relationship with other nations. There was a very rigid policy for import and export of goods and services. But, now-a-days due to liberal economic and export–import policy, restrictions on foreign investments have been largely abolished and duties on imported goods have been substantially reduced. This change has brought about increased competition in the market. Today because of globalization the entire world has become a big market. Goods produced in one country are readily available in other countries. So, to face the competition in the global market every business has certain objectives in mind, which may be called the global objectives.

(i) Raise general standard of living

Growth of business activities across national borders makes available quality goods at reasonable prices all over the world. The people of one country get to use

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similar types of goods that people in other countries are using. This improves the standard of living of people.

(ii) Reduce disparities among nations

Business should help to reduce disparities among the rich and poor nations of the world by expanding its operation. By way of capital investment in developing as well as underdeveloped countries it can foster their industrial and economic growth.

(iii) Make available globally competitive goods and services

Business should produce goods and services which are globally competitive and have huge demand in foreign markets. This will improve the image of the exporting country and also earn more foreign exchange for the country.

12.6 PROFIT VERSES VALUE (WEALTH) MAXIMIZATION DYNAMICS

Time value of money is the idea that money available at the present time is worth more than the same amount in the future due to its potential earning capacity. This core principle of finance holds that, provided money can earn interest, any amount of money is worth more the sooner it is received.

Time Value of Money (TVM) is an important concept in financial management. It can be used to compare investment alternatives and to solve problems involving loans, mortgages, leases, savings, and annuities.

TVM is based on the concept that a dollar that you have today is worth more than the promise or expectation that you will receive a dollar in the future. Money that you hold today is worth more because you can invest it and earn interest. After all, you should receive some compensation for foregoing spending. For instance, you can invest your dollar for one year at a 6% annual interest rate and accumulate ₹ 1.06 at the end of the year. You can say that the future value of the dollar is ₹ 1.06 given a 6% interest rate and a one-year period. It follows that the present value of the ₹ 1.06 you expect to receive in one year is only Re. 1.

A key concept of TVM is that a single sum of money or a series of equal, evenly-spaced payments or receipts promised in the future can be converted to an equivalent value today. Conversely, you can determine the value to which a single sum or a series of future payments will grow at some future date.

Calculation of Time Value of Money

The calculation of time value of money considers the following attributes: Interest Rate, Number of Periods, Payments, Present Value, and Future Value.

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1. Interest Rate

Interest is a charge for borrowing money, usually stated as a percentage of the amount borrowed over a specific period of time. Simple interest is computed only on the original amount borrowed. It is the return on that principal for one time period. In contrast, compound interest is calculated each period on the original amount borrowed plus all unpaid interest accumulated to date. Compound interest is always assumed in TVM problems.

2. Number of Periods

Periods are evenly-spaced intervals of time. They are intentionally not stated in years since each interval must correspond to a compounding period for a single amount or a payment period for an annuity.

3. Payments

Payments are a series of equal, evenly-spaced cash flows. In TVM applications, payments must represent all outflows (negative amount) or all inflows (positive amount).

4. Present Value

Present Value is an amount today that is equivalent to a future payment, or series of payments, that has been discounted by an appropriate interest rate. The future amount can be a single sum that will be received at the end of the last period, as a series of equally-spaced payments (an annuity), or both. Since money has time value, the present value of a promised future amount is worth less the longer you have to wait to receive it.

5. Future Value

Future Value is the amount of money that an investment with a fixed, compounded interest rate will grow to by some future date. The investment can be a single sum deposited at the beginning of the first period, a series of equally-spaced payments (an annuity), or both. Since money has time value, we naturally expect the future value to be greater than the present value. The difference between the two depends on the number of compounding periods involved and the going interest rate.

12.7 GOALS BEYOND PROFIT MAXIMIZATION

Profit and wealth maximisation has become a business cult today (Kennedy, 2000). It should, however, be attempted within a legal framework, with social responsibility, under business ethics (Friedman, 1970). When the zest for 'profit at any cost' is

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carried on to an extreme, there will be many Enrons, World Cons and Parmalate to create global economic disasters.

It is heartening to note that the corporate sectors in the global economy has become attentive and active to the social responsibility and has adopted a code of conduct, with aspiration for good governance. Beyond reasonable profit earnings, the firms should seek to a higher set of objectives.

People like Tata have understood that greater joy lies in sharing rather from acquisition of wealth. Tata Group, as such, is already been guided by the principle that as responsible citizens, wealth must be ploughed back where it is generated for contributing to the well-being of the society at large (Singh, 2004). Today, there are growing opportunities to make business, and then it is the social responsibility of the firms to become the primary engines of growth, innovation, exports and employment in the economic society. The broad purpose of business should be human welfare rather than profit at any cost. "In a developing country context, in which there are so many battles to be won against poverty and deprivation and in which a society needs to be modernized without losing track of its ethical and spiritual moorings, human business management is a necessity".

12.8 MODERN NON-PROFIT ORGANIZATION

In the modern economy, there are several non-profit private and governmental organization catering to certain social economic needs such as public utilities, sanitation, general education, public health care, safety net to the poor, and so on. These are social missions oriented organizations. They support the most important aspects of common life with the least profit consideration. These are social motivation-oriented organizations. They support the most important aspects of common life in most economies with least profit consideration.

Non-profit leaders are seeking commercial opportunities on several counts:

(i) Market forces have created their impact and inducement under the current triumph of capitalism and globalization.

(ii) Profit motive tends to promote efficiency and innovations.

(iii) Market discipline should be allowed to play its role in the social sector to improve the performance of social enterprise.

(iv) Beneficiaries can be charged to cover up the costs and keeping up their self-esteem.

Subsidies are no longer good when they lead to be over-dependent and creating a sense of helplessness.

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(v) There are many avenues of business-like job creating non-profit businesses to develop self-reliance for the poor such as bakeries, ice cream shops, greeting cards, tailoring and silk screened t-shirt store, to cite a few examples.

(vi) Financial sustainability of the organization needs same profitability in the business operations of non-profit organization.

(vii) Huge commercial markets are mushrooming.

(viii) Easy capitals are available for the commercial ventures. Like the proverbial 'tail wagging the dog,' commercial funding can pull a non-profit (organization) away from its sole social mission (Dees, 1999). For instances a housing colony project for the old-retired people is a commercialized proposition with a social mission.

(ix) A blending of commercial and philanthropic elements is a productive balance for the self-sufficiency; sustain ability and growth of a social enterprise. For instance, an Islamic bank meant to serve Muslims is commercial-cum-social mission oriented organization. Its goal is interest free credit, but not devoid of profit. Its business loans are on profit sharing basis. But, its consumption loans are though interest free, also involves a service charge and mild profit element in a way.

(x) It thus caters to the Islamic values. i.e. social mission with a commercial approach. It never dismisses profit, or seeking maximization of profit. In short, in modern times, social enterprise should remain mission driven but market led for the service, success and sustainability.

12.9 ALTERNATIVE OBJECTIVES OF BUSINESS FIRMS

Some important alternative objectives of business firms are discussed below:

1. Baumol's Hypothesis of Sales Revenue Maximistion:

Prof. Baumol has postulated maximisation of sales revenue as an alternative to profit- maximisation objective.

The reason behind this objective is the dichotomy between ownership and management. This dichotomy gives managers an opportunity to set their goals other than profit maximisation which most owner-businessmen pursue.

Given the opportunity, managers choose to maximise their own utility function. According to Baumol, the most plausible factor in managers' utility functions is maximisation of the sales revenue.

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The factors which explain the pursuance of this goal by the managers are:

(i) Salary and other earnings of managers are more closely related to sales revenue than to profits,

(ii) Banks and financial corporation's look at sales revenue while financing the corporation,

(iii) Trend in sale revenue is a readily available indicator of performance of the firm. It helps also in handling the personnel problem,

(iv) Increasing sales revenue enhances the prestige of managers while profit goes to the owners;

(v) Managers find profit maximisation a difficult objective to fulfill consistently over time and at the same level. Profits may fluctuate with changing conditions,

(vi) Growing sales strengthen competitive spirit of firm in the market and vice versa.

As empirical validity of sales maximisation objective is concerned, factual evidences are inconclusive. Most empirical works are in fact, based on inadequate data as requisite data are mostly not available. Even theoretically, if total cost function intersects the total revenue function (TR) before it reaches its climax, Baumol's theory collapses. Besides, it is also argued that, in the long run, sales maximisation and profit maximisation objectives converge into one. For, in the long run, sales maximisation tends to yield only normal levels of profit which turns out to be the maximum under competitive conditions. Thus, profit maximisation is not incompatible with sales maximisation.

2. Marris' Hypothesis of Maximisation of Firm's Growth Rate:

Marris has suggested another alternative objective, i.e., maximisation of balanced growth rate of the firm. Marris recognizes the dichotomy between owners' and managers' interest. Accordingly, he assumes that owners and managers having their own utility functions to maximise. The managers' utility function (Um) and owners' utility function (UD) may be specified as

Um = f (salary, power, job security, prestige, status),

Uo = f (output, capital, market-share, profit, public esteem).

Owner's utility function (U0) implies growth of demand for firm's product and supply of capital. Therefore, maximisation of UG means maximisation of 'demand for firm's product' or 'growth of capital supply'. According to Marris, by maximising

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these variables, managers maximise both their own utility function and that of the owners.

The managers can do so because most of the variables (e.g., salaries, status, job security, power, etc.) appearing in their own utility function and those appearing in the utility function of the owners (e.g., profit, capital market share, etc.) are positively and strongly correlated with a single variable, i.e., size of firm. Maximisation of these variables depends on the maximisation of the growth rate of the firms. The managers therefore seek to maximise a steady growth rate.

Marris's theory fails to deal satisfactorily with oligopolistic interdependence. Another shortcoming is that it ignores price determination which is the main concern of profit maximisation hypothesis. Marris's model too does not seriously challenge the profit maximisation hypothesis.

3. Williamson's Hypothesis of Maximisation of Managerial Utility Function:

Like Baumol and Marris, Willamson argues that managers have discretion to pursue objectives other than profit maximisation. The managers seek to maximise their own utility function subject to a minimum level of profit. Manager's utility function (U) is expressed as:

$$U = f(S, M, ID)$$

where, S = additional expenditure on staff

M = Managerial emoluments,

Id = Discretionary investments,

According to Williamson's hypothesis, managers maximise their utility function subject a satisfactory profit. A minimum profit is necessary to satisfy the shareholders; otherwise manager's job security is endangered. The utility functions which managers seek to maximize include both quantifiable variables like salary and slack earnings, and non-quantitative variable such as prestige, power, status, job security, professional excellence, etc.

The non-quantifiable variables are expressed, in order to make them operational, in terms of expense preference defined as 'satisfaction derived out of certain types of expenditures' (such as slack payments), and ready availability of funds for discretionary investment.

Thus, Williamson's theory too suffers from certain weaknesses. His model fails to deal with problem of oligopolistic interdependence. It is said to hold only where rivalry is not strong. In case of strong rivalry, profit maximisation is claimed to be a more appropriate hypothesis. Thus, Williamson's managerial utility function too does not offer a more satisfactory hypothesis than profit maximisation.

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4. Cyert-March Hypothesis of Satisfying Behaviour:

Cyert-March hypothesis is an extension of Simon's hypothesis of firms, 'satisfying behaviour'. Simon had argued that the real business world is full of uncertainty; accurate and adequate data are not readily available; where data are available managers have little time and ability to process them; and managers work under a number of constraints.

Under such conditions it is not possible for the firms to act in terms of rationality postulated under profit maximisation hypothesis. Nor do the firms seek to maximise sales, growth or anything else. Instead they seek to achieve a 'satisfactory profit,' a 'satisfactory growth', and so on. This behaviour of firms is termed as 'Satisfaction Behaviour'.

Cyert and March added that, apart from dealing with an uncertain business world, managers have to satisfy a variety of group of people-managerial staff, labour, shareholders, customers, financers, input suppliers, accountants, lawyers, authorities, etc. All these groups have their interest in the firms-often conflicting.

The managers' responsibility is to satisfy them all. Thus, according to the "Behavioural Theory of Firms', firm's behaviour is 'Satisfying Behaviour'. The underlying assumption of 'Satisfying Behaviour' of firms is that a firm is a coalition of different groups connected with various activities of the firms, e.g., shareholders, managers, workers, input supplier, customers, bankers, tax authorities, and so on. All these groups have some kind of expectations high and low- from the firm, and the firm seeks to satisfy all of them in one way or another by sacrificing some of its interest.

In order to reconcile between the conflicting interests and goals, managers form an aspiration level of the firm combining the following goals:

(a) Production goal,

(b) Sales and market share goals,

(c) Inventory goal, and

(d) Profit goal.

These goals and 'aspiration level' are set on the basis of the managers' past experience and their assessment of the future market conditions. The 'aspiration levels' are modified and revised on the basis of achievements and changing business environment.

The behavioural theory has however been criticized on the following grounds:

First, though the behavioural theory deals realistically with the firm's activity, it cannot explain the firm's behaviour under dynamic conditions in the long run.

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Secondly, it cannot be used to predict exactly the future course of firm's activities. Thirdly, this theory does not deal with equilibrium of the industry. Fourthly, like other alternative hypotheses, this theory, too fails to deal with interdependence and interaction of the firms.

5. Rothschild's Hypothesis of Long-run Survival and Market Share Goals:

Another alternative objective of a firm – as an alternative to profit maximisation- was suggested by Rothschild. According to him, the primary goal of the firm is long-run survival. Some others have suggested that attainment and retention of a constant market share is the objective of the firms.

The managers therefore seek to secure their market share and long- run survival, the firms may seek to maximise their profit in the long-run, though it is not certain.

6. Entry-prevention and Risk-avoidance:

Yet another alternative objective of the firms suggested by some economists is to prevent entry of new firms into the industry.

The motive behind entry-prevention may be:

(a) Profit maximisation in the long run,

(b) Securing a constant market share, and

(c) Avoidance of risk caused by the unpredictable behaviour of the new firms.

The evidence of whether firms maximise profits in the long run is not conclusive. Some argue that where management is divorced from the ownership, the possibility of profit maximisation is reduced. Some argue that only profit-maximising firms can survive in the long run. They can achieve all other subsidiary goals easily if they can maximise their profits.

It is further argued that, prevention of entry may be the major objective in the pricing policy of the firm, particularly in case of limit pricing. But then, the motive behind entry- prevention is to secure a constant share in the market. Securing constant share, market share is compatible with profit maximisation.

12.10 DEFINITIONS OF MARKET

According to Prof. R. Chapman, "The term market refers not necessarily to a place but always to a commodity and the buyers and sellers who are in direct competition with one another."

According to A.A. Cournot, "Economists understand by the term 'market', not any particular place in which things are bought and sold but the whole of any

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region in which buyers and sellers are in such free intercourse with one another that the price of the same goods tends to equality, easily and quickly."

12.11 CHARACTERISTICS OF MARKET

The essential features of a market are:

(1) An Area:

In economics, a market does not mean a particular place but the whole region where sellers and buyers of a product ate spread. Modem modes of communication and transport have made the market area for a product very wide.

(2) One Commodity:

In economics, a market is not related to a place but to a particular product.

Hence, there are separate markets for various commodities. For example, there are separate markets for clothes, grains, jewellery, etc.

(3) Buyers and Sellers:

The presence of buyers and sellers is necessary for the sale and purchase of a product in the market. In the modem age, the presence of buyers and sellers is not necessary in the market because they can do transactions of goods through letters, telephones, business representatives, internet, etc.

(4) Free Competition:

There should be free competition among buyers and sellers in the market. This competition is in relation to the price determination of a product among buyers and sellers.

(5) One Price:

The price of a product is the same in the market because of free competition among buyers and sellers.

12.12 MEANING OF MARKET STRUCTURE

Market structure refers to the nature and degree of competition in the market for goods and services. The structures of market both for goods market and service (factor) market are determined by the nature of competition prevailing in a particular market.**Explanation**

Market Structure the interconnected characteristics of a market, such as the number and relative strength of buyers and sellers and degree of collusion among them,

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level and forms of competition, extent of product differentiation, and ease of entry into and exit from the market. Four basic types of market structure are (1) Perfect competition: many buyers and sellers, none being able to influence prices. (2) Oligopoly: several large sellers who have some control over the prices. (3) Monopoly: single seller with considerable control over supply and prices. (4) Monophony: single buyer with considerable control over demand and prices.

The market is an assemblage of conditions in which buyers and sellers come in contact for the purpose of exchange. Market situations vary in their structure. Different market structures channel the behaviour of buyers and sellers (firms). Further, different prices and trade volumes are fashioned 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 different types of market.

12.13 DETERMINANTS OF MARKET STRUCTURE

There are a number of determinants of market structure for a particular good. They are:

1. Number and Nature of Sellers:

The market structures are influenced by the number and nature of sellers in the market. They range from large number of sellers in perfect competition to a single seller in pure monopoly, to two sellers in duopoly, to a few sellers in oligopoly, and to many sellers of differentiated products.

2. Number and Nature of Buyers:

The market structures are also influenced by the number and nature of buyers in the market. If there is a single buyer in the market, this is buyer's monopoly and is called monopsony market. Such markets exist for local labour employed by one large employer. There may be two buyers who act jointly in the market. This is called duopsony market. They may also be a few organised buyers of a product.

This is known as oligopsony. Duopsony and oligopsony markets are usually found for cash crops such as rice, sugarcane, etc. when local factories purchase the entire crops for processing.

3. Nature of Product:

It is the nature of product that determines the market structure. If there is product differentiation, products are close substitutes and the market is characterised by monopolistic competition. On the other hand, in case of no product differentiation, the market is characterised by perfect competition. And if a product is completely

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different from other products, it has no close substitutes and there is pure monopoly in the market.

4. Entry and Exit Conditions:

The conditions for entry and exit of firms in a market depend upon profitability or loss in a particular market. Profits in a market will attract the entry of new firms and losses lead to the exit of weak firms from the market. In a perfect competition market, there is freedom of entry or exit of firms.

But in monopoly and oligopoly markets, there are barriers to entry of new firms. Usually, governments have a monopoly in public utility services like postal, air and road transport, water and power supply services, etc. By granting exclusive franchises, entries of new supplies are barred. In oligopoly markets, there are barriers to entry of firms because of collusion, tacit agreements, cartels, etc. On the other hand, there are no restrictions in entry and exit of firms in monopolistic competition due to product differentiation.

5. Economies of Scale:

Firms that achieve large economies of scale in production grow large in comparison to others in an industry. They tend to weed out the other firms with the result that a few firms are left to compete with each other. This leads to the emergency of oligopoly. If only one firm attains economies of scale to such a large extent that it is able to meet the entire market demand, there is monopoly.

12.14 SUMMARY

Firm refers to a unit or entity carrying a portion of the business. It is a business organization, such as a corporation, limited liability company or partnership. Firms are associated with business organizations that practice law, but the term can be used for a wide variety or business operation units.

The sole proprietor is an unincorporated business with one owner who pays personal income tax on profits from the business. With little government regulation, they are the simplest business to set up or take apart, making them popular among individual self contractors or business owners.

Partnership is a nominate contract between individuals who, in a spirit of cooperation, agree to carry on an enterprise; contribute to it by combining property, knowledge or activities; and share its profit. Partners may have a partnership agreement or declaration of partnership and in some jurisdictions such agreements may be registered and available for public inspection. In many countries, a partnership is also considered to be a legal entity, although different legal systems reach different conclusions on this point.

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A co-operative society is a voluntary association started with the aim of service of its members. It is a form of business where individuals belonging to the same class join their hands for the promotion of their common goals. These are generally formed by the poor people or weaker section people in the society. It reflects the desire of the poor people to stand on their own legs or own merit. The philosophy of the formation of co-operative society is "all for each and each for all".

A joint-stock company (JSC) is a type of corporation or partnership involving two or more individuals that own shares of stock in the company. Certificates of ownership ("shares") are issued by the company in return for each financial contribution, and the shareholders are free to transfer their ownership interest at any time by selling their shareholding to others.

Economic objectives of business refer to the objective of earning profit and also other objectives that are necessary to be pursued to achieve the profit objective, which includes creation of customers, regular innovations and best possible use of available resources.

Profit is the lifeblood of business, without which no business can survive in a competitive market. In fact profit making is the primary objective for which a business unit is brought into existence. Profits must be earned to ensure the survival of business, its growth and expansion over time. Profits help businessmen not only to earn their living but also to expand their business activities by reinvesting a part of the profits.

A business unit cannot survive unless there are customers to buy the products and services. Again a businessman can earn profits only when he/she provides quality goods and services at a reasonable price. For this it needs to attract more customers for its existing as well as new products. This is achieved with the help of various marketing activities.

Sales maximization is an approach to business where the company's primary objective is to generate as much revenue as possible. Sales or revenue is the generation of cash flow through the sale of goods and services. A goal of maximizing revenue does not necessarily produce profits, because companies often sell products at a loss to generate revenue.

Social objectives are those objectives of business, which are desired to be achieved for the benefit of the society. Since business operates in a society by utilizing its scarce resources, the society expects something in return for its welfare. No activity of the business should be aimed at giving any kind of trouble to the society. If business activities lead to socially harmful effects, there is bound to be public reaction against the business sooner or later.

Time Value of Money (TVM) is an important concept in financial management. It can be used to compare investment alternatives and to solve problems involving

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loans, mortgages, leases, savings, and annuities. Market structure refers to the nature and degree of competition in the market for goods and services.

12.15 GLOSSARY

(a) Firm: Firm refers to a unit or entity carrying a portion of the business. It is a business organization, such as a corporation, limited liability company or partnership. Firms are associated with business organizations that practice law, but the term can be used for a wide variety or business operation units.

(b) Sole proprietor: The sole proprietor is an unincorporated business with one owner who pays personal income tax on profits from the business. With little government regulation, they are the simplest business to set up or take apart, making them popular among individual self contractors or business owners.

(c) Partnership: Partnership is a nominate contract between individuals who, in a spirit of cooperation, agree to carry on an enterprise; contribute to it by combining property, knowledge or activities; and share its profit.

(d) Economic objectives of business: Economic objectives of business refer to the objective of earning profit and also other objectives that are necessary to be pursued to achieve the profit objective, which includes creation of customers, regular innovations and best possible use of available resources.

(e) Sales maximization: Sales maximization is an approach to business where the company's primary objective is to generate as much revenue as possible. Sales or revenue is the generation of cash flow through the sale of goods and services. A goal of maximizing revenue does not necessarily produce profits, because companies often sell products at a loss to generate revenue.

(f) Market structure: Market structure refers to the nature and degree of competition in the market for goods and services.

12.16 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. Give the meaning of Firm.
2. State any two objectives of Business Firm.
3. What is Stakeholder?
4. Define the term decision-making.

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(B) Extended Answer Questions

1. Explain various types of Firm.
2. Explain the objectives of Business Firm.
3. Write note on: Stakeholders
4. State the characteristics of Decision Making.
5. Discus various steps involved in decision making process.

(C) True or False

1. Firm refers to a unit or entity carrying a portion of the business.
2. The sole proprietor is an unincorporated business with one owner who pays personal income tax on profits from the business.
3. A co-operative society is a voluntary association started with the aim of service of its members.
4. A joint-stock company is a type of corporation or partnership involving two or more individuals that own shares of stock in the company.

(D) Multiple Choice Questions

1. JSC stands for.....
   (a) Joint Stock Company (b) Joint Share Company
   (c) Joint Stock Corporation (d) None of the above
2. Economic objectives of business refer to the objective of.....
   (a) Earning profit (b) Maximise wealth
   (c) Sharing profit (d) None of the above
3. TVM stands for.....
   (a) Term Value of Money (b) Time Value of Money
   (c) Time Volume of Money (d) All the above

(E) Fill in the Blanks

1. Firm is a business organization, such as a corporation, limited Liability Company or.....
2. .....may have a partnership agreement or declaration of partnership and in some jurisdictions such agreements may be registered and available for public inspection.
3. A .....society is a form of business where individuals belonging to the same class join their hands for the promotion of their common goals.

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4. ……refers to the nature and degree of competition in the market for goods and services.

12.17 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True

(D) 1. (a), 2. (a), 3. (b)

(E) 1. Partnership, 2. Partners, 3. Co-operative, 4. Market structure

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12.19 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can

come handy. The list may include the following and the items should be presented in the same style as References:

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1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

12.20 TERMINAL QUESTIONS

1. Make various groups among all students and analyse the decisions of a firm under market uncertainty situations.

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2. State the characteristics of Decision Making. Discus various steps involved in decision making process.

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UNIT 13 PERFECT COMPETITION MARKET

Structure:

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Objectives

After reading this unit you will be able to understand:

- Perfect competition market and its features
- Perfect v/s pure competition
- Equilibrium of the firm
- Derivation of the supply curve of the firm
- Derivation of the supply curve of the industry
- Price and output determination under perfect competition
- Price and output determination in long run
- Long run supply curve of a competitive industry

13.1 INTRODUCTION

A perfectly competitive market is a hypothetical market where competition is at its greatest possible level. Neo-classical economists argued that perfect competition would produce the best possible outcomes for consumers, and society.

13.2 PERFECT COMPETITION

Perfect competition describes markets such that no participants are large enough to have the market power to set the price of a homogeneous product. Because the conditions for perfect competition are strict, there are few if any perfectly competitive markets. Still, buyers and sellers in some auction-type markets say for commodities or some financial assets may approximate the concept. Perfect competition serves as a benchmark against which to measure real-life and imperfectly competitive markets.

In neoclassical economics there have been two strands of looking at what perfect competition is. The first emphasis is on the inability of any one agent to affect prices. Usually it is justified by the fact that any one firm or consumer is so small relative to the whole market that their presence or absence leaves the equilibrium price very nearly unaffected. This assumption of negligible impact of each agent on the equilibrium price has been formalized by Aumann (1964) by postulating a continuum of infinitesimal agents. The difference between Aumann's approach and that found in undergraduate textbooks is that in the first, agents have the power to choose their own prices but do not individually affect the market price, while in the second it is simply assumed that agents treat prices as parameters. Both approaches lead to the same result.

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Perfect competition is a theoretical market structure that features no barriers to entry, an unlimited number of producers and consumers, and a perfectly elastic demand curve.

The degree to which a market or industry can be described as competitive depends in part on how many suppliers are seeking the demand of consumers and the ease with which new businesses can enter and exit a particular market in the long run.

The spectrum of competition ranges from highly competitive markets where there are many sellers, each of whom has little or no control over the market price - to a situation of pure monopoly where a market or an industry is dominated by one single supplier who enjoys considerable discretion in setting prices, unless subject to some form of direct regulation by the government.

In many sectors of the economy markets are best described by the term oligopoly - where a few producers dominate the majority of the market and the industry is highly concentrated. In a duopoly two firms dominate the market although there may be many smaller players in the industry.

13.3 MEANING OF PERFECTLY COMPETITIVE MARKET

A perfectly competitive market is a hypothetical market where competition is at its greatest possible level. Neo-classical economists argued that perfect competition would produce the best possible outcomes for consumers, and society.

13.4 DEFINITION OF PERFECTLY COMPETITIVE MARKET

According to Prof. Marshall, "The more nearly perfect a market is the stronger is the tendency for the same price to be paid for the same thing at the same time in all parts of the market".

According to Prof. Benham, "A market is said to be perfect when all the potential sellers and buyers are promptly aware of the price at which transactions take place and all of the offers made by other sellers and buyers and when any buyer can purchase from any seller and vice-versa".

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13.5 ASSUMPTIONS BEHIND A PERFECTLY COMPETITIVE MARKET

1. Many suppliers each with an insignificant share of the market – this means that each firm is too small relative to the overall market to affect price via a change in its own supply – each individual firm is assumed to be a price taker
2. An identical output produced by each firm – in other words, the market supplies homogeneous or standardised products that are perfect substitutes for each other. Consumers perceive the products to be identical
3. Consumers have perfect information about the prices all sellers in the market charge – so if some firms decide to charge a price higher than the ruling market price, there will be a large substitution effect away from this firm
4. All firms (industry participants and new entrants) are assumed to have equal access to resources (technology, other factor inputs) and improvements in production technologies achieved by one firm can spill-over to all the other suppliers in the market
5. There are assumed to be no barriers to entry & exit of firms in long run – which means that the market is open to competition from new suppliers – this affects the long run profits made by each firm in the industry. The long run equilibrium for a perfectly competitive market occurs when the marginal firm makes normal profit only in the long term
6. No externalities in production and consumption so that there is no divergence between private and social costs and benefits

13.6 CHARACTERISTICS OF PERFECTLY COMPETITIVE MARKET

Perfectly competitive markets exhibit the following characteristics:

(i) Infinite buyers and sellers: Infinite consumers with the willingness and ability to buy the product at a certain price, and infinite producers with the willingness and ability to supply the product at a certain price.

(ii) Zero entry and exit barriers: It is relatively easy for a business to enter or exit in a perfectly competitive market.

(iii) Perfect factor mobility: In the long run factors of production are perfectly mobile allowing free long term adjustments to changing market conditions.

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(iv) **Perfect information:** Prices and quality of products are assumed to be known to all consumers and producers.

(v) **Zero transaction costs:** Buyers and sellers incur no costs in making an exchange (perfect mobility).

(vi) **Profit maximization:** Firms aim to sell where marginal costs meet marginal revenue, where they generate the most profit.

(vii) **Homogeneous products:** The characteristics of any given market good or service do not vary across suppliers.

(viii) **Non-increasing returns to scale:** Non-increasing returns to scale ensure that there are sufficient firms in the industry.

13.7 PRICE AND OUTPUT DETERMINATION

Before Marshall there was controversy among economists on whether the force of demand (i.e. marginal utility) or the force of supply (i.e. cost of production) is more important is determining price. Marshall gave equal importance to both the demand and supply in determination of price. According to him, "As both blades of a scissors are important for cutting a cloth, so is both demand and supply essential for determination of price."

As we know that quantity demanded and quantity supplied vary with price , the equilibrium price is determined at the point where quantity demanded and quantity supplied are equal. If the equality between quantity demanded and quantity supplied doesn't hold for some price, buyer's and seller's desire are inconsistent. In case of either quantity demanded by the buyers is more than that offered by the sellers or or the quantity supplied by the sellers is greater than the quantity demanded by the buyers the price will change so as to bring about equality between quantity demanded and quantity supplied. The process of price determination can be explained with the help of following table below:

Price per Unit	Quantity demanded	Quantity supplied	Pressure on price
5	9	18	Falling
4	10	16	Falling
3	12	12	Neutral
2	15	07	Rising
1	20	00	Rising

It is seen in the table that when price is Rs 3 per unit, quantity demanded and quantity supplied are equal at 12 units. When price is Rs 5 per unit, quantity demanded is 9 units and the amount offered at this price is 18 unit is greater than

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demand and there will be the tendency for the price to fall, because at the price Rs 5 some of the seller will be unable to sell all the quantity they want to sale therefore they will reduce the price in order to attract the customers. Similarly at price Rs 4 quantity demanded 10 units is less than the quantity supplied 16 units' causes to fall in price. Similarly at price Rs 1 quantity demanded 20 is greater than quantity supplied zero causes to increase in price. In the other words, at this price the buyers who are willing to buy will find that quantity offered is not sufficient to satisfy their wants. Hence those consumers who have not been able to satisfy their wants will induce to increase the price or are willing to pay more for getting commodity. The process of price determination can be explained with the help of following diagram:

In the figure above, the price has been measured along vertical axis and quantity along horizontal axis. DD is the demand curve and SS is the supply curve. It is seen in the figure that at price OP quantity demanded is equal to the quantity supplied. So OP is the equilibrium price. At price more than OP supply is greater than demand causes to fall in the price. Similarly at price less than OP demand is greater than supply causes to rise in the price. Hence the equilibrium price OP is determined by demand and supply both.

13.8 PERFECT V/S PURE COMPETITION

Pure Competition	Perfect Competition
Pure competition is said to exist in a market where (a) there is a large number of buyers and sellers (b) products are homogeneous and (c) there is freedom of entry and exit of buyers and sellers.	In perfect competition, all the three features of pure competition exist. Besides these, perfect competition has more features. These are (d) perfect knowledge of the buyers and sellers regarding the market conditions (e) perfect mobility of factors of production (f) absence of transport cost and (g) uniform price.
The essential feature of pure competition is the absence of any monopoly element.	Perfect competition is not only pure but also free from other imperfection. It is a broader concept than pure competition.
Under pure competition, there is limited number of buyers and sellers.	Under perfect competition, there is large number of buyers and sellers.

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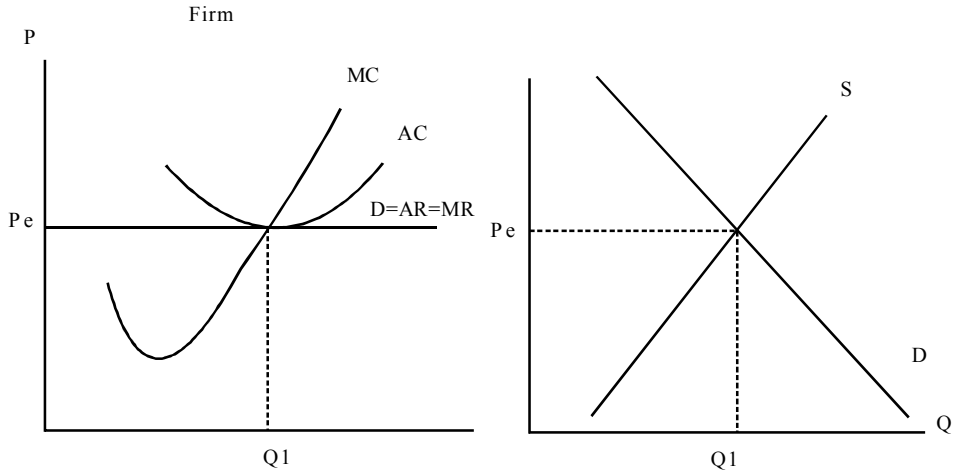
13.9 SHORT RUN EQUILIBRIUM OF THE FIRM AND INDUSTRY

Under perfect competition a firm takes price as given. In other words in perfect competition single firm and consumer cannot influence the price by varying their supply and demand respectively. Hence price remains constant in perfect competition. So the problem is to determine the output level to maximize profit.

We know that in short run total fixed cost incurred even if the output is nil or fixed cost remains same whatever be the level of output. Hence average variable cost plays an important role in making decision whether to produce or not. If the price falls below the minimum average variable cost then the firm will shut down in order to minimize losses. So the minimum variable cost sets a limit to the price in short run.

As we know that firm will be in equilibrium when it is earning maximum profit. According to marginal cost and marginal revenue approach a firm will make maximum profit when MR and MC are equal and MC cuts MR from below. The short run equilibrium of the firm requires short run equality between demand and supply. This can be explained clearly with the help of following diagram:



It is seen in the figure that the market price OP has been determined by the intersection point of the demand curve (D) and supply curve(S).

13.10 LONG RUN EQUILIBRIUM OF THE FIRM AND INDUSTRY

In the long-run, all the inputs available to the firms are variable, so that the concept of fixed cost is absent and the total cost (TC) equals the total variable cost (TVC). Therefore, we need only to deal with the long-run average cost (LAC = LTC/q).

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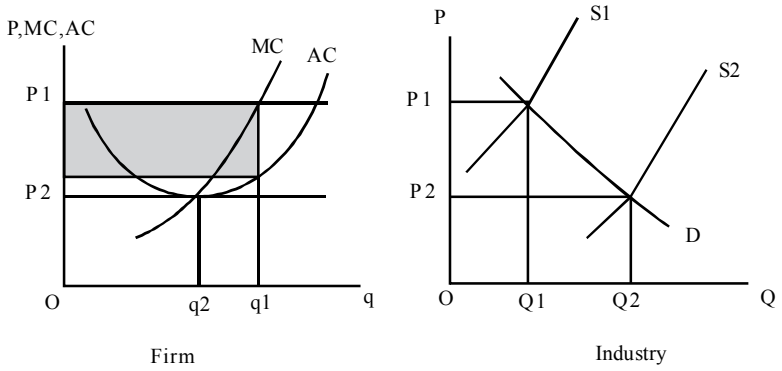
We assume the LAC to be U-shaped exhibiting the fact that at the low levels of output, the cost is falling and beyond a point, it rises. We have stated above that a perfectly competitive market is characterized by free entry and exit of the firms. As in the short-run, the firms are making profits; there will be entry of new firms in the market. As a result, the industry supply would go up and price would fall. This would continue until the profits are driven down to zero.

Such a process is described in the following diagram.



Long-run Profit of Competitive Firm

In figure at price P_1, the firm is producing an output q1 whereby it is making a profit shown by the shaded area. At price, P_1, the industry output is Q1. As the existing firms are making profit, there will be entry into the market. As a result, the total supply in the market would go up and the price in market would fall. If at the new price the firms are still making some profit, then there will be further entry and market supply would go up.

Consequently, the price would go down further level. This process would continue until the price falls to such a level that all profits are eliminated.

From the diagram, the shaded area ceases to exist. This price is P_2, where P = MC= AC and therefore profit is zero. The zero profit scenarios faced by the firms means that the economic profit is zero implying that the firms earn no more than they would elsewhere. In other words, the firms are breaking even at price P_2. At P_2, as the firms are earning zero profit, there is no incentive for other firms to enter the industry. Hence, price P_2 would represent an equilibrium price level with Q_2 as the equilibrium output. With that the long-run equilibrium is characterized by a situation where the economic profits for the firms are zero.

NOTES

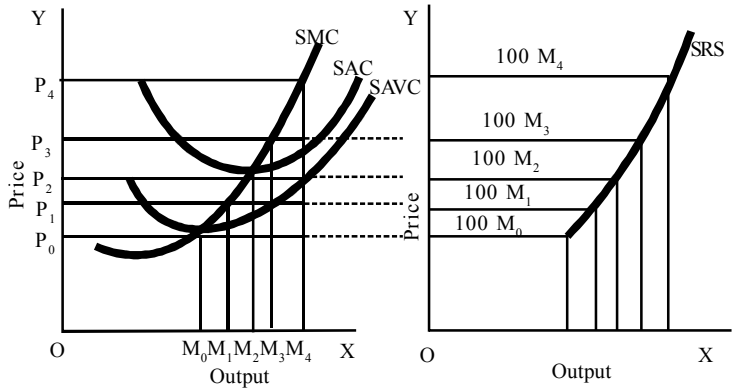
13.11 DERIVATION OF THE SUPPLY CURVE OF THE FIRM

By 'short-run' is meant a period of time in which the size of the plant and machinery is fixed, and the increased demand for the commodity is met only by an intensive use of the given plant, i.e., by increasing the amount of the variable factors.

Under perfect competition, a firm produces an output at which marginal cost equals! Price. If the price is higher than the marginal cost, it will pay the firm to expand its output so as to equal its price. If, on the other hand, the price is less than the marginal cost, it is incurring a loss, and it will reduce its output till the marginal cost and the price are made equal. Hence, the marginal cost curve of the firm is the supply curve of the perfectly competitive firm in the short-run.

But, even in the short-run, a firm will not supply at a price below its minimum average variable cost. That is, in the short-run, a firm must try to cover its' Variable cost at least. Hence, the short-run supply curve of a firm coincides with that portion of the short-run marginal cost curve which lies above the minimum point of the short-run average variable cost (SAVC) curve.

The following diagram [Fig. 13.1(a)] will make it clear:



Deriving Short-run Supply Curve of Industry

Fig. 13.1

In this diagram, Fig. 13.1(a) relates to a firm and 13.1(b) gives the supply curve of the industry. First look at the Fig. 13.1(a), which relates to a single firm. Along the axis OX are represented the output supplied and along OY the prices. SMC curve is the short-run marginal cost curve, and, as mentioned above, it is the short-run supply curve of the firm. But only that portion of SMC curve which lies above the short-run average variable cost (SAVC), which means the thick portion above the dotted portion.

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Thus, at the price OP_0, OM_0 output will be supplied, at OP_1 price, OM_1, quantity will be supplied at OP_2 price, OM_2 will be supplied, and so on. Nothing will be supplied below the price OP", because prices below OP_0 correspond to the dotted portion of the SMC which is below the minimum point of the SAVC (short-run average variable cost) curve.

Now from the supply curve of a firm, let us derive the supply curve of the "entire" industry of which all the firms are a constituent par) The supply curve SRS of the industry "'is derived by the lateral summation (i.e., adding up sideways) of that part of all the firms' marginal cost curves which lies above the minimum point on their average friable cost curves. This industry is supposed to consist of 100 identical firms like the firm represented by the Fig. 24.2(a).

It can be seen that at OP,, price, 100 OM_1 are supplied, at OP, price 100 OM , are supplied, at OP, price 100 OM, are supplied, and so on. We see that the short-run supply curve SRC of the industry rises upwards, because the short-run marginal curve SMC rises upwards.

Long-run Supply Curve:

The long-run is supposed to be a period sufficiently long to allow changes to be made both in the size of the plant and in the number of firms in the industry. Whereas in the short period, an increase in demand is met by over-using the existing plant, in the long-run, it will be met not only by the expansion of the plants of the existing firms but also by the entry into the industry of new firms.

Moreover, we have seen that, in the short-run, a firm produces that output at which its marginal cost is equal to the price. But, in the long-run, the price must be equal to both the-marginal cost and the average cost. The reason is that an industry will be in equilibrium when all firms in the industry are making normal profits, and they will be making normal profits only if the price, i.e., average revenue (AR) is equal to average cost AC.

The shape of supply curve, in the long run, will depend on whether the industry is subject to the law of constant return (i.e., constant costs), or to diminishing returns (i.e., increasing costs) or to increasing returns (i.e., dimin-ishing costs). We show these curves below.

Supply Curve of Constant Cost Industry:

The supply curve of the constant cost industry is shown in the following diagram (Fig. 13.2).

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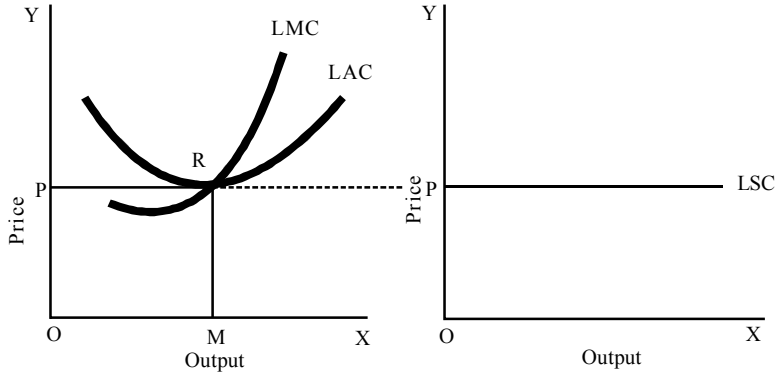

(a) (b)

Deriving Short-run Supply Curve of Industry

Fig. 13.2

In the Fig. 13.2(a) which relates to a firm, LMC is the long-run marginal cost curve, and LAC is the long-run average cost curve. They intersect at R which means that at the point R, the marginal cost is equal to the average cost. Here they are also equal to price OP. The output at this point is OM. Thus, at the output OM, MC = AC = Price.

Now look at the Fig.13.2(b). Corresponding to OP price, the long-run supply curve is LSC, which is a horizontal straight line parallel to the X-axis. This means that whatever the output along the X-axis, price is the same OP where the marginal cost and average cost are equal. The cost remains the same, because it is a constant cost industry.

It is an industry in which, even if the output is increased (or decreased), the economies and diseconomies cancel out so that the cost of production does not change. Also, when new firms enter the industry to meet the increased demand, they do not raise or lower the cost per unit.

Thus, the industry is able to supply any amount of the commodity at the price OP which is equal to the minimum long-run average cost which ensures normal profit to all the firms engaged in the industry. That is, every firm will be in the long-run equilibrium where Price = MC = AC. All firms have identical cost conditions.

Hence, in the case of a constant cost industry, the long-run supply curve LSC is a horizontal straight line (i.e., perfectly elastic) at the price OP, which is equal to the minimum average cost. This means that whatever the output supplied, the price would remain the same.

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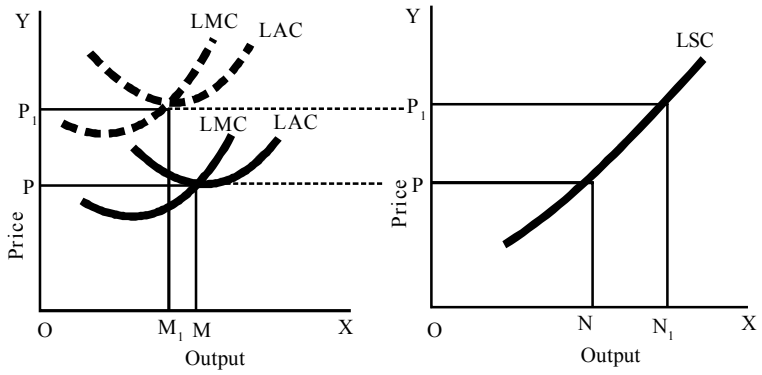
13.12 DERIVATION OF THE SUPPLY CURVE OF THE INDUSTRY

In the case of an increasing cost industry, the cost of production increases as the existing firms expand or the new firms enter into the industry to meet an increase in demand. The external diseconomies outweigh the external economies. The increased demand for the productive resources required to produce larger output to meet increased demand for the product raises their prices resulting in higher cost of production.

The rise in costs will shift both the average and marginal cost curves upward and the minimum average cost will rise. This means that the additional supplies of the product will be forthcoming at higher prices, whether the additional supplies come from the expansion of the existing firms or from the new firms which may have entered the industry. All this is shown in the following diagram (Fig. 13.3).



Long-run Supply curve of Increasing Cost Industry

Fig. 13.3

The Fig. 13.3(a) shows the position of individual firms. The position of the dotted LMC and LAC curves shows that they have been shifted upwards where each firm achieves a long-run equilibrium so that the price OP, =MC = AC. But, in the Fig. 13.3(b) which relates to the industry, we find that at the price OP i larger amount ON_1 is supplied than at the price OP (i.e., ON).

This means that the long-run supply curve LSC slopes upwards to the right as the output supplied increases. That is, more will be supplied at higher prices. This is probably typical of the actual competitive world, because higher prices have to be paid for the scarce productive resources to attract them from other uses so that production in this particular industry may be increased. Thus, we see that in the case of an increasing cost industry, the long-run supply curve slopes upward to the right.

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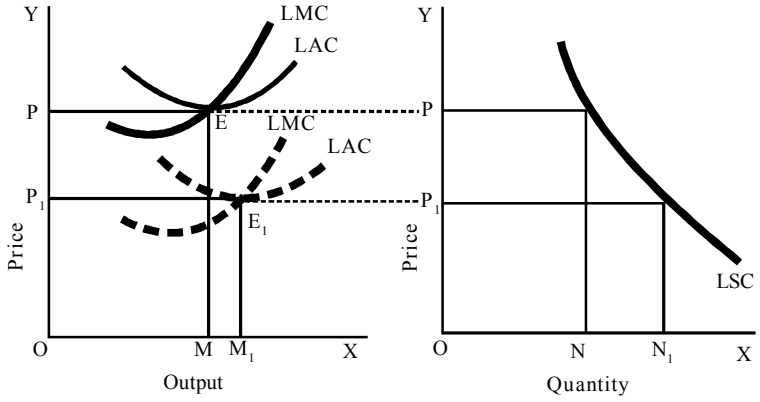
Supply Curve of a Decreasing Cost Industry:

In a decreasing cost industry, costs decrease as output is increased either by the expansion of the existing firms or by the entry of new firms. In this case, the economies of scale out-weight the diseconomies, if any. This happens when a young industry grows in a new territory where the supply of productive resources is plentiful. The net external economies will push the cost curves down so that the additional supplies of the output are forthcoming at lower prices.

The following diagram (Fig. 13.4) makes the whole thing clear:



Long-run Supply Curve of a Decreasing Cost Industry

Fig. 13.4

The Fig. 13.4(a) shows how the new, i.e., dotted LMC and LAC curves have been shifted downwards from their original position, when the LMC and LAC curves intersect at E where every firm was the equilibrium and was producing OM. The new curves intersect at E_1 which means that, at this point, the firms in the industry have achieved the- long-run equilibrium, each producing OM, output, so-that the price OP =MC = AC. But looking at the Fig. 13.4(b), we find that, at OP_1 price, ON is supplied which is more than ON supplied at the original price OP.

The LSC slopes downwards to the right which means that the additional supplies of the output are forthcoming at lower prices, since both the marginal cost and average cost have fallen owing to cheaper supplies of the productive resources.

13.13 PRICE AND OUTPUT DETERMINATION UNDER PERFECT COMPETITION

Perfect competition refers to a market situation where there are a large number of buyers and sellers dealing in homogenous products.

Moreover, under perfect competition, there are no legal, social, or technological barriers on the entry or exit of organizations.

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In perfect competition, sellers and buyers are fully aware about the current market price of a product. Therefore, none of them sell or buy at a higher rate. As a result, the same price prevails in the market under perfect competition.

Under perfect competition, the buyers and sellers cannot influence the market price by increasing or decreasing their purchases or output, respectively. The market price of products in perfect competition is determined by the industry. This implies that in perfect competition, the market price of products is determined by taking into account two market forces, namely market demand and market supply.

In the words of Marshall, "Both the elements of demand and supply are required for the determination of price of a commodity in the same manner as both the blades of scissors are required to cut a cloth." As discussed in the previous chapters, market demand is defined as a sum of the quantity demanded by each individual organizations in the industry.

On the other hand, market supply refers to the sum of the quantity supplied by individual organizations in the industry. In perfect competition, the price of a product is determined at a point at which the demand and supply curve intersect each other. This point is known as equilibrium point as well as the price is known as equilibrium price. In addition, at this point, the quantity demanded and supplied is called equilibrium quantity. Let us discuss price determination under perfect competition in the next sections.

13.14 DEMAND UNDER PERFECT COMPETITION

Demand refers to the quantity of a product that consumers are willing to purchase at a particular price, while other factors remain constant. A consumer demands more quantity at lower price and less quantity at higher price. Therefore, the demand varies at different prices.

Fig. 13.5 represents the demand curve under perfect competition:

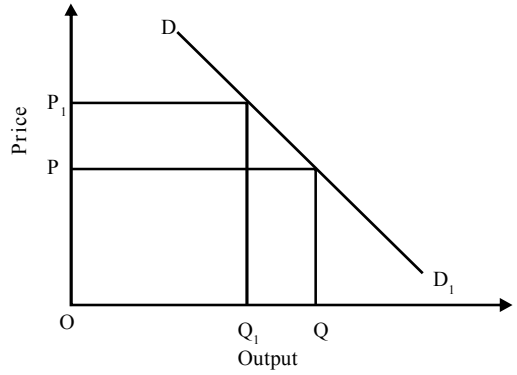

Fig. 13.5: Demand Curve under Perfect Competition

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As shown in Figure-1, when price is OP, the quantity demanded is OQ. On the other hand, when price increases to OP1, the quantity demanded reduces to OQ1. Therefore, under perfect competition, the demand curve (DD') slopes downward.

13.15 SUPPLY UNDER PERFECT COMPETITION

Supply refers to quantity of a product that producers are willing to supply at a particular price. Generally, the supply of a product increases at high price and decreases at low price.

Fig. 13.6 shows the supply curve under perfect competition:

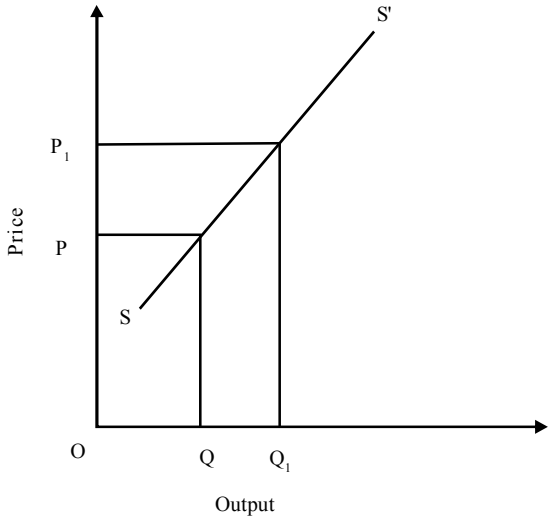

Fig. 13.6: Supply Curve under Perfect Competition

In Fig. 13.6, the quantity supplied is OQ at price OP. When price increases to OP1, the quantity supplied increases to OQ1. This is because the producers are able to earn large profits by supplying products at higher price. Therefore, under perfect competition, the supply curves (SS') slopes upward.

13.16 EQUILIBRIUM UNDER PERFECT COMPETITION

As discussed earlier, in perfect competition, the price of a product is determined at a point at which the demand and supply curve intersect each other. This point is known as equilibrium point. At this point, the quantity demanded and supplied is called equilibrium quantity.

Fig 13.7 shows the equilibrium under perfect competition:

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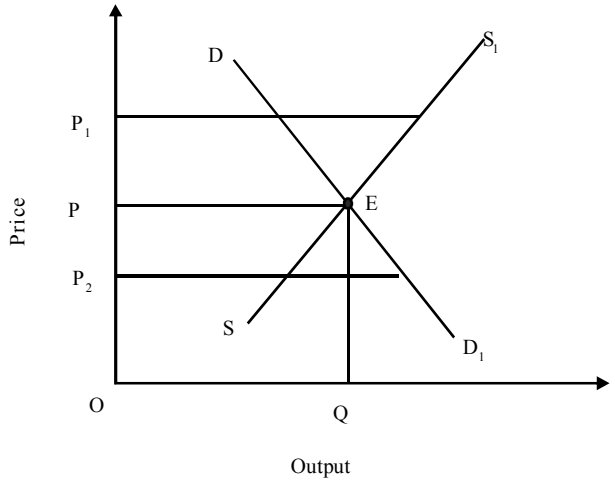

Fig. 13.7: Price and Output Determination under Perfect Competition

In Fig. 13.7, it can be seen that at price OP1, supply is more than the demand. Therefore, prices will fall down to OP. Similarly, at price OP2, demand is more than the supply. Similarly, in such a case, the prices will rise to OP. Thus, E is the equilibrium at which equilibrium price is OP and equilibrium quantity is OQ.

13.17 PRICE AND OUTPUT DETERMINATION IN LONG RUN

The long run is a period of time which is sufficiently long to allow the firms to make changes in all factors of production. In the long run, all factors are variable and none fixed. The firms, in the long run, can increase their output by changing their capital equipment; they may expand their old plants or replace the old lower-capacity plants by the new higher-capacity plants or add new plants.

Besides, in the long run, new firms can enter the industry to compete the existing firms. On the contrary, in the long run, the firms can contract their output level by reducing their capital equip-ment; they may allow a part of the existing capital equipment to wear out without replacement or sell out a part of the capital equipment.

Moreover, the firms can leave the industry in the long run. The long-run equilibrium then refers to the situation when free and full adjustment in the capital equip-ment as well as in the number of firms has been allowed to take place. It is therefore long-run average and marginal cost curve which are relevant for deciding about equilibrium output in the long run. Moreover, in the long run, it is the average total cost which is of determining importance, since all costs are variable and none fixed.

NOTES

As explained above, a firm is in equilibrium under perfect competition when marginal cost is equal to price. But for the firm to be in long-run equilibrium, besides marginal cost being equal to price, the price must also be equal to average cost.

For, if the price is greater or less than the average cost, there will be tendency for the firms to enter or leave the industry. If the price is greater than the average cost, the firms will earn more than normal profits. These supernormal profits will attract outer firms into the industry.

With the entry of new firms in the industry, the price of the product will go down as a result of the increase in supply of output and also the cost will go up as a result of more intensive competition for factors of production. The firms will continue entering the industry until the price is equal to average cost so that all firms are earning only normal profits.

On the contrary, if the price is lower than the average cost, the firms would make losses. These losses will induce some of the firms to quit the industry. As a result, the output of the industry will fall which will raise the price.

On the other hand, with some firms going out of the industry, cost may go down as a result of fall in the demand for certain specialised factors of production. The firms will continue leaving the industry until the price is equal to average cost so that the firms remaining in the field are making only normal profits. It, therefore, follows that for a perfectly competitive firm to be in long-run equilibrium, the following two conditions must be fulfilled.

1. Price — Marginal Cost
2. Price = Average Cost

If price is equal to both marginal cost and average cost, then we have a double condition of long-run perfectly competitive equilibrium:

Price = Marginal Cost – Average Cost

But from the relationship between marginal cost and average cost we know that marginal cost is equal to average cost only at the minimum point of the average cost curve.

Therefore, the condi-tion for long-run equilibrium of the firm can be written as:

Price = Marginal Cost = Minimum Average Cost.

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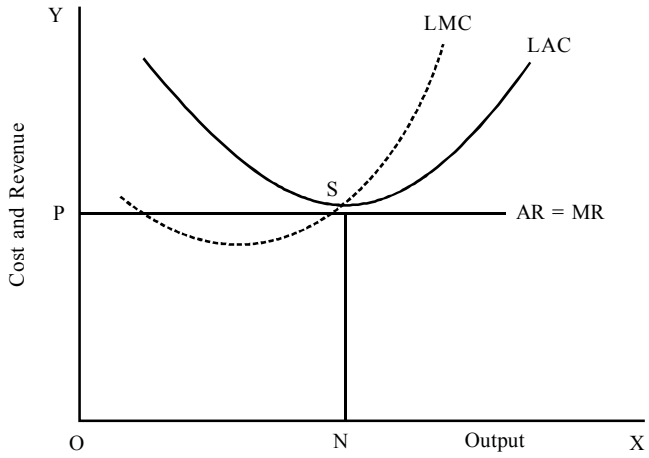

Fig. 13.8: Long-Run Equilibrium of the Firm

Fig. 13.8 represents long-run equilibrium of firm under perfect compe-tition. The firm cannot be in the long-run equilibrium at a price greater than OP in Fig. 13.8. This is be-cause if price is greater than OP, then the price line (demand curve) would lie somewhere above the minimum point of the av-erage cost curve so that marginal cost and price will be equal where the firm is earning abnormal profits.

Since there will be tendency for new firms to enter and compete away these abnormal profits, the firm cannot be in long-run equilibrium at any price higher than OP. Likewise, the firm cannot be in long-run equilibrium at a price lower than OP in Fig. 13.8 under perfect competition.

If price is lower than OP, the average and marginal revenue curve will lie below the average cost curve so that the marginal cost and price will be equal at the point where the firm is making losses. Therefore, there will be tendency for some of the firms in the industry to go out with the result that price will rise and the firms left in the industry make normal profits.

We therefore conclude that the firm can be in long-run equilibrium under perfect competition only when price is at such a level that the horizontal demand curve (that is, AR curve) is tangent to the average cost curve so that price equals average cost and firm makes only normal profits.

It should be noted that a horizontal demand curve can be tangent to a U-shaped average cost curve only at the latter's minimum point. Since at the minimum point of the average cost curve the marginal cost and average cost are equal, price in long-run equilibrium is equal to both marginal cost and average cost. In other words, double condition of long-run equilibrium is fulfilled at the minimum point of the average cost curve.

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It is clear from above that long-run equilibrium of the firm under perfect competition is estab-lished at the minimum point of the long-run average cost curve. Working at the minimum point of the long-run average cost curve signifies that the firm is of optimum size, that is, it is producing output at the lowest possible cost.

The fact that the firm, working under conditions of perfect com-petition tends to be of optimum size in the long run is beneficial from the social point of view in two ways. Firstly, working at optimum size implies that the resources of the society are being utilised in the most efficient way. Secondly, it signifies that the consumers are getting the goods at the lowest possible price.

13.18 LONG RUN SUPPLY CURVE OF A COMPETITIVE INDUSTRY

The supply curve in the long run will be totally elastic as a result of the flexibility derived from the factors of production and the free entry and exit of firms (imagine the firm-entry process portrayed before a few more times). In the long run, market demand will only affect the number of firms but not to the quantity produced by each of these firms. Therefore we can assume that the equilibrium in the long run is the point where profits are maximised (although each firm achieves zero economic profit), there are no firms entries nor exits and there is market clearance.

13.19 SUMMARY

Perfect competition refers to the market structure where competition among the sellers and the buyers prevails in its most perfect form. In a perfectly competitive market, a single market price prevails for a 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.

A distinction is often made between pure competition and perfect competition. But this distinction is more a matter of degree than of kind. For a market to be purely competitive, three fundamental conditions must prevail. These are: (i) a large number of buyers and sellers; (ii) homogeneity of product. (iii) Free entry or exit of firms. For the market to be perfectly competitive, four additional conditions must be fulfilled, viz., (a) perfect knowledge of market, (b) perfect mobility of factors of production, (c) absolute government non-intervention, and (d) no transport cost difference.

Perfect competition is an 'ideal concept' of market rather than an actual market reality. To some extent, the perfect competition model fits into the market for farm

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products like rice, cotton, wheat, etc., when all the units of each commodity are identical. Moreover, all conditions of perfect competition may not be satisfied.

In realty, competition is never perfect. So there is imperfect competition when perfect form of competition among the sellers and 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 categorized as the most realistic forms of market structures under imperfect competition.

An industry is in equilibrium in the short run when there is no tendency for its total output to expand or contract, i.e., the output of the industry is steady.

The short-period market price and its determining factors, viz., short demand and short-period supply, are in equilibrium. When the quantity demanded is equal to total quantity supplied, at the equilibrium short run market price, the market is cleared so there is no reason for the market price to change in the short run.

13.20 GLOSSARY

(a) Perfect competition: Perfect competition refers to the market structure where competition among the sellers and the buyers prevails in its most perfect form. In a perfectly competitive market, a single market price prevails for a 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.

(b) Pure Competition: Pure competition is a market situation where there is a large number of independent Sellers offering identical products. It means it is a term for an industry where competition is stagnant and relatively non-competitive.

(c) Imperfect competition: Imperfect competition covers all other forms of market structures ranging from highly competitive to less competitive in nature. Traditionally, oligopoly and monopolistic competition are categorized as the most realistic forms of market structures under imperfect competition.

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13.21 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Perfect competition market?
2. What is pure competition?
3. What is Equilibrium of the firm?
4. What is firm?
5. What is Industry?
6. What is competitive industry?

(B) Extended Answer Questions

1. Explain various types of market structures formed by the nature of competition.
2. Discuss Price determination under perfect competition.
3. Explain the Significance of time element.
4. State the characteristics of perfect competition.
5. Discuss the barriers to entry limiting competition.
6. Distinguish between Perfect and pure competition.
7. Explain derivation of the supply curve of the firm.
8. Discuss price and output determination under perfect competition.

(C) True or False

1. Under perfect competition, every participant is a price-taker.
2. A market is understood as a place where commodities are bought and sold at retail or wholesale prices.
3. Competition in market is always perfect.

(D) Multiple Choice Questions

1. Which market is a simple and convenient form of market structure to understand and analyze?
   (i) Perfect market
   (ii) Imperfect market
   (iii) Both of them
   (iv) None of them.

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2. According to Marshall, which are the time periods of varying duration.....
   (i) Market period (ii) Short period
   (iii) Long period (iv) All of them

(E) Fill in the Blanks

1. ……competition refers to the market structure where competition among the sellers and the buyers prevails in its most perfect form.
2. Under perfect competition, there is a …….ruling market price.
3. The market period is a very …….period.
4. Market price represents unstable equilibrium positions of…….
5. An …….price is one at which demand and supply tend to be equal to each other.

13.22 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. False

(D) 1. (i), 2. (iv)

(E) 1. Perfect, 2. Single, 3. Short, 4. Demand and supply, 5. Equilibrium

13.23 BIBLIOGRAPHY

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2. J. Baumol (1961). "What Can Economic Theory Contribute to Managerial Economics?," American Economic Review, 51(2), pp. 142-46. Abstract.
3. Ivan Png and Dale Lehman (2007, 3rd ed.). Managerial Economics. Wiley. Description and chapter-preview links.
4. M. L. Trivedi (2002). Managerial Economics: Theory & Applications, 2nd ed., Tata McGraw-Hill. Chapter-preview links.
5. NA (2009). "managerial economics," Encyclopedia Britannica. Cached online entry.
6. Carl Shapiro (1989). "The Theory of Business Strategy," RAND Journal of Economics, 20(1), pp. 125-137.
7. Thomas J. Webster (2003). Managerial Economics: Theory and Practice, ch. 13 & 14, Academic Press. Description.

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8. James O. Berger (2008).”statistical decision theory,” The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
9. Keisuke Hirano (2008). “decision theory in econometrics,” The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.

13.24 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

13.25 TERMINAL QUESTIONS

1. Students are required to prepare a brief report on Indian retail market and its competitive market condition.

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2. Explain various types of market structures formed by the nature of competition.

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UNIT 14 MONOPOLY MARKET

Structure:

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Objectives

After reading this unit you will be able to understand:

- Monopoly market
- Its source and feature
- Demand and revenue curve under monopoly
- Cost and supply curves under monopoly
- Profit maximization under monopoly
- Absence if supply curve under monopoly
- Monopoly v/s perfect competition
- Comparison of Long run price and output
- Equilibrium of Multi-plant monopoly
- Price determination by monopoly
- Measure of monopoly power

14.1 INTRODUCTION

A monopoly is a market structure in which there is only one producer/seller for a product. In other words, the single business is the industry. Entry into such a market is restricted due to high costs or other impediments, which may be economic, social or political.

14.2 INTRODUCTION TO MONOPOLY

A natural monopoly is defined in economics as an industry where the fixed cost of the capital goods is so high that it is not profitable for a second firm to enter and compete. There is a "natural" reason for this industry being a monopoly. It is an extreme imperfect form of market. In ancient times, common salt was responsible for natural monopolies, till the time people learned about winning sea-salt. Regions facing scarcity of transport facilities and storage were most prone to notorious acceleration of commodity prices and uneven distribution of daily-use products and services. The characteristics of monopoly are solitary to the condition generated by intent. Monopoly symbolizes domination over a product to the extent that the enterprise or individual dictates the terms of access and the markets for availability. The term is specific to a seller's market. A similar situation in the buyer's market is referred to as monopsony. It first appeared as an economics-related term in 'Politics' by Aristotle.

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14.3 MEANING OF MONOPOLY

The term 'Monopoly' has been derived from Greek term 'Monopolies' which means a single seller. Thus, monopoly is a market condition in which there is a single seller of a particular commodity who is called monopolist and has complete control over the supply of his product.

14.4 DEFINITION OF MONOPOLY

According to Prof. Thomas, "Broadly, the term Monopoly is used to cover any effective price control, whether of supply or demand of services or goods; narrowly it is used to mean a combination of manufacturers or merchants to control the supply price of commodities or services".

According to Prof. Chamberlain, "Monopoly refers to the control over supply".

According to Prof. Robert Triffin, "Monopoly is a market situation in which the firm is independent of price changes in the product of each and every other firm".

14.5 CHARACTERISTICS OF MONOPOLY

The characteristics of Monopoly are as follows:

1. Single Seller

Under monopoly, there is a single producer of a particular commodity or service in the market accruing to a rather large number of buyers. The mono manufacturer may be an individual, a group of partners or a joint stock company or state, being the only source of supply for the goods or services with no close substitute. In this market structure, the firm is the industry and, thus, the market is referred to as 'pure monopoly', but, it is more of a theoretical concept. At times, close substitutes are produced by few manufactures holding a substantial market share and this imperfect form of extreme market is termed as monopolistic competition.

2. Restricted Entry

Free entry of new organizations in this market arrangement is prohibited, that is, other sellers cannot enter the market of monopoly. Few of the primary barriers, constricting the entry of new sellers are:

(i) Government license or franchise

(ii) Resource ownership

(iii) Patents and copyrights

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(iv) High start-up cost

(v) Decreasing average total cost

3. Homogeneous Product

A monopoly firm manufactures a commodity that has no close substitute and is a homogeneous product. With the absence of availability of a substitute, the buyer is bound to purchase what is available at the tagged price. For instance: there is no substitute for railways as the 'bulk carrier'. Thus, to be the sole seller, in the monopolistic setup, a unique product must be produced.

4. Full Control over Price

In a monopoly market, restricted entry constricts competition and the monopolist exhibits full control over the market conditions. The absence of competition spares the monopolizing company from price pressure and grants him the opportunity to charge the product as per his advantage, targeting profit maximizing via predetermined quantity choice. Thus, a monopolist is a 'price maker' and not a 'price taker', wherein he decides the price and the buyers has to accept it. Nevertheless, to evade the entry from new market participants, the company needs to regulate the set product or service price within the paradigms of the Monopoly Theorem.

5. Price Discrimination

Price discrimination can be defined as the 'practice by a seller of charging different prices from different buyers for the same good or service'. A monopolist has the leverage to carry out price discrimination as he is the market and acts as per his suitability.

6. Increased Scope for Mergers

The scope for vertical and/or horizontal mergers is increase in lieu of control exhibited by a single entity under a monopoly. The mergers efficiently absorb competition and maintain the supply chain management.

7. Price Elasticity

With regards to the demand of the product or service offered by the monopolizing company or individual, the price elasticity to absolute value ratio is dictated by price increase and market demand. It is not uncommon to see surplus and/or a loss categorized as 'deadweight' within a monopoly. The latter refers to gain that evades both, the consumer and the monopolist.

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8. Lack of Innovation

On account of solitary market domination, monopolies exhibit an inclination towards losing efficiency over a period of time; new designing and marketing dexterity takes a back seat.

9. Lack of Competition

When the market is designed to serve a monopoly, the lack of business competition or the absence of viable goods and products shrinks the scope for 'perfect competition'. Being the sole merchant of a eccentric good with no close imitation, a monopoly has no opposition. The demand for turnout induced by a monopoly is the market demand, adhering extensive market control. The incompetence resulting from market dominance also makes monopoly a key type of market failure.

14.6 TYPES OF MONOPOLY

1. Natural Monopoly

Natural monopoly is due to natural factors. For example, a particular raw material is concentrated at a particular place and this gives rise to monopoly exploitation of such material, e.g. monopoly of diamond mines in South Africa.

2. Public Utility Monopoly

Governmental authorities seize complete control and management of some utilities to protect social interests. For example, posts and telegraph, telephones, electric power, railway transport, provision of water, are monopolies of the government and local authorities. There may be private monopolies of public utility services.

3. Fiscal Monopoly

To prevent exploitation of employees and consumers, government nationalises certain industries and acquires fiscal monopoly power over them. E.g. Fiscal monopoly of tobacco in France, Life insurance and general insurance monopoly in India

4. Legal Monopoly

Some monopolies are engendered and protected under certain laws. Inventors of new processes, articles or devices obtain monopoly powers for such inventions under patent, trade mark and copyright laws. There are many examples of legal monopoly of medicines. As Professor F.W. Taussing observes in his Principles of Economics, copyrights and patents are the simplest cases of absolute monopoly

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by law. However, as Professor E.H. Chamberlin points out, such cases would fall more under monopolistic competition than under monopoly.

5. Voluntary Monopoly through Combinations

To eliminate competition and thereby secure higher prices, firms producing a particular product may come together and make monopoly agreements. These are known as industrial combinations. When all the firms merge into one organisation, such a monopoly takes the form of a trust.

The Associated Cement Companies (A.C.C.) in India is an example of this kind of trust. Where the firms maintain their individual identity and yet enter into monopoly agreements such combinations are known as trade associations, pools, cartels and holding companies. A pool is deemed a loose combination to maintain a particular higher price level of a commodity. A cartel is based on agreements to restrict output to get high prices e.g. the Sugar Syndicate in Maharashtra. A holding company secures monopolistic control over a number of firms by holding a majority of shares in them.

14.7 DEMAND AND REVENUE CURVE UNDER MONOPOLY

It is important to understand the nature of the demand curve facing a monopolist. The demand curve facing an industrial firm under perfect competition, is a horizontal straight line, but the demand curve facing the whole industry under perfect competition is sloping downward.

This is so because the demand is by the consumers and the demand curve of consumers for a product usually slopes downward. The downward-sloping demand curve of the consumers faces the whole competitive industry. But an individual firm under perfect competition does not face a downward-sloping demand curve.

This is because an individual firm under perfect competition is one among numerous firms constituting the industry so that it cannot affect the price by varying its individual level of output. A perfect competitive firm has to accept the ruling price as given and constant for it. It can sell as much as it likes at the ruling price of the product.

Therefore the demand curve facing an individual firm under perfect competition is a horizontal straight line as the level of prevailing price of the product. A perfectly competitive firm is a mere quantity adjuster; it has no influence over price.

But in the case of monopoly one firm constitutes the whole industry. Therefore, the entire de-mand of the consumers for a product faces the monopolist. Since the demand curve of the consumers for a product slopes downward, the monopolist faces a downward sloping demand curve.

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If he wants to increase the sale of his good, he must lower the price. He can raise the price if he is prepared to sacrifice some sales. To put it in another way, a monopolist can lower the price by increasing his level of sales and output, and he can raise the price by reducing his level of sales or output.

A perfectly competitive firm merely adjusts the quantity of output it has to produce, price being a given and constant datum for him. But the monopolist encounters a more complicated prob-lem. He cannot merely adjust quantity at a given price because each quantity change by him will bring about a change in the price at which the product can be sold.

Consider DD is the demand curve facing a monopolist. At price OP the quantity demanded is OM, therefore he would be able to sell OM quantity at price OP. If he wants to sell a greater quantity ON, then price to the OL. If would he restricts his quantity to OG, fall price will rise to OH.

Thus every quantity change by him entails a change in price at which the product can be sold. Thus the problem faced by a monopo-list is to choose a price-quantity combination which is optimum for him, that is, which yields him maximum possible profits.

Demand curve facing the monopolist will be his average revenue curve. Thus, the average revenue curve of the monopolist slopes downward throughout its length. Since average revenue curve slopes downward, marginal revenue curve will lie below it. This follows from usual average- marginal relationship. The implication of marginal revenue curve lying below average revenue curve is that the marginal revenue will be less than the price or average revenue.

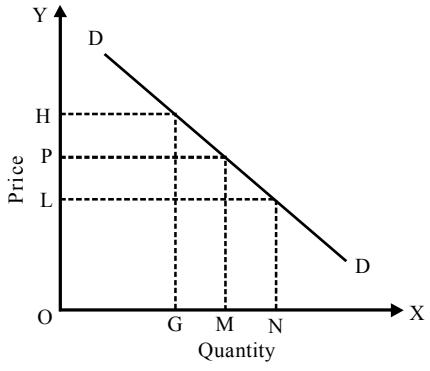

Fig. 14.1: Demand curve of the monopolist slopes downward.

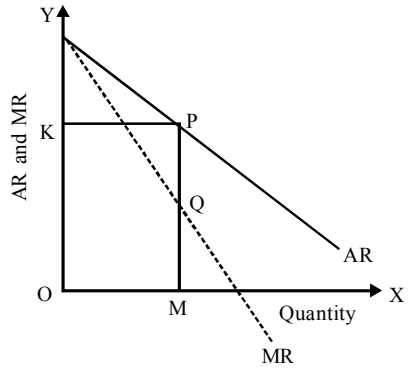

Fig. 14.2: Average and Marginal Revenue Curves under Monopoly

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When monopolist sells more, the price of his product falls; marginal revenue therefore must be less than the price. In Fig. 14.2 AR is the average revenue curve of the monopolist and slopes downward. MR is the marginal revenue curve and lies below AR curve. At quantity OM, average revenue (or price) is MP and marginal revenue is MQ which is less than MP.

Average and marginal revenue at a quantity are related to each other through price elasticity of demand and in this connection we derived the following formula:

$MR = AR\frac{(e \quad 1)}{e}$, where e stands for price elasticity.

Since AR is the sam thing as price

Therefore, $MR = price\frac{(e \quad 1)}{e}$

or price = $MR \ \frac{e}{(e \quad 1)}$

Since the expression e-1/e will be less than unity, MR will be less than price, or price will be greater than MR. The extent to which MR curve lies below AR curve depends upon the value of the e – 1/e fraction.

The monopolist has a clearly distinguished demand curve for his product, which is identical with the consumers' demand curve for the product in question. It is also worth mentioning that, unlike oligopolist or a firm under monopolistic competition, monopolist does not consider the re-percussions of the price change by him upon those of other firms.

Monopoly, as defined here, re-quires that the gap between the monopoly product and those of other firms is so sharp that change – in the price policies of the monopolist will not affect other firms and will therefore not evoke air readjustments of the policies by these firms.

14.8 COST AND SUPPLY CURVES UNDER MONOPOLY

Supply curve under imperfect competition or monopoly is not unique. It is because that price is simultaneously determined along with the quantity of the commodity produced unlike perfect competition; the price is not given to a firm under monopoly or monopolistic competition.

Here the firm is a price-maker for her product. Thus the firm fixes a price where it gets maximum profits. The supply of the commodity is determined by the market

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demand for its product. It is therefore impossible to talk of a supply curve under monopoly or monopolistic competition.

The output supplied by the producer under such monopolistic situation will depend upon the market demand conditions for his product and no unique supply curve (as well as the supply schedule) can be drawn.

Therefore, it is quite inapplicable to the causes of imperfect competition, monopolistic competition, monopoly and oligopoly. This is because the notion of supply curve refers to the question as to how much quantities of a commodity a firm will supply at various given prices.

Under various forms of imperfect competition, an individual firm does not take the price as given and is not a mere quantity adjuster. In fact, under various forms of imperfect competition, a firm sets its own price. For a firm under imperfect competition, it is not a question of adjusting output or supply at a given price but of choosing price-output combination which maximize its profits.

Commenting on the relevance of supply curve, Prof. Baumol writes: The supply curve is, strictly speaking, a concept which is usually relevant only for the case of pure (or perfect) competition… The reason for this lies in its definition the supply curve is designed to answer questions of the form, "How much will firm A supply if it encounters a price which is fixed at P Rupees." But such a question is most relevant to the behaviour of firms that actually deal with prices over whose determination they exercise no influence."

Thus, there is no unique price-quantity relationship, since quantity supplied by a firm under monopoly is not determined by price but in-stead by marginal revenue, given the marginal cost curve. Thus, Joan Robinson writes, "When com-petition is not perfect, the demand curve for the output of each individual producer is not perfectly elastic and each producer will sell that output at which his marginal cost is equal to his marginal receipts Marginal revenue will not be equal to price, it is marginal revenue and not price that determines output of the individual producer."

That, under monopoly, we do not get a series of unique price-output relationship or supply curve of a product is illustrated in Figure 14.3. Suppose the demand curve is initially D_1, corre-sponding to which MR_1 is the marginal revenue curve. Given the marginal cost curve MC, monopo-list is in equilibrium at OM level of output and charging price OP_1.

Now, suppose that demand curve shifts to the position D_2 corresponding to which MR_2 is the marginal revenue curve. It will be seen from Fig. 14.3 that the new marginal revenue curve MR_2 also intersects the given marginal cost curve MC at the same level of output OM as before the shift in the demand curve but price has risen to OP_2.

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Thus we see that under monopoly, a shift in demand may lead to the production and supply of the same output at two different prices. This clearly shows that there is no unique price-output relationship which is essential for the concept of supply curve to be applicable.

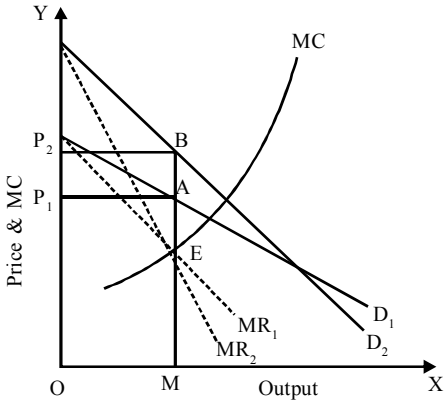

Fig. 14.3: Under monopoly a shift in demand leading to the same output being supplied a two different prices.

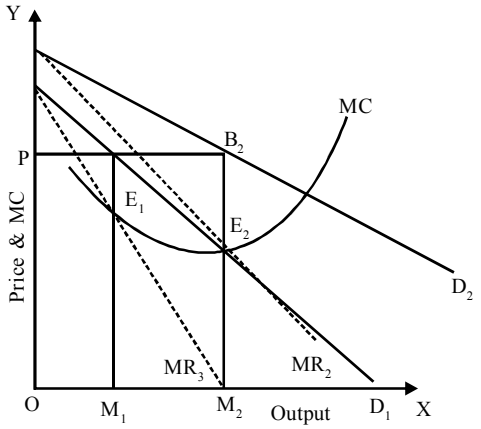

Fig. 14.4: Under monopoly a shift in demand may lead to a change in output being supplied at the same price

Figure 14.4 illustrates another special case where shift in demand leads to the different levels of output being supplied at the same price. Initially, with D, and MR_X as the demand and marginal revenue curves respectively, the monopolist maximises his profits by producing output OM_1 and charging price OP.

With the shift in demand curve to D_2 and the marginal revenue curve to MR_2, the marginal cost curve MC cuts the new MR_2 curve at E_2 and it will be observed from Figure 14.4 that in the new equilibrium, the monopolist produces higher quantity OM_2 at the same price OP. This again shows that under monopoly there is no any specific quantity of the product supplied at a price.

To sum up, under monopoly, there is no supply curve associating a unique output with a price. Shift in demand may lead to either change in price with the same output being produced and sup-plied or it may lead to the change in output with same price.

However, usually the shift in demand would lead to the changes in both output and price. How price and output will change as a result of shift in demand depends not only on the marginal cost curve but also on the price elasticity of demand.

The important thing to remember is that in sharp contrast to the case of a perfectly competi-tive firm, under monopoly marginal cost curve does not serve as the supply curve of the firm and further that there is no supply curve under monopoly depicting unique price-output relationship.

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14.9 PROFIT MAXIMIZATION UNDER MONOPOLY

Monopolies have much more power than firms normally would in competitive markets, but they still face limits determined by demand for a product. Higher prices (except under the most extreme conditions) mean lower sales. Therefore, monopolies must make a decision about where to set their price and the quantity of their supply to maximize profits. They can either choose their price, or they can choose the quantity that they will produce and allow market demand to set the price.

Since costs are a function of quantity, the formula for profit maximization is written in terms of quantity rather than in price. The monopoly's profits are given by the following equation: $\pi = p(q)q - c(q)$

In this formula, p(q) is the price level at quantity q. The cost to the firm at quantity q is equal to c(q). Profits are represented by π. Since revenue is represented by pq and cost is c, profit is the difference between these two numbers. As a result, the first-order condition for maximizing profits at quantity q is represented by:

$$0 = \partial q = p(q)+qp'(q)-c'(q)$$

The above first-order condition must always be true if the firm is maximizing its profit - that is, if $p(q)+qp'(q)-c'(q)$ is not equal to zero, then the firm can change its price or quantity and make more profit.

Marginal revenue is calculated by $p(q)+qp'(q)$, which is derived from the term for revenue, pq. The term c2(q) is marginal cost, which is the derivative of c(q). Monopolies will produce at quantity q where marginal revenue equals marginal cost. Then they will charge the maximum price p(q) that market demand will respond to at that quantity.

Consider the example of a monopoly firm that can produce widgets at a cost given by the following function: c(q)=2+3q+q2

If the firm produces two widgets, for example, the total cost is 2+3(2)+22=12. The price of widgets is determined by demand: p(q)=24-2p

When the firm produces two widgets it can charge a price of 24-2(2)=20 for each widget. The firm's profit, as shown above, is equal to the difference between the quantity produces multiplied by the price, and the total cost of production: p(q)q-c(q). How can we maximize this function?

Using the first order condition, we know that when profit is maximized,

$$0 = p(q)+qp'(q)-c'(q) .$$

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In this case: 0=(24-2p)+q(-2)-(3+2q)=21-6q

Rearranging the equation shows that q=3.5. This is the profit maximizing quantity of production.

Consider the diagram illustrating monopoly competition. The key points of this diagram are fivefold.

First, marginal revenue lies below the demand curve. This occurs because marginal revenue is the demand, p(q), plus a negative number.

Second, the monopoly quantity equates marginal revenue and marginal cost, but the monopoly price is higher than the marginal cost.

Third, there is a deadweight loss, for the same reason that taxes create a deadweight loss: The higher price of the monopoly prevents some units from being traded that are valued more highly than they cost.

Fourth, the monopoly profits from the increase in price, and the monopoly profit is illustrated.

Fifth, since—under competitive conditions—supply equals marginal cost, the intersection of marginal cost and demand corresponds to the competitive outcome.

14.10 ABSENCE OF SUPPLY CURVE UNDER MONOPOLY

An important feature of the monopoly is that, unlike a competitive firm, the monopolist does not have the supply curve. It is worth noting that the supply curve shows how much output a firm will produce at various given prices of a product.

The supply curve of a product by a firm traces out the unique price-output relationship, that is, against a given price there is a particular amount of output which the firm will produce and sell in the market. The concept of supply curve is relevant only when the firm exercises no control over the price of the product and therefore takes it as given.

Therefore, it is perfectly competitive firm which is a price taker and demand curve facing it is a horizontal straight line that a unique price-output relationship is estab-lished. For a perfectly competitive firm, marginal revenue (MR) equals price and therefore to maxi-mize profits, the firm equates price (= MR) with marginal cost.

As price changes due to the shift in demand, the competitive firm equates the new higher price (i.e. new MR) with its marginal cost at higher level of output. In this way under perfect competition, marginal cost curve becomes the supply curve of the firm.

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To quote professor Baumol, "The supply curve is strictly speaking, a concept which is usually relevant only for the case of pure or perfect competition …. The reason for this lies in its definition … the supply curve is designed to answer question of the form, "How much will firm A supply if it encounters a price which is at P dollars. But such a question is most relevant to the behaviour of firms that actually deal with price over whose determination they exercise no influ-ence."

But a monopolist does not take the price as given and exercises control over the price of the product as he is the sole producer of the product. Further, for a monopoly firm demand curve slopes downward and marginal revenue (MR) curve lies below it.

Therefore, a monopolist in order to maximise profits does not equate price with marginal cost; instead he equates marginal revenue with marginal cost. As a result, shifts in demand causing changes in price do not trace out a unique price-output series as happens in case of a perfectly competitive firm.

In fact, under monopoly shifts in demand can lead to a change in price with no change in output or a change in output with no change in price or they can lead to changes in both price and output. This renders the concept of supply curve inapplicable and irrelevant under conditions of monopoly.

Thus, there is no unique price-quantity relationship, since quantity supplied by a firm under monopoly is not determined by price but in-stead by marginal revenue, given the marginal cost curve. Thus, Joan Robinson writes, "When com-petition is not perfect, the demand curve for the output of each individual producer is not perfectly elastic and each producer will sell that output at which his marginal cost is equal to his marginal receipts Marginal revenue will not be equal to price, it is marginal revenue and not price that determines output of the individual producer."

14.11 MONOPOLY V/S PERFECT COMPETITION

Following points make clear difference between both the competitions:

1. Output and Price:

Under perfect competition price is equal to marginal cost at the equilibrium output. While under monopoly, the price is greater than average cost.

2. Equilibrium:

Under perfect competition equilibrium is possible only when MR = MC and MC cuts the MR curve from below. But under simple monopoly, equilibrium can be realized whether marginal cost is rising, constant or falling.

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3. Entry:

Under perfect competition, there exist no restrictions on the entry or exit of firms into the industry. Under simple monopoly, there are strong barriers on the entry and exit of firms.

4. Discrimination:

Under simple monopoly, a monopolist can charge different prices from the different groups of buyers. But, in the perfectly competitive market, it is absent by definition.

5. Profits:

The difference between price and marginal cost under monopoly results in super-normal profits to the monopolist. Under perfect competition, a firm in the long run enjoys only normal profits.

6. Supply Curve of Firm:

Under perfect competition, supply curve can be known. It is so because all firms can sell desired quantity at the prevailing price. Moreover, there is no price discrimination. Under monopoly, supply curve cannot be known. MC curve is not the supply curve of the monopolist.

14.12 COMPARISON OF LONG RUN PRICE AND OUTPUT UNDER MONOPOLY

In the long run monopolist would make adjustment in the size of his plant. The long-run average cost curve and its corresponding long-run marginal cost curve portray the alternative plants, i.e., various plant sizes from which the firm has to choose for operation in the long-run.

The monopolist would choose that plant size which is most appropriate for a particular level of demand. In the short run the monopolist adjusts the level of output while working with a given existing plant. His profit- maximising output in the short run will be where only the short-run marginal cost curve (i.e., mar-ginal cost curve with the existing plant) is equal to marginal revenue.

But in the long run he can further increase his profits by adjusting the size of the plant. So in the long run he will be in equilib-rium at the level of output where given marginal revenue curve cuts the long run marginal cost curve.

Fixing output level at which marginal revenue is equal to long-run marginal cost shows that the size of the plant has also been adjusted. That is, a plant size has been chosen which is most optimal for a given de-mand for the product. It should

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be care-fully noted that, in the long run, mar-ginal revenue is also equal to short-run marginal cost.

But this short-run mar-ginal cost is of the plant which has been selected in the long run keeping in view the given demand for the product. Thus while, in the short run, marginal revenue is equal only to the short-run marginal cost of the given existing plant, in the long run marginal revenue is equal to the long-run marginal cost as well as to the short-run marginal cost of that plant which is appropriate for a given demand for the product in the long run. In the long- run equilibrium, therefore, both the long-run marginal cost curve and short-run marginal cost curve of the relevant plant intersect the marginal revenue curve at the same point.

Further, it is important to note that, in the long run, the firm will operate at a point on the long- run average cost curve (LAC) at which the short-run average cost is tangent to it. This is because it is only at such tangency point that short-run marginal cost (SMC) of a plant equals the long-run marginal cost (LMC).

Figure 14.5 portrays the long-run equilibrium of the monopolist. He is in equilibrium at OL output at which long-run marginal curve LMC intersects marginal revenue curve MR. Given the level of demand as indicated by positions of AR and MR curves he would choose the plant size whose short-run average and marginal cost curves are SAC and SMC. He will be charging price equal to LQ or OP and will be making profits equal to the area of rectangle THQP.

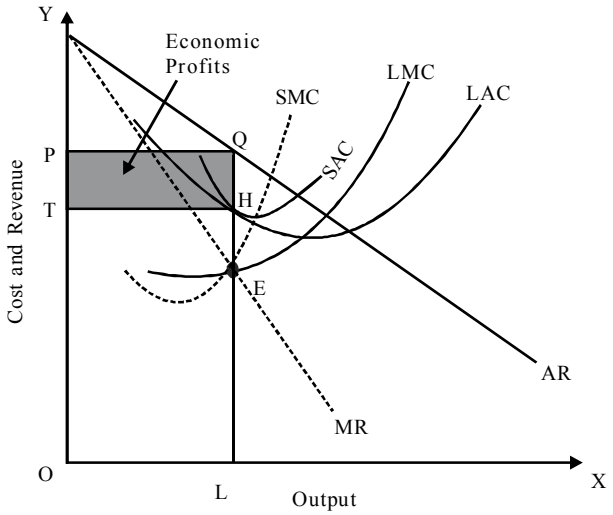

Fig. 14.5: Long-Run Equilibrium under Monopoly

It therefore follows that for the monopolist to maximise profits in the long run, the following conditions must be fulfilled:

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MR = LMC = SMC

SAC = LAC

P = LAC

The last condition implies that in long-run monopoly equilibrium price of the product should be either greater than long-run average cost or at least equal to it. The price cannot fall below long-run average cost because in the long run the monopolist will quit the industry if it is not even able to make normal profits.

Long-run Equilibrium Adjustment under Monopoly:

In order to understand fully the difference between the short-run equilibrium and long-run ad-justment under monopoly, it is necessary to show short-run equilibrium and long-run equilibrium in one figure. This has been done in Fig. 14.6 which shows that for a given level of demand, the monopolist will be in short-run equilibrium at point E or at output OQ_1 if he has plant size SAC_1 at that time.

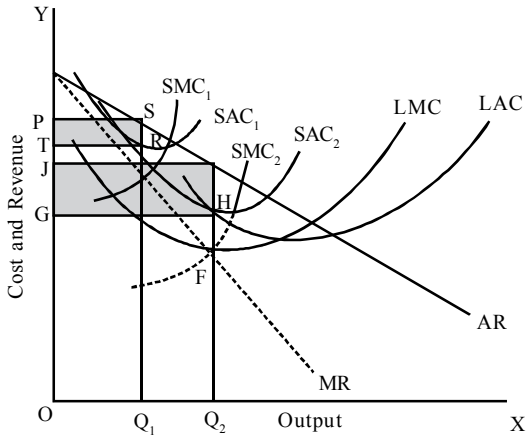

Fig. 14.6: Shift from a Short-Run to Long-Run Equilibrium Position under Monopoly

But in the long run he would not be in equilibrium at E since in the long run he can also change the plant and will employ that plant which is most appropriate for a given level of demand. In the long run he will be in equilibrium at point F where marginal revenue curve cuts his long- run marginal cost curve (LMC).

But every point of the long-run marginal cost curve corresponds to a point of some short-run marginal cost curve. Long-run equilibrium point F at which marginal revenue curve cuts long-run marginal cost curve is also the point on short-run marginal cost curve SMC_2which corresponds to the short-run average cost curve SAC_2.

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It means that, in long-run equilibrium position, monopo-list has chosen the plant with short-run average and marginal cost curves SAC_2 and SMC_2. The plant having short-run cost curves SAC_2 and SMC_2 is optimal for him in the long run, given the level of demand as given by AR and MR curves.

It is now clear that the monopolist who was in equilibrium at E in the short run with the given plant having cost curves SAC_1 and SMC_1 has shifted to the plant having cost curves SAC_2 and SMC_2 in his long run adjustment, level of demand being given. It will be noticed that, in the long run, the output has increased from OQ_1 to OQ_2 and price has fallen from OP to OJ. Profits have also increased in the long run; area GHKJ is larger than the area TRSP.

14.13 EQUILIBRIUM OF MULTI-PLANT MONOPOLY

A multi-plant monopoly is given in monopolistic firms that have their production divided into more than one production plant, each one having its own cost structure. Different cost structures give place to different marginal costs and hence each production plant will have to choose the individual production output level following the maximising principle.

To maximise profits, the monopolist has to make two important decisions. Firstly, how much output to produce altogether and at what price to sell it so as to maximise profit? Secondly, how to allocate the optimal (profit maximising) output between the different plants?

Thus, the Multiplan monopolist not only faces the problem of determining the profit maximising price and output levels. He has also to decide a profit maximising way for distributing this output among the various plants, which in turn depends upon the cost conditions prevailing in each plant. If the marginal cost of production in any plant is lower than that in the others, then it costs relatively less to produce an additional unit of output in this plant in comparison to the other plants. The concerned monopolist can reduce his total costs and hence raise his profit level by diverting production from other higher cost plants to that specific plant.

Ultimately, the cost minimising or profit maximising allocation of total output among different plants of a Multiplan monopolist can be achieved, when the marginal cost of production is equated across all the plants. Now, no more further redistribution of output from one plant to the other can reduce the overall costs of production.

As far as the determination of the profit maximising output level is concerned, the Multiplan monopolist (just like an ordinary monopolist or any profit maximising firm) applies the marginalist rule of the equality of marginal revenue (MR) and

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(total) marginal cost (MC) in the market. This is described below in case of a monopolist operating with two plants. It can easily be generalised to any number of plants.

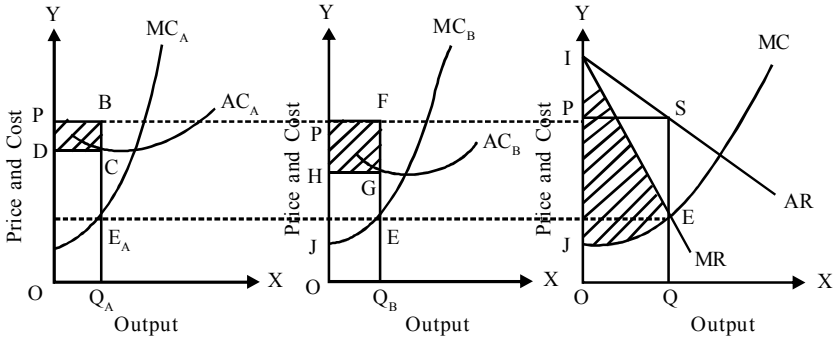

Fig. 14.7: Multi Plant Monopolist: Determination of Profit Maximising Output and its Optimal AllocationAmong Two Plants

The Multiplan monopolist attains maximum profits at equilibrium point 'E'. The monopolist is now confronted with the problem of allocating the profit maximising output OQ between the two plants in an optimal manner. He will allocate this output in a way such that marginal cost of each plant is equal to the Multiplan marginal cost at the optimal output level, i.e. $MC_A = MC_B = MC$.

If $MC_A > MC_B$, the monopolist can reduce his total costs and increase the profits by transferring the output from plant 'A' to plant 'B' similarly if $MC_A, < MC_B$, the output would be transferred from plant 'B' to plant 'A'. This process of transfer would continue until $MC_A = MC_B$.

Graphically, this can be shown by drawing a horizontal line from equilibrium point 'E' in Fig. 14.7 (c), parallel to the X-axis, until it intersects the MC_A and MC_B curves in Fig. 14.7 (a) and Fig. 14.7 (b) at points E_A and E_0respectively. At these points, the equilibrium condition $MC_A = MC_0 = MR = MC$ is satisfied. This is the condition required for efficient allocation of the profit maximising output of the Multiplan monopolist among the two industrial plants 'A' and 'B'.

The output levels corresponding to the equilibrium points 'E_A' and 'E_B' are obtained by dropping perpendiculars to X-axis of Fig. 14.7 (a) and Fig. 14.7 (b) respectively. Out of the total output OQ to be produced by the monopolist under consideration, OQ_A will be produced in plant 'A' and OQ_B will be produced in plant 'B'.

Evidently, $OQ_A + OQ_B = OQ$, since the aggregate marginal cost curve MC in Fig 14.74 (c) was itself obtained from the horizontal summation of the individual marginal cost curves MC_A and MC_B, as depicted in Fig. 14.7 (a) and Fig. 14.7 (b) respectively.

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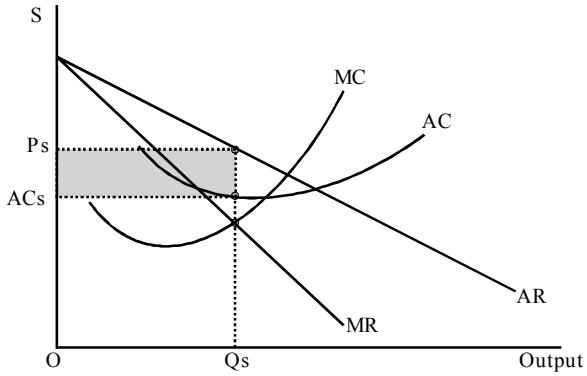
The profits from the two plants 'A' and 'B' are shown by the shaded areas DPBC and HPFG respectively. The total profit earned by the monopolist at the equilibrium point 'E' is shown by the shaded area JIE in Fig. 14.7 (c), which is equal to the sum of the profits earned in plant 'A' and plant 'B', i.e., area (DPBC+ HPFG).

From the foregoing discussion, it can be inferred that the Multiplan monopolist maximises his profits and attains equilibrium by utilising each plant up to the level at which the marginal costs are equal to each other and to the common marginal revenue and total marginal cost in the market.

14.14 PRICE-OUTPUT DETERMINATION UNDER MONOPOLY

A firm under monopoly faces a downward sloping demand curve or average revenue curve. Further, in monopoly, since average revenue falls as more units of output are sold, the marginal revenue is less than the average revenue. In other words, under monopoly the MR curve lies below the AR curve. The Equilibrium level in monopoly is that level of output in which marginal revenue equals marginal cost. The producer will continue producer as long as marginal revenue exceeds the marginal cost. At the point where MR is equal to MC the profit will be maximum and beyond this point the producer will stop producing.



In the short run, the monopolist has to keep an eye on the variable cost, otherwise he will stop producing. In the long run, the monopolist can change the size of plant in response to a change in demand. In the long run, he will make adjustment in the amount of the factors, fixed and variable, so that MR equals not only to short run MC but also long run MC.

Pricing under Pure Monopoly

The aim of the monopolist is to maximise profit therefore; he will produce that level of output and charge that price that gives him maximum profits. He will be in

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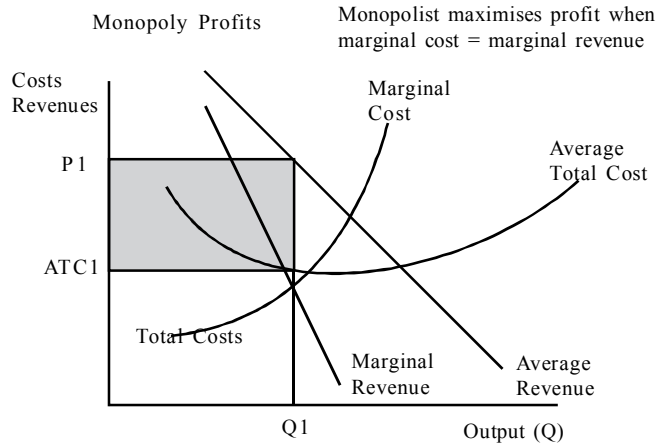
equilibrium at that price and output at which his profits are the maximum. In other words, he will be in equilibrium position at that level of output at which marginal revenue equals marginal cost.

In order to achieve equilibrium, the monopolist should satisfy two conditions:

- Marginal cost should be equal to marginal revenue.
- The marginal cost curve should cut marginal revenue curve from below.

A pure monopolist is the sole supplier in an industry and, as a result, the monopolist can take the market demand curve as its own demand curve. A monopolist therefore faces a downward sloping AR curve with a MR curve with twice the gradient of AR. The firm is a price maker and has some power over the setting of price or output. It cannot, however, charge a price that the consumers in the market will not bear. In this sense, the position and the elasticity of the demand curve acts as a constraint on the pricing behaviour of the monopolist. Assuming that the firm aims to maximise profits (where MR=MC) we establish a short run equilibrium as shown in the diagram below. Assuming that the firm aims to maximise profits (where MR=MC) we establish a short run equilibrium as shown in the diagram below.



The profit-maximizing output can be sold at price P1 above the average cost AC at output Q1. The firm is making abnormal "monopoly" profits (or economic profits) shown by the yellow shaded area. The area beneath ATC1 shows the total cost of producing output Qm. Total costs equals average total cost multiplied by the output.

The relationship between AR, MR and elasticity of demand under monopoly

The average and marginal revenue at a quantity are related to each other though elasticity.

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In this connection we derive the following formula:

MR=AR (e-1/e) Where e stands for elasticity.

Since AR = Price

Therefore, MR=Price (e-1/e)

Or Price=MR (e/e-1)

The expression e-1/e will be less than unity. Hence MR will be less than price. The extent to which marginal revenue will be less than price depends upon the value of the fraction (e-1/e).

14.15 MEASURE OF MONOPOLY POWER

Professor A.P. Lerner has put forward a measure of monopoly power which has gained great popularity and is most widely cited. Lerner takes perfect competition as the basis of departure for measuring monopoly power.

He regards pure or perfect competition as the state of social optimum or maximum welfare and any departure from it would indicate the presence of some monopoly power leading to misallocation of resources or state of less than social optimum.

As we know, in perfect competition price is equal to marginal cost of the product in the equilibrium position. And it is this equality of price with marginal cost under perfect competition that ensures maximum social welfare or optimum allocation of resources.

Now, when competition is less than pure or perfect the demand curve facing a firm will be sloping downward and marginal revenue curve will lie below it. Consequently, when competition is less than pure (perfect), that is, when it is imperfect, in a seller's equilibrium position; marginal cost will be equal to marginal revenue but price will stand higher than marginal cost or marginal revenue.

This divergence between price and marginal cost, according to Professor Lerner, is the indicator of the existence of monopoly power. The greater this divergence between price and marginal cost, the greater the degree of monopoly power possessed by the seller.

Based on this, Lerner has given the following precise index of the degree of monopoly power:

Degree of monopoly power = P – MC/P

Where P denotes price and MC denotes marginal cost at the equilibrium level of output.

When competition is pure or perfect, price (P) is equal to marginal cost and therefore Lerner's index of monopoly power is equal to zero indicating no monopoly

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power at all, for when price is equal to marginal cost, P – MC will be equal to zero and the above formula will yield the value of index as zero.

Thus, under perfect competition, Lerner's index of monopoly power = (P – MC/P) = 0/P = 0. On the other hand, when the monopolised product entails no cost of production, that is, when the product is a free good whose supply is controlled by one person, the marginal cost will be equal to zero and Lerner's index of monopoly power (P-MC/P) would be equal to one or unity. Thus when MC is equal to zero P – MC/P = P – 0/P = P/P = 1

It is thus clear that Lerner's index of monopoly power can vary from zero to unity. Within this range, the greater the value of the index (P – MC/P) the greater the degree of monopoly power possessed by the seller. For instance, if the price of a product is equal to ₹ 15 per unit and its marginal cost is ₹ 10, then the value of index of monopoly power will be 15 – 10/15 = 5/15 = 1/3 and when the price is equal to ₹ 20 and marginal cost is equal to 10, the index of monopoly power will be equal to 20 – 10/20 = 10/20 = 1/2.

Monopoly Power and Price Elasticity of Demand:

Now, it has been shown that Lerner's index of monopoly power is equal to the inverse of the price elasticity of demand.

We can prove this as follows:

Since at the equilibrium level, marginal cost is equal to marginal revenue, we can substitute in the above formula marginal revenue for marginal cost.

Thus

Lerner's index of monopoly power = P – MC/P

Since in equilibrium, MC = MR

Lerner's index of monopoly power = P – MR/P…..(i)

We know that MR = P(1-1/|e|) where e is absolute value of the price elasticity of demand at the equilibrium output. Thus, putting P (1-1/|e|) in place of MR in (i) above we get,

Lerner's index of monopoly power

$$= P - MC/P = P - P\,(1 - 1|e|)/P = 1 - 1 + 1/|e| = 1\backslash|e|$$

It therefore follows that Lerner's index of monopoly power is equal to the inverse of price elasticity of demand. Thus degree of monopoly power can be judged by merely knowing the price elasticity of demand at the equilibrium output.

The degree of monopoly power varies inversely with the absolute value of price elasticity of demand for the good. It is worth noting that price elastic-ity of demand in Lerner's index refers only to the price elasticity at the equilibrium output.

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Critique of Lerner's Measure of Monopoly Power:

Lerner's measure has many shortcomings. First, the chief shortcoming of Lerner's measure is its inability to measure the strength of monopoly and competitive elements in the non-price compe-tition and in cases of product differentiation as found in monopolistic competition and differentiated oligopoly.

Lerner's index at the best measures the strengths of monopoly and competitive elements when the competition between the sellers is on the basis of price. When instead of competing on the basis of price the sellers in monopolistic competition and oligopoly compete on the basis of product variation, advertising and other of selling costs, Lerner's index fails to indicate truly the degree of monopoly and competition involved in such market structures.

Suppose Lerner's monopoly index for a firm selling a differentiated product yields a high figure. But this does not necessarily mean that the seller will be possessing a high degree of monopoly power and facing less competition.

It may be that the sellers of the various varieties of the product may not be competing on the basis of price and instead may be engaged in highly intense competition in product variation and advertising and other forms of selling costs to promote the sales of their products.

On the basis of the above non-price factors some firms may enjoy greater monopoly control over their products than others. Thus Professor Chamberlin rightly says that elasticity and Lerner's index measures "pass over completely the important problems of competition and monopoly in the non price area; quality and other aspects of the product including location and advertising and other forms of selling costs."

Secondly Lerner's measure is based upon only one aspect of monopoly, namely, its control over price which depends upon the availability and effectiveness of existing substitutes. It ignores the restraints on monopoly power put by the potential substitutes which would come to exist with the entry of new firms into the industry as a powerful factor limiting be monopoly power of the existing sellers.

To quote Chamberlin again, "Neither elasticity nor the Lerner's index measures anything the effectiveness of existing substitutes; it gives no indication as to potential substitutes (the important problem of entry)."

Thirdly, Lerher's index is criticised on the ground that monopoly power does not express itself only in the divergence of price from marginal cost it also expresses itself in the restriction of output.

14.16 SUMMARY

Monopoly is a well-defined market structure where there is only one seller who controls the entire market supply, as there are no close substitutes for his product

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and there are barriers to the entry of rival producers. This sole seller in the market is called "monopolist". The term "Monopolist" is derived from the Greek work "mono", meaning "single", and "polist" meaning " seller". Thus, the monopolist may be defined as the sole seller of a product which has no close substitutes. The monopolist is faced by a large number of competing buyers for his product. Evidently, monopoly is the antithesis of competition.

The various factors and circumstances which act as entry barriers and cause the emergence of monopoly and its growth may be enlisted. In many cases natural factors create a monopolistic position, which is described as 'natural monopolies. For instance, in many professional services, the natural talent and skill bestow monopoly on some individuals.

Monopoly is acquired through the sole ownership or control of essential raw materials by a firm, as it would be an effective barrier to the entry of other firms in field. Legislative enactments regarding patents and copyrights, trademarks etc. bestow monopoly on some privileged firms, and such legal provisions tend to prevent the entry of potential competitors in the field.

Pure monopoly means a single firm which controls the supply of a commodity which has no substitutes, not even a remote one. It possesses an 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 the closeness of a substitute. In practice, there are many cases of such imperfect monopolies.

14.17 GLOSSARY

(a) Monopoly: Monopoly is a well-defined market structure where there is only one seller who controls the entire market supply, as there are no close substitutes for his product and there are barriers to the entry of rival producers.

(b) xMonopoly market: Monopoly market is the situation where one producer (or a group of producers acting in concert) controls supply of a good or service, and where the entry of new producers is prevented or highly restricted. Monopolist firms (in their attempt to maximize profits) keep the price high and restrict the output, and show little or no responsiveness to the needs of their customers. Most governments therefore try to control monopolies by (1) imposing price controls, (2) taking over their ownership (called 'nationalization'), or (3) by breaking them up into two or more competing firms.

(c) Pure monopoly: Pure monopoly means a single firm which controls the supply of a commodity which has no substitutes, not even a remote one.

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It possesses an 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 the closeness of a substitute. In practice, there are many cases of such imperfect monopolies.

14.18 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Monopoly?
2. What is Monopoly Market?
3. What is profit maximization?
4. What is multi-plant monopoly?
5. What is monopoly power?

(B) Extended Answer Questions

1. State various features of Monopoly market.
2. Discuss about demand and revenue curve under monopoly.
3. Explain cost and supply curves under monopoly.
4. Discuss profit maximization under monopoly.
5. Discuss absence of supply curve under monopoly.
6. Distinguish between monopoly and perfect competition.
7. Discuss price determination by monopoly.
8. Explain measure of monopoly power.

(C) True or False

1. Monopoly is market structure where there is only one seller who controls the entire market supply.
2. Monopoly is acquired through the sole ownership or control of essential raw materials by a firm.
3. Pure monopoly means a single firm which controls the supply of a commodity which has no substitutes, not even a remote one.

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(D) Multiple Choice Questions

1. The sole seller in the market is called .....
   (a) Pure competition (b) Monopolist
   (c) Monopoly (d) Oligopoly
2. The monopoly market model is the opposite extreme of.....
   (a) Perfect competition (b) Monopolist
   (c) Monopoly (d) Oligopoly

(E) Fill in the Blanks

1. Monopoly is a well-defined market structure where there is only one seller who controls the entire market.....
2. The term "Monopolist" is derived from the Greek work.....
3. A discriminating monopoly operates in more than.....

14.19 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True

(D) 1. (b), 2. (a)

(E) 1. Supply, 2. "Mono", 3. One market

14.20 BIBLIOGRAPHY

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8. James O. Berger (2008).”statistical decision theory,” The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
9. Keisuke Hirano (2008). “decision theory in econometrics,” The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.

14.21 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

14.22 TERMINAL QUESTIONS

1. Students are required to select any product of Tata Automobile and explain details about the market situation of that particular product.

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2. Explain cost and supply curves under monopoly. Discuss absence of supply

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UNIT 15 MONOPOLISTIC COMPETITION MARKET

Structure:

Objectives

After reading this unit you will be able to understand:

- Monopolistic completion market and its features
- Foundation of monopolistic competition model
- Price and output determination under monopolistic competition
- Analysis of selling cost and firm's equilibrium
- Critical appraisal of Chamberlin's theory of Monopolistic Competition

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15.1 INTRODUCTION

Monopolistic competition is a type of imperfect competition such that many producers sell products that are differentiated from one another (e.g. by branding or quality) and hence are not perfect substitutes. In monopolistic competition, a firm takes the prices charged by its rivals as given and ignores the impact of its own prices on the prices of other firms.

15.2 INTRODUCTION TO MONOPOLISTIC COMPETITION

Monopolistic competition is a type of imperfect competition such that many producers sell products that are differentiated from one another as goods but not perfect substitutes. In monopolistic competition, a firm takes the prices charged by its rivals as given and ignores the impact of its own prices on the prices of other firms.

The long-run characteristics of a monopolistically competitive market are almost the same as a perfectly competitive market. Two differences between the two are that monopolistic competition produces heterogeneous products and that monopolistic competition involves a great deal of non-price competition, which is based on subtle product differentiation. A firm making profits in the short run will nonetheless only break even in the long run because demand will decrease and average total cost will increase. This means in the long run, a monopolistically competitive firm will make zero economic profit.

15.3 MEANING OF MONOPOLISTIC COMPETITION

Monopolistic competition is a market structure quite similar to perfect competition in that vigorous price competition among a large number of firms and individuals is present.

Monopolistic competition is the market situation midway between the extremes of perfect competition and monopoly, and displaying features of the both. In such situations firms are free to enter a highly competitive market where several competitors offer products that are close substitutes and, therefore, prices are at the level of average costs. Some consumers have a preference for one product over another that is strong enough to make them keep buying it even when its price increases, thus giving its producer a small amount of market power. Monopolistic situation is a common situation in all free markets.

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15.4 FEATURES OF MONOPOLISTIC COMPETITION

Following are the features of a monopolistic competitive market:

(i) Large number of firm:

Monopolistic competition is characterised by large number of firms producing close substitutes but not identical product. Each firm must control a small yet significant portion of the market share such that by substantially extending or restricting its own sales, it is not able to affect the sales of any other individual seller. This condition is the same as in perfect market.

(ii) There is product differentiation:

No seller has full control over the market supply. Each seller produces very close substitute products. The product is neither identical nor markedly different. Since every seller produces slightly differentiated product, each seller has minor control over the price. Unlike perfect market conditions, the firm is a price – maker to some extent. That is, a firm can change the price slightly, though not much. The control over price will depend on the degree of product differentiation.

(iii) Absence of Inter-dependence:

Existence of a large number of firms insures the condition too large and too small. Thus, the individual firm's supply is small constituent of total supply. Therefore, individual firm has limited control over price level. Similarly, each firm can decide, its price or output policies independently through price discrimination, any action by one firm may not invite reaction from rival firms.

(iv) Selling cost:

Competitive advertisement is an essential feature of monopolistic competition. Selling cost becomes an integral part of the marketing of firms when product is differentiated. It is necessary to tell the buyers about the superiority of the product and induce the customer to buy the products. However, the presence of many close substitutes limits the price-setting ability of individual firms, and drives profits down to a normal rate of return in the long-run. As in the case of perfect competition, above-normal profits are only possible in the short-run before rivals are able to take effective counter measures. Examples of monopolistically competitive market structures include a broad range of industries producing clothing, consumer financial services, professional services, restaurants, and so on.

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(v) Free entry and exit:

Under monopolistic competition, new firm firms can exit. There are no restrictions on entry or exit of the small size of firms. Existence of supernormal profit attracts entry loss, business firms to quit the market.

15.5 FOUNDATION OF MONOPOLISTIC COMPETITION MODEL

A monopolistically competitive market has features that represent a cross between a perfectly competitive market and a monopolistic market (hence the name). The following are some of the main assumptions of the model:

Many, many firms produce in a monopolistically competitive industry. This assumption is similar to that found in a model of perfect competition.

Each firm produces a product that is differentiated (i.e., different in character) from all other products produced by the other firms in the industry. Thus one firm might produce a red toothpaste with a spearmint taste, and another might produce a white toothpaste with a wintergreen taste. This assumption is similar to a monopoly market that produces a unique (or highly differentiated) product.

The differentiated products are imperfectly substitutable in consumption. This means that if the price of one good were to rise, some consumers would switch their purchases to another product within the industry. From the perspective of a firm in the industry, it would face a downward-sloping demand curve for its product, but the position of the demand curve would depend on the characteristics and prices of the other substitutable products produced by other firms. This assumption is intermediate between the perfectly competitive assumption in which goods are perfectly substitutable and the assumption in a monopoly market in which no substitution is possible.

Consumer demand for differentiated products is sometimes described using two distinct approaches: the love-of-variety approach and the ideal variety approach. The love-of-variety approach assumes that each consumer has a demand for multiple varieties of a product over time. A good example of this would be restaurant meals. Most consumers who eat out frequently will also switch between restaurants, one day eating at a Chinese restaurant, another day at a Mexican restaurant, and so on. If all consumers share the same love of variety, then the aggregate market will sustain demand for many varieties of goods simultaneously. If a utility function is specified that incorporates a love of variety, then the well-being of any consumer is greater the larger the number of varieties of goods available. Thus the consumers would prefer to have twenty varieties to choose from rather than ten.

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The ideal variety approach assumes that each product consists of a collection of different characteristics. For example, each automobile has a different color, interior and exterior design, engine features, and so on. Each consumer is assumed to have different preferences over these characteristics. Since the final product consists of a composite of these characteristics, the consumer chooses a product closest to his or her ideal variety subject to the price of the good. In the aggregate, as long as consumers have different ideal varieties, the market will sustain multiple firms selling similar products. Therefore, depending on the type of consumer demand for the market, one can describe the monopolistic competition model as having consumers with heterogeneous demand (ideal variety) or homogeneous demand (love of variety).

There is free entry and exit of firms in response to profits in the industry. Thus firms making positive economic profits act as a signal to others to open up similar firms producing similar products. If firms are losing money (making negative economic profits), then, one by one, firms will drop out of the industry. Entry or exit affects the aggregate supply of the product in the market and forces economic profit to zero for each firm in the industry in the long run. (Note that the long run is defined as the period of time necessary to drive the economic profit to zero.) This assumption is identical to the free entry and exit assumption in a perfectly competitive market.

There are economies of scale in production (internal to the firm). This is incorporated as a downward-sloping average cost curve. If average costs fall when firm output increases, it means that the per-unit cost falls with an increase in the scale of production. Since monopoly markets can arise when there are large fixed costs in production and since fixed costs result in declining average costs, the assumption of economies of scale is similar to a monopoly market.

These main assumptions of the monopolistically competitive market show that the market is intermediate between a purely competitive market and a purely monopolistic market. The analysis of trade proceeds using a standard depiction of equilibrium in a monopoly market. However, the results are reinterpreted in light of these assumptions. Also, it is worth mentioning that this model is a partial equilibrium model since there is only one industry described and there is no interaction across markets based on an aggregate resource constraint.

15.6 PRICE AND OUTPUT DETERMINATION IN SHORT RUN

In monopolistic competition, every firm has a certain degree of monopoly power i.e. every firm can take initiative to set a price. Here, the products are similar but not identical, therefore there can never be a unique price but the prices will be in a

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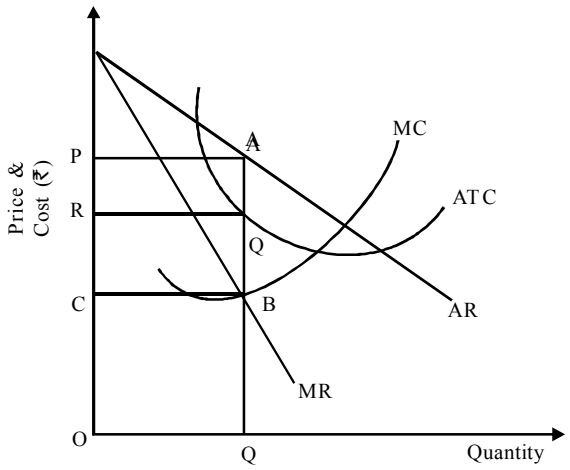
group reflecting the consumers' tastes and preferences for differentiated products. In this case the price of the product of the firm is determined by its cost function, demand, its objective and certain government regulations, if there are any. As the price of a particular product of a firm reduces, it attracts customers from its rival groups (as defined by Chamberlin). Say for example, if 'Samsung' TV reduces its price by a substantial amount or offers discount, then the customers from the rival group who have loyalty for, say 'BPL', tend to move to buy 'Samsung' TV sets. As discussed earlier, the demand curve is highly elastic but not perfectly elastic and slopes downwards. The market has many firms selling similar products, therefore the firm's output is quite small as compared to the total quantity sold in the market and so its price and output decisions go unnoticed. Therefore, every firm acts independently and for a given demand curve, marginal revenue curve and cost curves, the firm maximizes profit or minimizes loss when marginal revenue is equal to marginal cost. Producing an output of Q selling at price P maximizes the profits of the firm.



In the short run, a firm may or may not earn profits. The equilibrium point for the firm is at price P and quantity Q and is denoted by point A. Here, the economic profit is given as area PAQR. The difference between this and the monopoly case is that here the barriers to entry are low or weak and therefore new firms will be attracted to enter. Fresh entry will continue to enter as long as there are profits. As soon as the super normal profit is competed away by new firms, equilibrium will be attained in the market and no new firms will be attracted in the market. This is the situation corresponding to the long run and is discussed in the next section.

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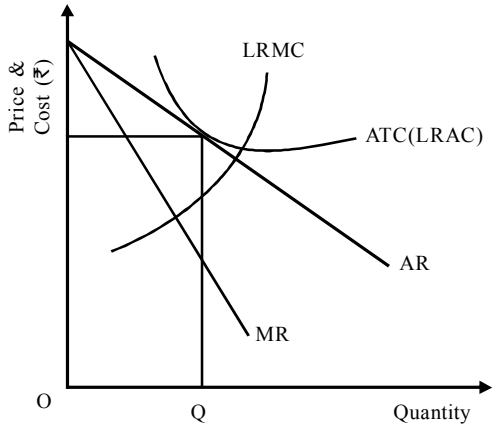
15.7 PRICE AND OUTPUT DETERMINATION IN LONG RUN

The difference between monopolistic competition and perfect competition is that in monopolistic competition the point of tangency is downward sloping and does not occur at minimum of the average cost curve and this is because the demand curve is downward sloping.

Under monopolistic competition in the long run we see that LRAC is the long run average cost curve and LRMC the long run average marginal curve. Let us take a hypothetical example of a firm in a typical monopolistic situation where it is making substantial amount of economic profits.

Here it is assumed that the other firms in the market are also making profits. This situation would then attract new firms in the market. The new firms may not sell the same products but will sell similar products. As a result, there will be an increase in the number of close substitutes available in the market and hence the demand curve would shift downwards since each existing firm would lose market share. The entry of new firms would continue as long as there are economic profits. The demand curve will continue to shift downwards till it becomes tangent to LRAC at a given price P1 and output at Q1 as shown in the figure. At this point of equilibrium, an increase or decrease in price would lead to losses. In this case the entry of new firms would stop, as there will not be any economic profits.



Due to free entry, many firms can enter the market and there may be a condition where the demand falls below LRAC and ultimately suffers losses resulting in the exit of the firms. Therefore under the monopolistic competition free entry and exit must lead to a situation where demand becomes tangent to LRAC, the price becomes equal to average cost and no economic profit is earned. It can thus be said that in the long run the profits peter out completely. One of the interesting features of the monopolistically competitive market is the variety available due to

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product differentiation. Although firms in the long run do not produce at the minimum point of their average cost curve, and thus there is excess capacity available with each firm, economists have rationalized this by attributing the higher price to the variety available. Further, consumers are willing to pay the higher price for the increased variety available in the market.

15.8 ANALYSIS OF SELLING COST AND FIRM'S EQUILIBRIUM

Selling costs play the key role in monopolistic competition and oligopoly. Under these market forms, the firms have to compete to promote their sale by spending on advertisements and publicity.

Moreover, producer has not to decide about price and output and he also keeps in view how to maximize the profit.

Thus, cost on advertisement publicity and salesmanship ads to the demand of the product. We do not find perfect competition or monopoly in the real world but monopolistic competition or oligopoly. In short, selling costs is a broader concept than the advertisement expenditures. Advertisement expenditures are part of selling costs.

In selling costs we include the salaries of sales persons, allowances to retailers to display the products etc. besides the advertisements. Advertisement expenditure includes costs incurred for advertising in newspapers and magazines, televisions, radio, cinema slides etc. It was Chamberlin who introduced the analysis of selling costs and distinguished it from the production costs. The production costs include all those expenses which are spent on the manufacturing of the commodity, its transportation cost of handling, storing and delivering of the commodity to actual customers because these add utilities to a commodity.

On the other hand, all selling costs include all expenditures in order to raise demand for a commodity. In short, selling costs are those which are made to create the demand for the product. Transport costs should not be included in selling costs; rather these should be included in the production costs. Transport costs actually do not increase the demand; it only helps in meeting the demand of the consumers.

In the same fashion, high rents are not the part of selling costs. High rents are paid so as to meet the already existing demand of the people. According to Edward H. Chamberlin, "Those costs which are made to adopt the product to the demand are costs of production; those made to adopt the demand to product are costs of selling."

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Definitions:

"Selling costs are costs incurred in order to alter the position or shape of the demand curve for the product." E.H. Chamberlin

"Selling costs may be defined as costs necessary to persuade a buyer to buy one product rather than another or to pay from one seller rather than another." Meyers

Assumptions:

Basically, the concept of selling cost is based on the following two assumptions:

1. Buyers do not have any perfect knowledge about the different types of product.
2. Buyers demand and tastes can be changed.

Difference between Selling Costs and Production Costs:

There is a fundamental difference between selling costs and production costs. Production cost includes all the expenses incurred in making particular product and transporting it to the consumers. They include, outlays incurred on services engaged in the manufacturing of the product like land, labour and capital etc. On the other hand, selling costs include all the costs incurred to change the consumer's preference from one product to another. These are generally intended to raise the demand of one product at any given price.

According to E.H. Chamberlin, "Production costs create utilities in order that demands may be satisfied while selling costs create and shift the demand curves themselves." In short, we cannot make a clear cut distinction between the selling cost and production cost. In fact, both the costs are inter-related throughout the price system, so that at no point it can be said that one has ended and the other is to begin.

Average Selling Cost:

The curve of selling cost is a tool of economic analysis. It is a curve of average selling cost per unit of product. It is akin to the average cost curves. In other words, like the cost curves, selling costs are also of U-shape. Moreover, there are two terms according to which the curve of selling cost is drawn. But, in both the cases, the shape of selling cost differs from one another. This has been illustrated with the help of a Fig. 15.1.

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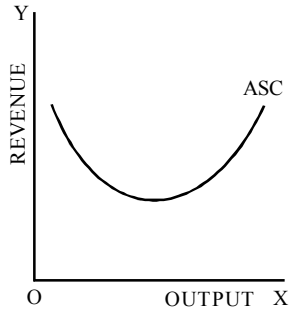

Fig. 15.1.

In Fig. 15.1 (A) ASC is the average selling cost. In the initial stage, the curve falls and later it starts rising. It means in the beginning proportionate increase in sale is more than the increase in selling costs, but after a point proportionate increase in sale is less than the selling cost. It signifies the fact that up to a certain level per unit selling cost go on to diminish but after that the same tend to increase. But, the ASC neither will touch the X-axis nor it will be zero. In other words, the ASC will form the shape of rectangular hyperbola.

Equilibrium with Selling Costs (Variable Costs):

Selling costs influence equilibrium price-output adjustment of a firm under monopolistic competition. In the Fig. 15.2. APC is the initial average production cost. AR_1 is the initial average revenue curve or initial demand curve. The initial price is OP and the firm earns profits shown by the first shaded rectangle PQRS.

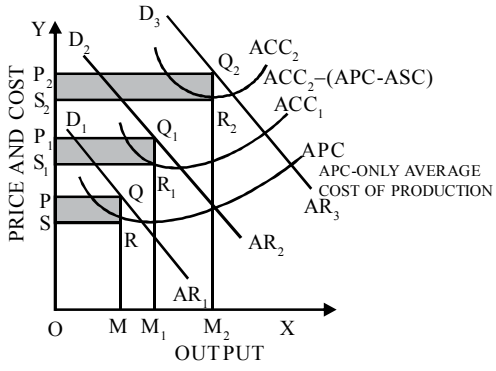

Fig. 15.2

ACC_1 is the average composite costs curve, which includes the average selling cost (ASC). Average selling cost is equal to the vertical distance between APC and ACQ. The new demand curve is AR_2. It is obtained after incurring selling costs or after making advertisements.

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It is, obvious, that the demand for the product has increased as a result of selling costs. The profits have also increased as a result of selling costs. The profits after incurring selling costs at OM_1 level of output become equal to the shaded area $P_1Q_1R_1S_1$. Now these profits are greater than the initial level of profits when no selling cost is incurred, i.e., $P_1Q_1 R_1 S_1 > PQRS$.

ACC_2 is the average composite cost when more additional cost is incurred, as a result of which the demand for the product further increases. The new demand curve is AR3 which indicates a higher demand for the product. The profits are also greater than before since the shaded area $P_2Q_2R_2S_2 > P_1Q_1R_1S$.

It is, thus, obvious that the demand for the product is increasing as a result of the selling costs. Since selling costs are included in the cost of production, therefore price of the product is also increasing as a result of selling costs. Profits are also increasing as a result of higher selling costs and increased demand. In the above diagram, the effect of selling outlay on competitive advertisement has been indicated. Before selling costs are incurred, the firm's average revenue or demand curve is AR_1 and APC is the basic initial cost of production.

So, the firm earns maximum profits as shown by the shaded area PQRS. Here, question arises, how long a firm may go on incurring expenditure on selling costs? It will continue to make expenditure on selling costs as long as any addition to the revenue is greater than the addition to the selling costs. The firm will stop incurring expenditure on selling costs when the total profits are at the highest possible level.

This would be the point at which the additional revenue due to advertising expenditure equals the extra expenditure on advertisement. It should, however, be noted clearly that the effects of advertisement on prices and output are uncertain. Advertisement by a firm may be considered successful if the elasticity of demand for its product falls.

Equilibrium with Selling Costs (Fixed Costs):

In modern times, a lot of money is spent on selling costs. Of course, it becomes difficult to determine the most profitable output. At the same time, we also know that selling costs create a new demand curve. However, here equilibrium is determined when there are fixed selling costs as shown in Fig. 15.3.

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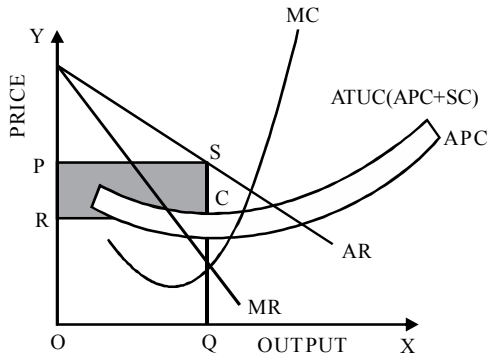

Fig. 15.3

In Fig. 15.3, AR is the average revenue or demand curve. MR is the marginal revenue curve. The average production cost (APC), the shaded area B shows the selling cost. This shows that by adding selling cost in average production cost, we get average total cost. (ATUC = APC + SC) SC is the net return per unit while SQ is the price minus SC – the average total unit cost and OQ is the level of output. Thus shaded area PRCS is the maximum net return and OQSP is the total revenue minus total cost OQCR.

Product Differentiation:

According to Chamberlin product differentiation is one of the most important feature of monopolistic competition. Product differentiation indicates that goods are close substitutes but are not homogeneous. They differ in colour, name, packing, size etc. For instance, you may get a variety of soaps in the market like Moti, Sandal, Lux, Hamam, Rexona, Lifebouy etc. All these are close substitutes but at the same time, they differ from each other.

Main Peculiarities of Product Differentiation:

The main peculiarities of product differentiation are as under:

1. Due to product differentiation, goods are not homogeneous.
2. Product differentiation aims at to control price and increase profits.
3. Product differentiation satisfies people's urge for variety.
4. Product differentiation may be real or artificial.
5. Product differentiation provides the producer name and brand legally patented.

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Demand Curve under Product Differentiation:

The credit goes to Prof. Saraffa to introduce the concept of product differentiation under monopolistic competition on the basis of downward sloping demand curve. But Chamberlin introduced it on the basis of price and output determination.

Chamberlin opined that demand for product is influenced not by price only but also the style of the product and selling costs. It is so because aim of product differentiation is to inspire the consumer to demand a particular product. The producer is no longer entirely price taker; he becomes partially a price maker. As a result demand curve assumes negative slope. It indicates that when price falls demand will be more and vice-versa.

Equilibrium and Product Differentiation:

Product differentiation also affects the equilibrium of the firm under monopolistic competition. It has been shown in Fig. 9, supposing there are two types of products X and Y and no selling costs are incurred for the sale of these products. The producer has to decide about the quality of the product so as to maximize his profit. If the price of the product is already fixed, then the firm has to choose the product which has larger sales and will bring maximum profits.

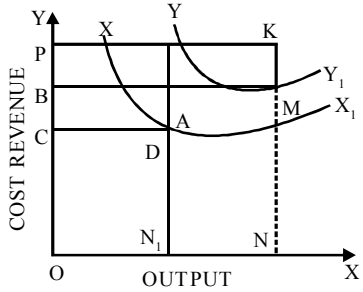

Fig. 15.4

In Fig. 15.4, XX_1 and YY_1 are the cost curves for products X and Y. The cost curve of Y is highest which shows that Y product is of a better quality. Both the products can be sold at price OP. At price OP, ON_1 amount of X commodity can be sold and the profit is CDTP. At price OP, ON_1 amount of Y commodity can be sold and the profit is BMKP which is higher than the profit which can be earned by sale of X commodity. Hence, the producer will choose to produce Y commodity.

15.9 CRITICAL APPRAISAL OF CHAMBERLIN'S THEORY OF MONOPOLISTIC COMPETITION

Edward Hastings Chamberlin (b. 1899) in 1933 published The Theory of Monopolistic Competition as a reorientation of the theory of value, designed to

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base it on a synthesis of monopolistic and competitive theories. He argues that the old idea of monopoly and competition as alternative is wrong; and that most situations are composites in which elements of both monopoly and compe-tition are combined. But he asserts that the correct procedure is to start from the theory of monopoly. This, he thinks, has the merit of eliminating none of the competitive elements, since these operate through the demand for the monopolist's product; while on the contrary the alternative assumption of competition rules out the monopoly elements.

Thus, in taking monopoly as a starting point, Chamberlin's approach is similar to that of Cournot.

But, while with Cournot the transition to perfect competition takes place only on a scale of numbers of competitors, with Chamberlin it takes place also on a scale of substitution of products. Any producer whose product is significantly different from the products of others has some monopoly of it, subject to the competition of substitutes. He considers each producer in an industry as having some monopoly in his own product. If he be the sole seller of a unique product, he has a pure mo-nopoly.1 If there be two sellers of similar products, the situation is one of "duopoly." If there be several, an "oligopoly" exists. The condition may range through various degrees of oligopoly to pure competition, under which there are so many sellers of a highly standardized product that any one could sell all his product without affecting the demand. Pure competition is found only under the dual condition of (a) a large number, and (b) a perfectly standardized product. The usual condition Chamberlin considers to be in the intermediate area, in which some element of "monopoly" exists, and which he calls "mo-nopolistic competition."

Economic inertia and friction are "imperfections" which he does not consider as part of "monopolistic competition."

Thus Chamberlin's thought centers on the product. Each producer, under "monopolistic competition," faces competition from "substitute" products which are not identical and which are sold by other concerns with various price policies, and sales expenses. These merely limit his "monopoly" of his own product.

The individual demand curve (or sales) for one seller's product is then regarded as affected by the market policies of other indi-vidual sellers whose products are partial substitutes. Total sales of the partly competing group of substitute products are treated as limiting the sales of the product of any one seller. Under "pure" competition (many sellers and a completely standardized product) a horizontal demand curve (average revenue) would exist for each individual competitor's product. This would mean identical prices. Chamberlin argues that "pure" compe-tition would force all individual competitors to treat differential advantages, or rents, as costs, the same as other costs.

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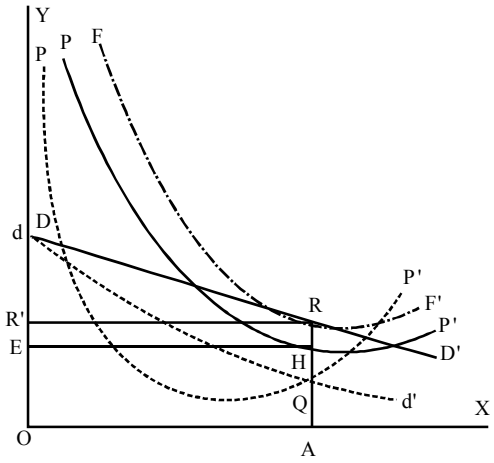
Chamberlin emphasizes the effect of judgments by one seller concerning his rivals' policies, possible retaliation, etc. He also argues that selling costs such as advertising are not part of the cost of production, but are incurred to increase the sales of the given product; and thus they affect the demand curve. Through-out, his basic idea is that, no matter how slight, any differentiation of a seller's product gives him to that extent a monopoly. And all these conditions, commonly found in competitive markets, are either "impurities" in the nature of monopoly elements, or are associated with such elements. They make "pure" competi-tion impossible.

To Chamberlin, actual "competition"1 includes the effort of competitors to increase their monopoly powers.



DD'= demand curve (avg. rev.)

PP'= avg. cost of production, including a "min-imum profit" (charge required to attract capital and enterprise) and all "rents"

FF'= avg. total cost, including fixed uniform sell-ing costs

AR= price

EHRR'= profit (above "minimum")

OA= quantity sold

pp'= marginal cost of production

dd'= marginal revenue

Q= intersection of pp' and dd'

And the essence of "monopoly," and therefore of "monopo-listic competition," is seen as lying in differences — (1) differ-ences in price policy, (2) differences in nature of product, and (3) differences in such sales effort as advertising outlays. It is a contribution of Chamberlin's to have developed the second and third of these variables as arising out of the mixture of monopoly and competition.

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Chamberlin starts with a single firm and develops the idea of monopoly price and competitive prices as determined by the intersection of revenue or sales curves with expense curves. Either the marginal revenue curve, or the average revenue curve (from which it is derived), may be used to determine the mo-nopoly output and price, the former by intersecting the rising marginal cost curve, the latter by the familiar Marshallian method of fitting the maximum profit area between it and the average cost curve, which includes rents or differentials and thus equals the average price.

The analysis with respect to all three variables then is extended beyond the firm to groups of sellers, which may be taken as cor-responding to conventional "industries," depending on how broadly a "class of product" is conceived in a particular case. The group is analyzed, first under the assumption of symmetry (all its members assumed to have uniform cost and demand curves). Then some consideration is given to what might hap-pen if a "diversity of conditions" existed. If selling costs are not great, and if they reduce the slope of the sellers' demand curves, increasing them may result in a lower price. Varia-tions in product may lead to either smaller or larger outputs. Group equilibrium (with "alert" competitors) must result in the optimum with respect to all the variables, and no profits above a necessary minimum for every producer.

The conclusion is drawn that under monopolistic competition the equilibrium price is higher, and the volume of output prob-ably (not necessarily) lower, than under pure competition. The net profits of enterprise, however, may or may not be higher than under pure competition because of the expense which is required to maintain the monopoly elements and which is often increased by a multiplication of substitute products surrounding the monopolist. Chamberlin argues that monopolistic competition need not bring higher profits to the marginal firm in a given industry. Instead it may allow the existence of a larger number of firms making normal profits.

15.10 SUMMARY

Monopolistic competition is a market structure quite similar to perfect competition in that vigorous price competition among a large number of firms and individuals is present.

Monopolistic competition is characterised by large number of firms producing close substitutes but not identical product. Each firm must control a small yet significant portion of the market share such that by substantially extending or restricting its own sales, it is not able to affect the sales of any other individual seller. This condition is the same as in perfect market.

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Under monopolistic competition, new firm firms can exit. There are no restrictions on entry or exit of the small size of firms. Existence of supernormal profit attracts entry loss, business firms to quit the market.

Under monopolistic competition in the long run we see that LRAC is the long run average cost curve and LRMC the long run average marginal curve. Let us take a hypothetical example of a firm in a typical monopolistic situation where it is making substantial amount of economic profits.

15.11 GLOSSARY

(a) Monopolistic competition: Monopolistic competition is a market structure quite similar to perfect competition in that vigorous price competition among a large number of firms and individuals is present.

(b) Product Differentiation: Product differentiation is a marketing process that showcases the differences between products. Differentiation looks to make a product more attractive by contrasting its unique qualities with other competing products.

(c) Selling costs: Products under monopolistic competition are spending huge amounts on advertising and publicity. Much of this expenditure is wasteful from the social point of view. The producer can reduce the price of the product instead of spending on publicity.

15.12 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Monopolistic completion market?
2. State any two features of Monopolistic completion market.
3. What is firm's equilibrium?

(B) Extended Answer Questions

1. Discuss about monopolistic completion market and its features.
2. Explain about foundation of monopolistic competition model.
3. Discuss about price and output determination under monopolistic competition.
4. Discuss the analysis of selling cost and firm's equilibrium.
5. Explain about critical appraisal of Chamberlin's theory of Monopolistic Competition.

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(C) True or False

1. Monopolistic competition is characterised by large number of firms producing close substitutes but not identical product.
2. Product differentiation is a marketing process that showcases the differences between products.
3. Differentiation looks to make a product more attractive by contrasting its unique qualities with other competing products.
4. Products under monopolistic competition are spending huge amounts on advertising and publicity.

(D) Multiple Choice Questions

1. What is Monopolistic Competition?
   (a) It is characterised by large number of firms producing close substitutes but not identical product.
   (b) It is a market structure where only a few large rivals are responsible for the bulk, if not all, industry output.
   (c) Both (a) and (b)
   (d) Nome of the above
2. What is a marketing process that showcases the differences between products?
   (a) Product differentiation
   (b) It is characterised by large number of firms producing close substitutes but not identical product.
   (c) It is a market structure where only a few large rivals are responsible for the bulk, if not all, industry output.
   (d) None of the above

(E) Fill in the Blanks

1. .....competition is a market structure quite similar to perfect competition in that vigorous price competition among a large number of firms and individuals is present.
2. Under monopolistic competition, there are no restrictions on entry or exit of the .....of firms.
3. ……..looks to make a product more attractive by contrasting its unique qualities with other competing products.

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4. Products under monopolistic competition are spending huge amounts on…….

15.13 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True

(D) 1. (a), 2. (a)

(E) 1. Monopolistic, 2. Small size, 3. Differentiation, 4. Advertising and publicity

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14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

15.15 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

15.16 TERMINAL QUESTIONS

1. Prepare the statement on monopolistic competition.

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2. Critical appraisal of Chamberlin's theory of Monopolistic Competition

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UNIT 16 OLIGOPOLY MARKET

Structure:

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Objectives

After reading this unit you will be able to understand:

- Oligopoly market its meaning and characteristics
- Duopoly model
- Oligopoly models
- Game theory approach to oligopoly

16.1 INTRODUCTION

An oligopoly is a market structure in which a few firms dominate. When a market is shared between a few firms, it is said to be highly concentrated. Although only a few firms dominate, it is possible that many small firms may also operate in the market.

16.2 OLIGOPOLY

According to Mrs. John Robinson, "Oligopoly is market situation in between monopoly and perfect competition in which the number of sellers is more than one but is not so large that the market price is not influenced by any one of them".

According to Prof. George J. Stigler, "Oligopoly is a market situation in which a firm determines its marketing policies on the basis of expected behaviour of close competitors".

According to Prof. Stoneur and Hague, "Oligopoly is different from monopoly on one hand in which there is a single seller, on the other hand, it differs from perfect competition and monopolistic competition also in which there is a large number of sellers. In other words, while describing the concept of oligopoly, we include the concept of a small group of firms".

16.3 OLIGOPOLY MARKET

Oligopoly is a market structure where only a few large rivals are responsible for the bulk, if not all, industry output. As in the case of monopoly, high to very high barriers to entry are typical. Under oligopoly, the price/output decisions of firms are interrelated in the sense that direct reactions from leading rivals can be expected. As a result, the decision making of individual firms is based, in part, on the likely response of competitors.

The term oligopoly is derived from two Greek words, Oleg's and 'Pollen'. Oleg's means a few and Pollen means to sell thus. Oligopoly is said to prevail when there are few firms or sellers in the market producing and selling a product. Oligopoly is

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often referred to as "competition among the few". In brief oligopoly is a kind of imperfect market where there are a few firm in the market, producing either and homogeneous product or producing product which are close but not perfect substitutes of each other.

There is no such border line between a few and many. Usually oligopoly is understood to prevail when the numbers of sellers of a product are two to ten. Oligopoly is of two types-oligopoly without product differentiation or pure.

16.4 CHARACTERISTICS OF OLIGOPOLY

1. Interdependence: The firms under oligopoly are interdependent in making decision. They are interdependent because the number of competition is few and any change in price & product etc by a firm will have a direct influence on the fortune of its rivals, which in turn retaliate by changing their price and output. Thus under oligopoly a firm not only considers the market demand for its product but also the reactions of other firms in the industry. No firm can fail to take into account the reaction of other firms to its price and output policies. There is, therefore, a good deal of interdependences of the firm under oligopoly.

2. Importance of advertising and selling costs: The firms under oligopolistic market employ aggressive and defensive weapons to gain a greater share in the market and to maximise sale. In view of this firms have to incur a great deal on advertisement and other measures of sale promotion. Thus advertising and selling cost play a great role in the oligopolistic market structure. Under perfect competition and monopoly expenditure on advertisement and other measures is unnecessary. But such expenditure is the life-blood of an oligopolistic firm.

3. Group behaviour: Another important feature of oligopoly is the analysis -of group behaviour. In case of perfect competition, monopoly and monopolistic competition, the business firms are assumed to behave in such a way as to maximize their profits. The profit-maximizing behaviour on his part may not be valid. The firms under oligopoly are interdependent as they are in a group.

4. Indeterminateness of demand curve: This characteristic is the direct result of the interdependence characteristic of an oligopolistic firm. Mutual interdependence creates uncertainty for all the firms. No firm can predict the consequence of its price-output policy. Under oligopoly a firm cannot assume that its rivals will keep their price unchanged if he makes charge in its own price. The demand curve as is well known, relates to the various quantities of the product that could be sold it different levels of prices when the quantity to be sold is itself unknown and uncertain the demand curve can't be definite and determinate.

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5. Elements of monopoly: There exist some elements of monopoly under oligopolistic situation. Under oligopoly with product differentiation each firm controls a large part of the market by producing differentiated product. In such a case it acts in its sphere as a monopolist in lining price and output.

6. Price rigidity: Under oligopoly there is the existence price rigidity. Prices lend to be rigid and sticky. If any firm makes a price-cut it is immediately retaliated by the rival firms by the same practice of price-cut. There occurs a price-war in the oligopolistic condition. Hence under oligopoly no firm resorts to price-cut without making price-output decision with other rival firms. The net result will be price - finite or price-rigidity in the oligopolistic condition.

16.5 CAUSES OF OLIGOPOLY

1. **Economies of Scale:** The firms in the industry, with heavy investment, using improved technology and reaping economies of scale in production, sales, promotion, etc, will compete and stay in the market.
2. **Barrier to Entry:** In many industries, the new firms cannot enter the industry as the big firms have ownership of patents or control of essential raw material used in the production of an output. The heavy expenditure on advertising by the oligopolistic industries may also be a financial barrier for the new firms to enter the industry.
3. **Merger:** If the few firms in the industry smell the danger of entry of new firms, they then immediately merge and formulate a joint policy in the pricing and production of the products. The joint action of the few big firms discourages the entry of new firms into the industry.
4. **Mutual Interdependence:** As the number of firms is small in an oligopolistic industry, therefore, they keep a strict watch of the price charged by rival firms in the industry. The firm generally avoids price ware and tries to create conditions of mutual interdependence.

16.6 EFFECTS OF OLIGOPOLY

1. **Small output and high prices:** As compared with perfect competition, oligopolist sets the prices at higher level and output at low level.
2. **Restriction on the entry:** Like monopoly, there is a restriction on the entry of new firms in an oligopolistic industry.
3. **Prices exceed Average Cost:** Under oligopoly, the firms fixed the prices at the level higher than the AC. The consumers have to pay more than it is necessary to retain the resources in the industry. In other words, the

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economy's productive capacity is not utilized in conformity with the consumers' preferences.

4. **Lower efficiency:** Some economists argued that there is a low level of production efficiency in oligopoly. There is no tendency for the oligopolists to build optimum scales of plant and operate them at the optimum rates of output. However, the Schumpeterian hypothesis states that there is high tendency of innovation and technological advancement in oligopolistic industries. As a result, the product cost decreases with production capacity enhancement. It will offset the loss of consumer surplus from too high prices.
5. **Selling Costs:** In order to snatch markets from their rivals, the oligopolistic firms may engage in aggressive and extensive sales promotion effort by means of advertisement and by changing the design and improving the quality of their products.
6. **Wider range of products:** As compared with pure monopoly or pure competition, differentiated oligopoly places at the consumers' disposal a wider variety of commodities.
7. **Welfare Effect:** Under oligopoly, vide sums of money are poured into sales promotion to create quality and design differentiations. Hence, from the point of view of economic welfare, oligopoly fares fairly badly. The oligopolists push non-price competition beyond socially desirable limits.

16.7 PRICE DETERMINATION UNDER OLIGOPOLY

The price and output behaviour of the firms operating in oligopolistic or duopolistic market condition can be studied under two main heads:

1. Price and Output Determination under Duopoly:

(a) If an industry is composed of two giant firms each selling **identical or homogenous** products and having half of the total market, the price and output policy of each is likely to affect the other appreciably, therefore there is every likelihood of **collusion** between the two firms. The firms may agree on a price, or divide the total market, or assign quota, or merge themselves into one unit and form a monopolxy or try to differentiate their products or accept the price fixed by the leader firm, etc.

(b) In case of **perfect substitutes** the two firms may be engaged in **price competition.** The firm having lower costs, better goodwill and clientele will drive the rival firm out of the market and then establish a monopoly.

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(c) If the products of the duopolists are **differentiated,** each firm will have a close watch on the actions of its rival firms. The firm good quality product with lesser cost will earn abnormal profits. Each firm will fix the price of the commodity and expand output in accordance with the demand of the commodity in the market.

2. Price and Output Determination under Oligopoly:

(a) If an industry is composed of few firms each selling **identical or homogenous products** and having powerful influence on the total market, the price and output policy of each is likely to affect the other appreciably, therefore they will try to promote **collusion.**

(b) In case there is **product differentiation**, an oligopolist can raise or lower his price without any fear of losing customers or of immediate reactions from his rivals. However, keen rivalry among them may create condition of **monopolistic competition.**

There is no single theory which satisfactorily explains the oligopoly behaviour regarding price and output in the market. There are set of theories like Cournot Duopoly Model, Bertrand Duopoly Model, the Chamberlin Model, the Kinked Demand Curve Model, the Centralized Cartel Model, Price Leadership Model, etc., which have been developed on particular set of assumptions about the reaction of other firms to the action of the firm under study.

16.8 PRICE DETERMINATION MODELS OF OLIGOPOLY

1. Kinky Demand Curve:

The kinky demand curve model tries to explain that in non-collusive oligopolistic industries there are not frequent changes in the market prices of the products. The demand curve is drawn on the assumption that the kink in the curve is always at the ruling price. The reason is that a firm in the market supplies a significant share of the product and has a powerful influence in the prevailing price of the commodity. Under oligopoly, a firm has two choices:

(a) The first choice is that the firm **increases the price** of the product. Each firm in the industry is fully aware of the fact that if it increases the price of the product, it will lose most of its customers to its rival. In such a case, the upper part of demand curve is more elastic than the part of the curve lying below the kink.

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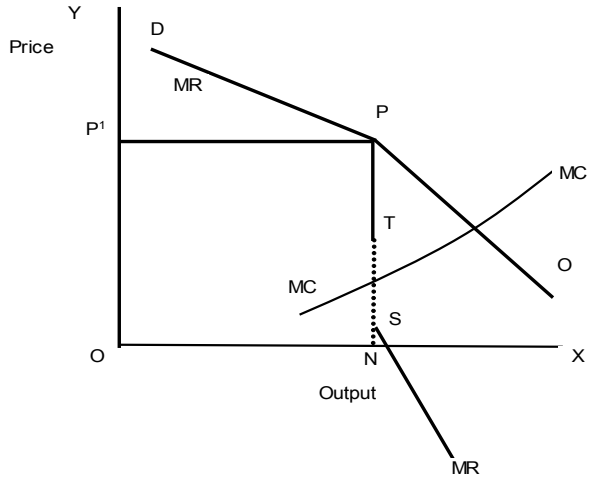
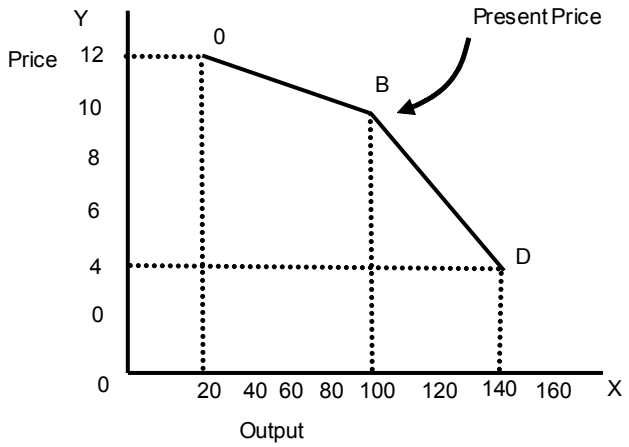
(b) The second option for the firm is to **decrease the price.** In case the firm lowers the price, its total sales will increase, but it cannot push up its sales very much because the rival firms also follow suit with a price cut. If the rival firms make larger price cut than the one which initiated it, the firm which first started the price cut will suffer a lot and may finish up with decreased sales. The oligopolists, therefore avoid cutting price, and try to sell their products at the prevailing market price. These firms, however, compete with one another on the basis of quality, product design, after-sales services, advertising, discounts, gifts, warrantees, special offers, etc.



In the above diagram, we shall notice that there is a discontinuity in the marginal revenue curve just below the point corresponding to the kink. During this discontinuity the marginal cost curve is drawn. This is because of the fact that the firm is in equilibrium at output ON where the MC curve is intersecting the MR curve from below. The kinky demand curve is further explained in the following diagram:



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In the above diagram, the demand curve is made up of two segments DB and BD'. The demand curve is kinked at point B. When the price is ₹ 10 per unit, a firm sells 120 units of output. If a firm decides to charge ₹ 12 per unit, it loses a large part of the market and its sales come down to 40 units with a loss of 80 units. In case, the producer lowers the price to ₹ 4 per unit, its competitors in the industry will match the price cut. Its sales with a big price cut of ₹ 6 increases the sale by only 40 units. The firm does not gain as its total revenue decreases with the price cut.

2. Price Leadership Model:

Under price leadership, one firm assumes the role of a price leader and fixes the price of the product for the entire industry. The other firms in the industry simply follow the price leader and accept the price fixed by him and adjust their output to this price. The price leader is generally a very large or dominant firm or a firm with the lowest cost of production. It often happens that price leadership is established as a result of price war in which one firm emerges as the winner.

In oligopolistic market situation, it is very rare that prices are set independently and there is usually some understanding among the oligopolists operating in the industry. This agreement may be either tacit or explicit.

Types of Price Leadership: There are several types of price leadership. The following are the principal types:

(a) Price leadership of a dominant firm, i.e., the firm which produces the bulk of the product of the industry. It sets the price and rest of the firms simply accepts this price.

(b) Barometric price leadership, i.e., the price leadership of an old, experienced and the largest firm assumes the role of a leader, but undertakes also to protect the interest of all firms instead of promoting its own interests as in the case of price leadership of a dominant firm.

(c) Exploitative or Aggressive price leadership, i.e., one big firm built its supremacy in the market by following aggressive price leadership. It compels other firms to follow it and accept the price fixed by it. In case the other firms show any independence, this firm threatens them and coerces them to follow its leadership.

Price Determination under Price Leadership: There are various models concerning price-output determination under price leadership on the basis of certain assumptions regarding the behaviour of the price leader and his followers. In the following case, there are few assumptions for determining price-output level under price leadership:

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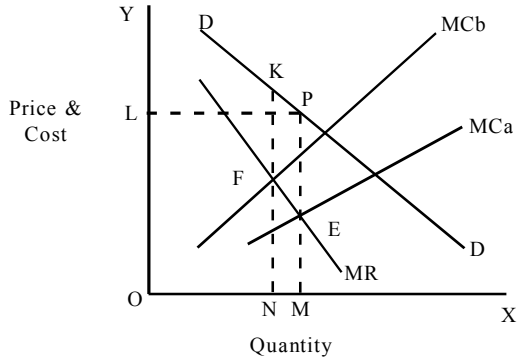
(a) There are only **two firms A and B** and firm A has a lower cost of production than the firm B.

(b) The **product is homogenous or identical** so that the customers are indifferent as between the firms.

(c) Both A and B have **equal share in the market**, i.e., they are facing the same demand curve which will be the half of the total demand curve.



In the above diagram, MCa is the marginal cost curve of firm A and MCb is the marginal cost curve of firm B. Since we have assumed that the firm A has a lower cost of production than the firm B, therefore, the MCa is drawn below MCb.

Now let us take the firm A first, firm A will be maximizing its profit by selling OM level of output at price MP, because at output OM the firm A will be in equilibrium as its marginal cost is equal to marginal revenue at point E. Whereas the firm B will be in equilibrium at point F, selling ON level of output at price NK, which is higher than the price MP. Two firms have to charge the same price in order to survive in the industry. Therefore, the firm B has to accept and follow the price set by firm A. This shows that firm A is the price leader and firm B is the follower.

Since the demand curve faced by both firms is the same, therefore, the firm B will produce OM level of output instead of ON. Since the marginal cost of firm B is greater than the marginal cost of firm A, therefore, the profit earned by firm B will be lesser than the profit earned by firm A.

16.9 DUOPOLY MODEL

The uncertainty is respect of behaviour pattern of a firm under oligopoly arising our of their unpredictable action and reaction makes a systematic analysis of oligopoly difficult.

However, classical and modern economists have developed a variety of models based on different behavior assumptions.

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These models can broadly be classified into two categories (I) classical duopoly models and modern oligopoly Duopoly Models, when there are only two sellers a product, there, exists duopoly.

Duopoly is a special case of oligopoly. Duopoly is a special case in the sense that it is limiting case of oligopoly as there must be at least two sellers to make the market oligopolistic in nature.

1. The Cournot's Duopoly Model
2. The Chamberlin Duopoly Model
3. The Bertrand's Duopoly Model
4. The Edgeworth Duopoly Model

1. Cournot's Duopoly Model:

Augustin Cournot, a French economist, was the first to develop a formal duopoly model in 1838.

To illustrate his model, Cournot assumed:

(a) Tow firms, each owing an artesian mineral water well;

(b) Both operate their wells at zero marginal cost[2];

(c) Both face a demand curve with constant negative slope;

(d) Each seller acts on the assumption that his competitor will not react to his decision to change his and price. This is Cournot's behavioural assumption.

On the basis of this model, Cournot has concluded that each seller ultimately supplies one-third of the market and charges the same price. While one-third of the market remains unsupplied.

Diagram Representation:

Cournot's duopoly model is presented in Fig. 16.1. To begin the analysis, suppose that there are only two firms. A and B, and that, initially. A is the only seller of mineral water in the market. In order to maximize his profits (or revenue), he sells quantity OQ where his MC = O MR, at price OP_2 His total profit is OP_2PQ.

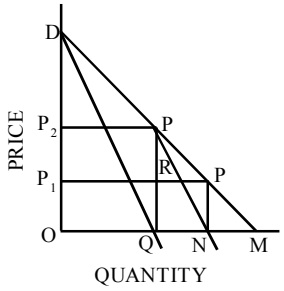

Fig. 16.1: Price and Output Determination under Duopoly Cournot's Model

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Now let B enters the market. The market open to him is QM which is half of the total market. He can sell his product in the remaining half of the market. He assumes that A will not change his price and output as he is making the maximum profit i.e., A will continue to sell OQ at price OP_2 Thus, the market available to B is QM and the demand curve is PM.

When to get maximize revenue, B sells ON at price OP1, His total revenue is maximum at QRP'N. Note that B supplies only QN = 1/4 = (l/2)/2 of the market.) With the entry of B, price falls to OP_1 Therefore, A's expected profit falls to OP_1 PQ Faced with this situation, A attempts to adjust his price and output to the changed conditions. He assumes that B will not change his output QN and price OP_1 as he is making maximum profit.

Accordingly, A assumes that B will continue to supply 1/4 of market and he has 3/4 (= 1 – 14) of the market available to him. To maximise his profit. Supplies 1/2 of (3/4), i.e., 3/8 of the market. Note that A's market share has fallen from 1/2 to 3/8.

Now it is B's turn to react. Considering Cournot's assumption, B assumes that A will continue to supply only 3/8 of the market and market open to him equals 1 – 3/8 = 5/8.

In order to maximise his profit under the new conditions B supplies 1/2 x 5/8 = 5/16 of the market. It is now for A to reappraise the situation and adjust his price and output accordingly.

This process of action and reaction continues in successive periods. In the process, A continues to lose his market share and B continues to gain. Finally situation is reached when their market shares equal at 1/3 each.

Any further attempt to adjust output produces the same result. The firms, therefore, reach their equilibrium position where each one supplies one-third of the market.

The equilibrium of firms, according to Cournot's model, has been presented in table below:

Period	Firm A	Firm B
I	$\frac{1}{2}(1)\ \ \frac{1}{2}$	$\frac{1}{2}\ \frac{1}{2}\ \ \frac{1}{4}$
II	$\frac{1}{2}\ 1\ \frac{1}{4}\ \ \frac{3}{4}$	$\frac{1}{2}\ 1\ \frac{3}{8}\ \ \frac{5}{16}$
III	$\frac{1}{2}\ 1\ \frac{5}{16}\ \ \frac{11}{32}$	$\frac{1}{2}\ \ \frac{11}{32}\ \ \frac{21}{24}$
IV	$\frac{1}{2}\ 1\ \frac{11}{32}\ \ \frac{43}{128}$	$\frac{1}{2}\ 1\ \frac{43}{128}\ \ \frac{85}{256}$

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-	———	———
-	———	———
N	$\frac{1}{2}$ 1 $\frac{1}{3}$ $\frac{1}{3}$	$\frac{1}{2}$ 1 $\frac{1}{3}$ $\frac{1}{3}$

Cournot's equilibrium solution is stable. For given the action and reaction, it is not possible for any of the two sellers to increase their market share.

It can be shown as follows:

A's share= 1/2(1 – 1/3) = 1/3.

Similarly B's share = 1/2 (1 – 1/3) = 1/3.

Cournot's model of duopoly can be extended to the general oligopoly. For example, if there are three sellers, the industry, and firms will be in equilibrium when each firm supplies 1/3 of the market. Thus, the three sellers together supply 3/4 of the market, 1/4 of the market remaining unsupplied. The formula for determining the share of each seller in an oligopolistic market is: Q -f- (n + 1), where Q = market size, and n = number of sellers.

Criticism of the Model:

Although ournot's model yields a stable equilibrium, it has been criticised on the following grounds:

(1) Curnot's behavioural assumption [assumption (d) above] is naive to the extent that it implies that firms continue to make wrong calculations about the competitor's behaviour. Each seller continues to assume that his rival will not change his output even though he reportedly observes that his revel firm does change its output.

(2) The assumption of zero cost of production is totally unrealistic. If this assumption is dropped, it does not alter his position.

2. Chamberlin's Duopoly Model- A Small Group Model:

Chamberlin's model of duopoly recognizes interdependence if firms in such a market. Chamberlin argues that in the real world of oligopoly firms are not so native that they will not learn from the past experience. However, he makes the same assumptions as the exponents of old classical models have done. In other words, his model is also based on the assumption of homogeneous products, firms of equal size with identical costs, no entry by new firms and full knowledge of demand.

Recognition of interdependence of firms in an oligopolistic market given us a result quite different from that of Cournot. Chambrilin argues that firms are aware of the

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fact that their output or price decision will definitely invite reactions of other firms. Therefore, he goes not visualize any price war in oligopolistic markets. He also rules out the possibility of firms adjusting their outputs over a period of time and thus reaching the equilibrium at an output level lower than that would be reached under monopoly.

According to Chamberlin, recognition of possible sharp reactions to an oligopolistic firm's price or output manipulations would avert harmful competition amongst the firms in such a market and would result in a stable industry equilibrium with the monopoly price and monopoly output. He further stated that no collusion is required for obtained this solution.

In case farms in an oligopolistic market are aware of their mutual dependence, and willing to learn from their past experience, then in order to maximize their individual and joint profits they will charge the monopoly price.

Chamberlin's model can be explained in the frame work of a dupoly market. Chamberlin, like Cournot, assumes linear demand for the product. For simplicity we assume that even in this case the cost of producing the good is zero.

Chamberlin model has been illustrated in Figure 16.2. In this figure DQ is the market demand curve. If firm A is first to enter the market, it will produce output OQ_1 because at this level of output its marginal revenue is equal to marginal cost (MR = MC = 0). The firm can charge price OP_1 which is the monopoly price.

This will maximise its profits. At price OP) elasticity of demand is unity. Firm B entering market at this stage considers that its demand curve is CQ and will thus produce Q_1Q_2 so as to maximise its profit. It will charge price OP_2.

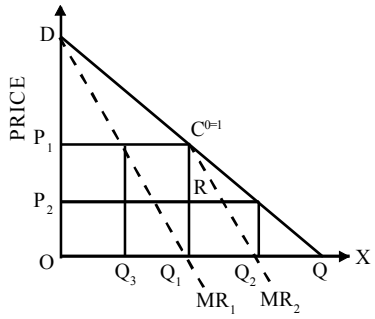

Fig. 16.2: Chamberlin's model

It now realizes that it cannot sell QQ_1 quantity at the monopoly price and thus decides to reduce the output to QQ_3, which is one-half of the monopoly output QQ_1. Firm B can continue to produce quantity Q_1Q_2 which is same as Q_3Q_1.

The industry output thus is OQ_1 and the price rises to the level OP_1. This is an ideal situation from the point of view of both firms A and B. In this case, the joint output of the two firms is monopoly output and they charge monopoly price. Thus,

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considering the assumption of equal costs (costs = 0) the market will be shared equally between firms A and B.

Appraisal of the Model:

Chamberlin's model is certainly more realistic than earlier models. It assumes that firms recognize interdependence and then act in a manner that monopoly solution is reached. In the real world of oligopoly there are certain difficulties in reaching this solution. In the absence of collusion, firms must have a good knowledge of market demand curve which is almost impossible to obtain. In case this information is lacking, firms will not know how to reach monopoly solution.

Further, Chamberlin ignores entry. In real practice, oligoplistic markets are rarely closed. So if we recognize the fact of entry, it would not be certain that the stable monopoly solution will ever be reached. Differences in costs and market opportunities are also hindrance for attaining a monopoly-type outcome by the independent actions of firms in oligopolies.

3. Bertrand's Duopoly Model:

Bertrand, a French Mathematician developed his own model of duopoly in 1883. Bertrand's model differs from Cournot's model in respect of its behavioural assumption. While under Cournot's model, each seller assumes his rival's output to remain constant, under Bertrand's model each seller determines his price on the assumption that his rival's price, rather than his output, remains constant.

Bertrand's model focuses on price competition. His analytical tools are reaction function of the duopolists. Reaction functions are derived on the basis of iso-profit curves. An iso-profit curve, for a give level of profit, is drawn on the basis of various combinations of prices charged by the rival firms. He assumed only two firms, A and B and their prices are measured along the horizontal and vertical axes, respectively.

Their iso-profit curves are drawn on the basis of the prices of the two firms. Iso-profit curves of the two firms are concave to their respective prices axis, as shown in Fig. 16.3 and 4. Iso- profit curves of firm A are convex to its price axis P_A (Fig. 16.3) and those of firm B are convex to P_B (Fig. 16.4).

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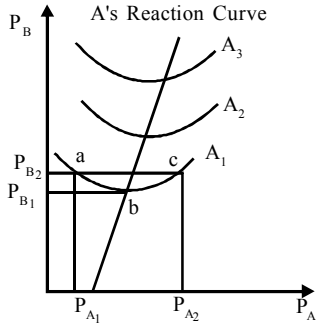

Fig. 16.3: A's Reaction Curves

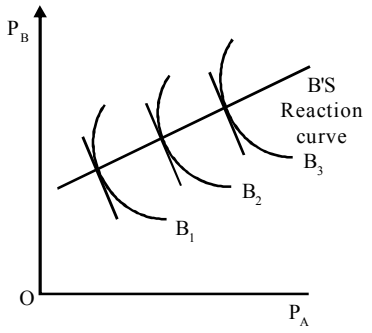

Fig. 16.4. B's Reaction Curves

In Figure 16.4, we have curve A, which shows that A can earn a given profit from the various combinations of its own and its rival's price. For example, price combinations at points, a, b and c yield the same level of profit indicated by the iso-profit curve A_1. If firms B fixes its prices Pb_1– firm A has two alternative prices, Pa_1 and Pa_2, to make the same level of profits.

When B reduces its price, A may either raise its price or reduce it. A will reduce its price when he is at point c and raise its price when he is at point a. But there is a limit to which this price adjustment is possible. This point is shown by point b. So there is a unique price for A to maximize its profits. This unique price lies at the lowest point of iso-profit curve.

The same analysis applies to all other iso-profit curves, A_1 A_2 and A3 we get A's reaction curve. Note that A's reaction curve has a rightward slant. This is so because, iso-profit curve tends to shift rightward when A gains market from his rival B.

Following the same process, B's reaction curve may be drawn as shown in Fig. 16.4.

The equilibrium of duopolists suggested by Bertrand's model may be obtained by putting together the reaction curves of the firms A and B as shown in Fig. 16.5.

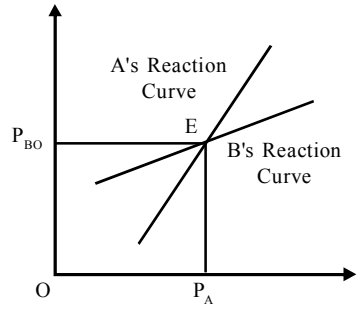

Fig. 16.5: Duopoly Equilibrium

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The reaction curves of A and B intersect at point E where their expectations materialize, point E is therefore equilibrium point. This equilibrium is stable. Fo, if any one of the firms disagrees to this point, it will create a series of actions and reactions between the firms which will lead them back to point E.

Criticism of the Model:

Bertrand's model has been criticised on the same grounds as Cournot's model. Bert- rand's implicit behavioural assumption that firms never learn from their past experience seems to be unrealistic. If cost is assumed to be zero, price will fluctuate between zero and the upper limit of the price, instead of stabilizing at a point.

4. Edgeworth's Duopoly Model:

Edgeworth developed his model of duopoly in 1897. Edgeworth's model follows Bertrand's assumption that each seller assumes his rival's price, instead of his output, to remain constant.

His model is illustrated in Fig. 16.6.

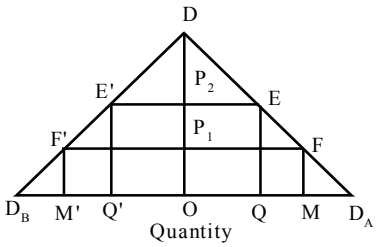

Fig. 16.6. Edgeworth's Model of Duopoly

In this figure we have supposed that there are two sellers, A and B, in the market who face identical demand curves. A has his demand curve DD_B and as DD_B Let us also assume that seller A has a maximum capacity of output OM and B has a maximum output capacity of OM'. The ordinate ODA measures the price.

To explain Edgeworth's model, let us assume, to begin with, that A is the only seller in the market. Following the profit maximising rule of a monopoly seller, he sells OQ and charges a price, OP_2. His monopoly profit under zero cost, equals OP_2EQ Now, let B enter the market. B assumes that A will not change his price since he is making maximum profit. He sets his price slightly below A's price (OP_2) and is able to sell his total output. At this price, he captures a substantial part of A's market.

Seller A, on the other hand, that his sales have gone down. In order to regain his market, A sets his price slightly below B's price. This leads to price-war between the sellers.

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The price- war takes the form of price-cutting which continues until price reaches OP_1 At this price both A and B are able to sell their entire output- A sells OQ and B sells OQ The price OP_1 could therefore be expected to be stable. But, according to Edgeworth, price OP_1 should not be stable.

Simple reason is that, once price OP is set in the market, the sellers observe an interesting fact. This is, each seller realise that his rival is selling his entire output and he will therefore not change his price, and each seller thinks that he can raise his price to OP_2 and can make pure profit.

This realisation forms the basis of their action and reaction. For examples, let seller A take the initiative and raise his price to OP_2. Assuming A to retain his price OP_2.B finds that if he raises his price at a level slightly below OP_2 he can sell his entire output at a higher price and make greater profit. Therefore, B raises his price according to his plan.

Now it is A's turn to know the situation and react. A finds that his price is higher than B's price and his total sale has fallen. Therefore assuming B to retain his price, A reduces his price slightly below B's price.

Thus, the price-war between A and B begins once again. This process continues indefinitely and price keeps moving up and down between OP_1 and OP_2 Obviously, according to Edgeworth's model of duopoly, equilibrium is unstable and indeterminate since price and output are never determined. In the words form Edgeworth, "there will be an indeterminate tract through which the index of value will oscillate, or, rather will vibrate irregularly for an indefinite length of time.

In a net shell Edgeworth's model, like Cournot's is based on a native assumption, i.e. each seller continues to assume that his rival will never change his price even though they are proved repeatedly wrong. But according to Hotelling Edgeworth's model is definitely an improvement upon Cournot's model in that it assumes price, rather than output, to be the relevant decision variable for the sellers.

16.10 OLIGOPOLY MODELS

A model of oligopoly was first of all put forward by Cournota French economist, in 1838. Cournot's model of oligopoly is one of the oldest theories of the behaviour of the individual firm and relates to non-collusive oligopoly.

In Cournot model it is assumed that an oligopolist thinks that his rival will keep their output fixed regardless of what he might do. That is, each oligopolist does not take into account the possible reactions of his rivals in response to his actions.

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Another important model of non-collusive oligopoly which we will discuss below was put for-ward by E.H. Chamberlin in his famous work "The Theory of Monopolistic Competition". Chamberlin made an important improvement over the classical models of oligopoly, including that of Cournot.

In sharp contrast to Cournot and other classical models Chamberlin assumes in his model that oligopoly firms recognise their inter-dependence while fixing their output and price. Through his model Cham-berlin arrives at a monopoly solution of pricing and output under oligopoly wherein oligopolistic firms in an industry jointly maximise their profits.

1. Cournot's Duopoly Model:

As said above, Augustin Cournot, a French economist, published his theory of duopoly in 1838. But it remained almost unnoticed until 1880's when Walras called the attention of the economists to Cournot's work. Cournot dealt with the case of duopoly.

Let us first state the assumptions which are made by Cournot in his analysis of price and output under duopoly. First, Cournot takes the case of two identical mineral springs operated by two owners who are selling the mineral water in the same market. Their waters are identical. Therefore, his model relates to the duopoly with homogeneous products.

Secondly, it is assumed by Cournot, for the sake of simplicity, that the owners operate mineral springs and sell water without incurring any cost of production. Thus, in Cournot's model, cost of production is taken as zero; only the demand side of the market is analysed.

It may be noted that the assumption of zero cost of production is made only to simplify the analysis. His model can be presented when cost of production is positive. Thirdly, the duopolists fully know the market demand for the mineral water; they can see every point on the demand curve. Moreover, the market demand for the product is assumed to be linear, that is, market demand curve facing the two producers is a straight line.

Lastly, Cournot assumes that each duopolist believes that regardless of his actions and their effect upon market price of the product, the rival firm will keep its output constant, that is, it will go on producing the same amount of output which it is presently producing.

In other words, the duopolist will decide about the amount of output which is most profitable for him to produce in the light of his rival's present output and assumes that it will remain constant. In other words, for determining the output to be produced, he will not take into account reactions of his rival in response to his variation in output and thus decides its level of output independently.

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Cournot's Approach to Equilibrium of the Duopolists:

Suppose the demand curve confronting the two producers of the mineral water is the straight line MD as shown in Fig. 29A.1. Further suppose that ON = ND is the maximum daily output of each mineral spring. Thus, the total output of both the springs is OD = ON + ND.

It will be seen from the figure that when the total output OD of both the springs is offered for sale in the market, the price will be zero. It may be noted here that if there was a perfect competition, the long-run equilibrium price would have been zero and actual output produced equal to OD. This is because cost of production being assumed to be zero; price must also be zero so as to provide a zero profit long-run equilibrium under perfect competition.

Assume for the moment that one producer A of the mineral water starts the business first. Thus, to begin with he will be the monopolist. He will then produce daily ON output because his profits will be maximum at output ON' and will be equal to ONKP (since the costs are zero, the whole of total revenue ONKP will represent profits).

The price which that producer will charge will be OP. Suppose now that the owner of the other spring enters into the business and starts operating his spring. This new producer B sees that the former producer A is producing ON amount of output.

According to the assumption made by Cournot, the producer B believes that the former producer A will continue producing ON (= 1/2 OD) amount of output, regardless of what output he himself decides to produce. Given this belief, the best that the new producer B can do is to regard segment KD as the demand curve confronting him. With his demand curve KD, and corresponding marginal revenue curve MR_B, the producer B will produce NH (= 1/2 ND) amount of output. The total output will now be ON + NH = OH, and as a result the price will fall to OP' or HL per unit.

The total profits made by the two producers will be OHLP' which are less than ONKP. Out of total profits OHLP', profits of producer A will be ONGP' and profits of producer B will be NHLG. Thus entry into the market by producer B and producing output NH by him, the producer A's profits has been reduced.

A will therefore reconsider the situation. But he will assume that producer B will continue to produce output NH. With producer B producing output NH, the best that the producer A can do is to produce 1/2 (OD -NH). He, will, therefore, reduce his output.

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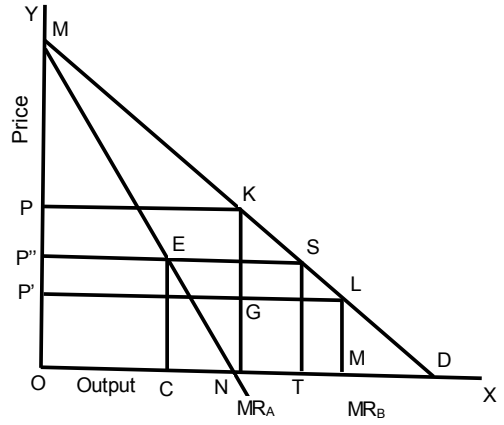

Fig. 16.7: Output Consumers Duopoly Solution

Now that the producer B has been surprised by the reduction of output by producer A and will also find that his share of total profits is less than that of producer A, he will reconsider his situation. Learning nothing from his earlier experience and believing that producer A will continue producing its new current level of output, the producer B will find that he will now be making maximum profits by producing output equal to 1/2 (OD – New output of A).

Producer B, accordingly, will increase his output. With this move of producer B, producer A will find his profits reduced. The producer A will therefore again reconsider his position and will find that he can increase his profits by producing output equal to 1/2 (OD – Current output of producer B).

This process of adjustment and readjustment will continue and producer A being forced gradually to reduce his output and producer B being able to increase his output gradually until the total output OT is produced (OT = 2/3 OD) and each is producing the same amount of output equal to 1/3 OD.

In this final position, producer A produces OC amount of output and producer B produces CT amount of output, and OC = CT. Throughout this process of adjustment and readjustment, each producer assumes that the other will keep his output constant at the present level and then always finds his maximum profits by producing output equal to 1/2, (OD – the present output of the other).

As seen above, producer A starts by producing ON = (1/2 OD) and continuously reduces his output until he produces OC. The final output OC of producer A will be equal to 1/3 OD (= 1/2 OT). On the other hand, producer B begins by producing 1/4th of OD and continuously increases his output until he produces CT. His final output CT will be equal to 1/3 OD (= 1/2 OT). Thus, the two producers together will produce total output equal to 1/3 OD + 1/3 OD= 2/3 OD (= OT).

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Cournot's Duopoly Equilibrium:

It will be seen from Fig. 16.7 that when each producer is producing 1/3 OD (that is, when producer A is producing OC and producer B equal to CT), the best that his rival can do is to produce 1/2 (OD – 1/3 OD) which is equal to 1/3 OD = OC – CT. Thus, when each producer is producing 1/3 OD so that the total output of the two together is 2/3 OD, no one will expect to increase his profits by making any- further adjustment in output. Thus, in Cournot's model of duopoly, stable equilibrium is reached when total output produced is 2/3rd of OD and each producer is producing 1/3rd of OD.

It will be useful to compare the Cournot's duopoly equilibrium with the monopolistic and the purely competitive equilibriums. If the two producers had combined and formed a coalition, then the output produced by them together will be the monopoly output ON and. therefore, the price set will be the monopoly price OP.

Monopoly output ON produced in case of coalition is much less than the output OT produced in Cournot's duopoly equilibrium. Further, the monopoly price OP charged in case of coalition is much greater than the price OP" determined in Cournot's duopoly equilibrium.

In case of coalition, they will enjoy the monopoly profits ONKP which are maximum possible joint profits, given the demand curve MD. These monopoly or maximum joint profits can be shared equally by them. It will be seen from Fig. 29A. 1, that these monopoly profits ONKP made in case of coalition are much greater than the total profits OTSP" made by them in Cournot's duopoly equilibrium.

It is thus clear that in case of the duopolists competing with each other as conceived by Cournot's duopoly solution, the price and the profits are lower and output is greater than if they had combined together and formed a monopoly.

On the other hand, if the market were perfectly competitive, the output would have been OD and price would have been zero. This is because with assumed marginal cost being equal to zero, perfectly competitive equilibrium will be reached at the output level where price is equal to zero. That is, perfectly competitive solution would have resulted in greater output and lower price than under Cournot's duopoly equilibrium.

To sum up, under Cournot's duopoly equilibrium, output is two thirds of the maximum possible output (i.e., perfectly competitive output) and price is two-thirds of the most profitable price (i.e., monopoly price).

Following Cournot, the cost of production in the above discussion of Cournot's oligopoly solu-tion has been taken to be zero. However, it should be noted that above conclusions will not change if the cost curves with positive cost of production are introduced into the discussion.

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Reaction Functions and Cournot Duopoly Solution:

Cournot solution of duopoly problem can also be obtained with reaction functions of the two firms. An output reaction function depicts the profit-maximising output of a firm, on the assumption that the other firm's output remains constant.

We have seen above that the profit-maximising output of a Cournot's duopolist is one-half of the difference between the other firm's output and the market demand for output at which price equals marginal cost.

This is called reaction function of a firm. This output at which price equals marginal cost (MC) is the maximum output which can be produced because any output beyond this will cause the price to go below marginal cost (which is equal to AT under constant cost conditions) and will therefore not be worthwhile to produce.

The following example will make clear the concept of reaction functions. Let the market demand function is: Q = 100 – P and marginal cost is ₹ 10. In order to determine reaction functions of two duopolist firms, we set price equal to the given marginal cost to determine market demand at price (P) = MC. Thus, from the given demand function

$$P = 100\text{-}0 \ldots. \text{(i)}$$

Setting it equal to MC we have

$$100\text{-}0 = 10$$

Or

$$Q = 100\text{-}10 = 90$$

Thus, the reaction function of firm A is: $Q_a = 90 - Q_b/2$….. (ii)

Where Q_a and Q_b are the outputs of firm A and B respectively.

Similarly, reaction function of firm B is:

$$Qb = 90\text{-}Q_a/2 \ldots\ldots\ldots\ldots\ldots \text{(iii)}$$

The above two equations (ii) and (iii) can be solved simultaneously to determine Q_a and Q_b. To do so we substitute the value of $Qb = 90\text{-}Q_a/2$ in equation (ii) and have:

$$Q_a = \frac{90 \quad \frac{90 \quad Q_a}{2}}{2}$$

$$Q_a = \frac{90 \quad 45 \quad \frac{Q_a}{2}}{2} \quad 45 - 22.5 \quad \frac{1}{4}Q_a$$

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$$Q_b - \frac{1}{4}Q_a \quad \frac{3}{4}Q_a \quad 22.5$$

$$Q_a = 22.5 \quad \frac{4}{3} \quad \frac{90}{3} \quad 30$$

With $Q_a = 30$

$$Q_b = \frac{90 \quad Q_a}{2} \quad \frac{90 \quad 30}{2} \quad 30$$

$$Q = Q_a + Q_b = 60$$

Solving equation (i) for P we get

$$P = 100 - Q = 100 - 60 = 40$$

Cournot Equilibrium as Nash Equilibrium:

John F. Nash, a noted American Mathematician and a Nobel Prize winner in economics, has put forward the concept of equilibrium known as Nash Equilibrium. Cournot duopoly equilibrium is an example of Nash equilibrium.

According to Nash equilibrium, competing firms reach their equilib-rium state when each of them thinks that it is doing its best that is, maximising its profits in response to the given strategy adopted by others which think they are also maximising their profits with the given strategies. As a result, no one has a tendency to change its strategy.

Therefore, we have a stable equilibrium. Since in Cournot duopoly equilibrium each firm chooses to produce an output level hat maximises its profits, given the profit-maximising level of output of the other firm, Cournot duopoly is generally called Cournot-Nash duopoly equilibrium.

Cournot's Duopoly Equilibrium Explained with the Aid of Reaction Curves:

Some economists have employed the reaction curves to explain Cournot's duopoly equilibrium. The reaction curves may be output reaction curves or price reaction curves depending upon whether it is the output or the price which is the adjustment viable.

Since, in Cournot's model, it is the output which is subject to the adjusting variation, output reaction curves are relevant. It should be carefully noted that these reaction curves refer not to the reactions which a seller expects will be forthcoming from his rivals but to the sellers' own reactions to the moves of his rival.

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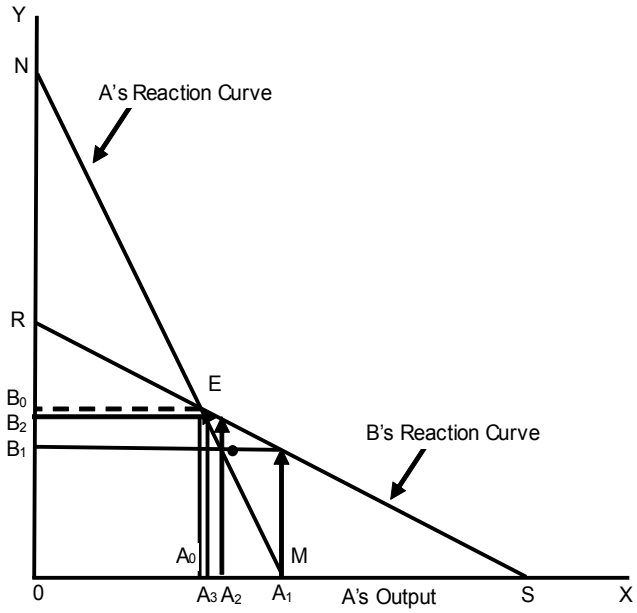

Fig. 16.8: Output Reaction Curves Accounting to Cournots Model

In Fig. 16.8 output reaction curves of two producers (sellers) A and B are shown, MN is the output reaction curve of A and RS is the output reaction curve of B. The output reaction curve MN of seller A shows how A will react to any change in output by B, that is, A's output reaction curve shows how much output A will decide to produce for each given output of producer B.

In other words, A's output reaction curve MN indicates the most profitable output for A for each given output of B. Likewise, B's output reaction curve RS shows how much output B will decide to produce (that is, what will be B' s most profitable output) for each given output of A.

For example, if B produces output OB_1. A's output reaction curve MN shows that A will produce output OA_2 in response to B's output OB_1. Similarly, for all other outputs on the other hand, if A produces OA_2, B's output reaction curve shows that B will produce $OB_2$and so forth for all other outputs.

It will be seen from Fig. 29 A.2, that output reaction curves have been drawn to be straight lines. This is because we are assuming that market demand curve for the product of duopolist is a straight line and that the marginal costs of production of both producers A and B are constant (at zero).

It should be noted that output OM is the monopoly output since producer A will produce output OM if producer B's output is zero. In other words, producer A will produce and sell output OM if he were the monopolist. On the other hand, A will produce zero output if B 'S output is ON.

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Given the marginal cost equal to zero, a producer will be forced to produce zero output when the price has fallen to zero and, therefore, production is no longer profitable. Output ON will be produced under conditions of perfect competition since at output ON the price will be zero and therefore equal to marginal cost which is assumed to be zero in the present case.

Thus, while OM is the monopoly output, ON is the perfectly competitive output. We assume the two producers A and B to be completely identical, OR will, therefore, be equal to OM, and OS will be equal to ON.

Output reaction curves, as interpreted above, can be used to explain Cournot's duopoly equilib-rium. Each producer, as before, assumes that his rival will continue producing the same amount of output regardless of what he might himself decide to produce. To begin with, suppose producer A goes into business first and is therefore initially a monopolist.

Therefore, in the beginning A will produce output OM which is a monopoly output as output by the firm B is zero. Suppose now B also enters into business, B will assume that A, will keep his output constant at OM. B's output reaction curve RS reveals that for output OM of A, he will produce OB, But when A sees that B is producing OB_1 he will reconsider his last decision but will assume that B will go on producing OB_1.

Output reaction curve NM of seller A shows that he will produce OA_2 in reaction to output OB_1, of firm B. Now when B sees that A is producing OA_2, he will think of readjusting his output but will assume that A will continue producing OA_2. B's output reaction curve RS, shows that he will produce output OB_2 for output OA_2 of producer A, but when A knows that B is producing OB_2 he will again readjust his output and will produce OA_3.

This process of adjustments and readjustments will continue until point E is reached where the two reaction curves intersect each other and A and B are producing OA_n and OB_n respectively. The duopolists attain stable equilibrium at the intersection point, since they will not feel induced to make any further adjustments in their outputs.

With B producing OB_n, A's most profitable output is OA_n as indicated by his reaction curve NM, and with A producing OA_n, the most profitable output for B is OB_n as shown by his reaction curve RS, Therefore, no one will have a tendency to make any further changes in their output. It is thus evident also from the reaction curve analysis that Cournot's solution yields a unique and stable equilibrium under duopoly.

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A Critique of Cournot's Oligopoly Model:

Cournot model of oligopoly is perhaps the first model which describes the behaviour of an individual firm under conditions of monopoly and competition. Therefore, it has occupied an impor-tant place in economic theory as a reference model or as a starting point of explaining the behaviour of individual firms under oligopolistic market structure.

In our analysis of Cournot's duopoly model, we have seen that he makes an important assumption,, namely, while deciding about his output policy each duopolist believes that his riyal will hold output constant at the present level whatever output he himself might produce. Further, a producer remains unshaken in this erroneous belief even when he constantly finds himself to be proved incorrect since after his action the rival does react and changes his output. This is a chief logical error in Cournot's model.

Furthermore, by assuming that duopolist (oligopolist), will think that his rival will continue pro-ducing the current level of output Cournot model ignores the mutual interdependence between the duopolist which is the chief characteristic of oligopoly, Thus, Cournot model provides solution for oligopoly problem by removing from it its most important feature.

2. Bertrand's Duopoly Model:

Joseph Bertrand, a French mathematician, criticized Cournot's duopoly solution and put forward a substitute model of duoply. According to Betrand, there was no limit to the fall in price since each producer can always lower the price by underbidding the other and increasing his supply of output until the price becomes equal to his unit cost of production.

There are some important differ-ences in assumptions of Bertrand and Cournot's models of duopoly. In Bertrand's model, producers do not produce any output and then sell whatever price it can bring in. Instead, the producers first set the price of the product and then produce the output which is demanded at that price. Thus, in Bertrand's model adjusting variable is price and not output.

In Cournot's model, each producer adjusts his output believing that rival will continue to produce the same output as he is doing at present, but in Bertrand's model each producer believes that his rival will keep his price constant at the present level whatever price he might himself set. Thus, in Bertrand's adjusting variable is price and not output.

Furthermore, in Bertrand's model, it is not very important that the producers should know the correct market demand of their product, or should have identical view

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about the market demand. It is enough for each producer to know that he can capture the whole market by undercutting his rival.

The other assumptions of Bertrand's model are the same as those of Cournot's model though their impli-cations may be somewhat different. Thus, in Bertrand s model the products produced and sold by the two producers are completely identical and in no way differentiated.

Its implications are that if a producer underbids the other, it can conquer the whole market (that is, snatch away all the customers from his rival). Further, the two producers have identical costs and also work under condition of constant marginal cost. Moreover, the productive capacity of the producers is unlimited, that is, there is no limit to their increase in the supply of output up to the maximum requirement of demand.

Bertrand's duopoly model is illustrated through Fig. 29A.3. Let there be two producers A and B. Market demand curve for the product produced by them is given by linear curve DD'. Suppose that producer A goes into business first.

Because A is the only producer at present he sets the price at the monopoly level, which is the most profitable for him. This monopoly price is P_m and producer A produces monopoly output ON which is half of perfectly competitive output 0 assuming constant average and marginal cost equal to OG.

Now, suppose that B also enters into the business and starts producing the same product as produced by A. But B assumes that A will go on charging the same price P_m which he is doing at present, irrespective of whatever price he himself might set.

Further B finds that he can capture the whole market by slightly undercutting the price and thereby make substantial amount of profits. Accordingly, B sets a price slightly lower than A's price P_m and as a result gets the entire demand of the product. A's sales, for the moment, falls to zero. Now threatened with the loss of his entire business, producer A will reconsider his price policy. But while deciding about his new price policy he assumes that S will continue to charge the same price which he is doing at present.

There are two alternatives open to him. First, he may match the price cut made by B, that is, he may charge the same price as B is now charging. In this case, he will secure half the market, the other half going to the producer B.

Secondly, he may undercut B and set a slightly lower price than that of B In this case, A thinks he will seize the entire market. Evidently, the latter course looks more profitable and thus A undercuts B and sets a price lower than S's price.

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But with the above move of A, producer B finding himself deprived of all his sales will react and think of changing his price. Since B also assumes A's price to remain fixed at the present level, whatever price he himself might set. Producers have similarly two alternatives: he may match A's price or undercut him. Finding the undercutting more profitable, B will set a bit lower price than A and thus seize the whole market.

But again, A will be forced to undercuts. This price war (i.e. the process of undercutting) will go on until the price falls to the competitive levels, that is, equal to average or marginal cost of produc-tion. Once the price has fallen to the level of average or marginal cost of production, neither of them will like to cut the price further because in that case total cost would exceed total revenue and will therefore bring losses to the duopolists.

Also, neither of them would like to raise the price, since in doing so each of them would be afraid of losing his entire business given the belief that the other will go on charging the same lower price. Thus, when the price has fallen to the competitive level of average cost of production, neither of the duopolists would have any incentive to lower the price further or to raise it and, therefore, the equilibrium has been achieved. In Bertrand's model equilibrium is achieved when as a result of price war market price has fallen to the average cost of production and the combined equilibrium output of the two duopolists is equal to the competitive output.

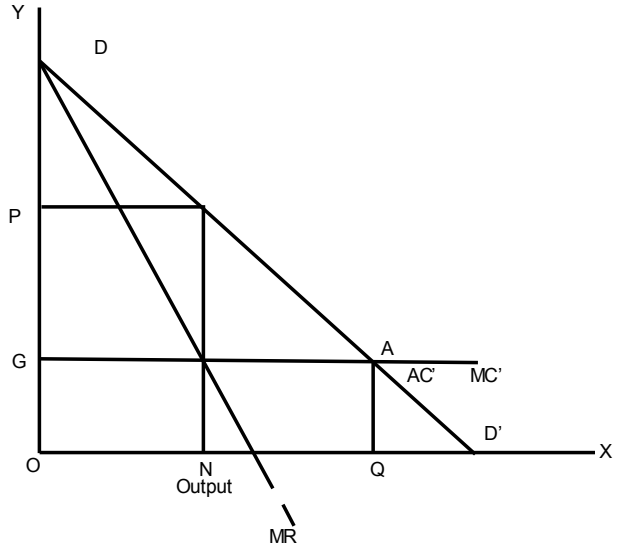

Fig. 16.9: Bertrands Duopoly Model

It is evident from the above analysis of the Cournot and Bertrand's models of duopoly that the fundamental assumption about the behaviour of the duopolists in the two models is similar. The duopolists in both models have erroneous and incorrigible belief that the rival will continue to do what he is presently doing regardless of what he himself might do.

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However, the basic assumption in the two models is not exactly the same. In Cournot's model, the basic assumption relates to the output policy, but in Bertrand's model, it relates to the price policy. Therefore, the two models yield different results.

According to Cournot's model, equilibrium output is less than the perfectly competitive output and, therefore, under it price is higher than the perfectly competitive price. But, according to Bertrand's model, output and price under duopoly are equal to those under pure competition.

3. Edgeworth Duopoly Model:

F.Y. Edgeworth, a famous French economist, also attacked Cournot's duopoly solution. He criticised Cournot's assumption that each duopolist believes that his rival will continue to produce the same output irrespective of what he himself might produce.

According to Edgeworht (as in Bertrand's model), each duopolist believes that his rival will continue to charge the same price as he is just doing irrespective of what price he himself sets. With his assumption, and taking the example of Cournot's "mineral wells' with zero cost of production, Edgeworth showed that no determinate equilibrium would be reached in duopoly.

The main difference between Edgeworth's model and Bertrand's model is that whereas in Bertrand, productive capacity of each duopolist is practically unlimited so that he could satisfy any amount of demand but in Edgeworth's model, the productive capacity of each duopolist is limited so that neither duopolist can meet entire demand at the lower price ranges.

Each duopolist accepts as much demand of the product at a price as he can meet. It is not essential in Edgeworth's model that the products of duopolist should be perfectly homogeneous; his argument will apply even if the products were close substitutes so that a slight price differential is sufficient for a good proportion of customers to switch from a higher priced product to a lower price product.

However, in our analysis below we assume that the products of the two duopolists are perfectly homogeneous. Moreover, the cost conditions of the two duopolists need not be exactly same but must be similar.

Fig. 29A.4 illustrates Edgeworth's model of duopoly. Since it is assumed that the products of two duopolists are completely identical, the market would be equally divided between the two duopolists at the same price of the product.

Suppose DC and DC' represent the demand curves facing each duopolist. Further suppose OB and OB' are the maximum possible outputs of the two duopolist

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respectively. If the duopolists form a collusion, they will set the mo-nopoly price OP and will make maximum joint profits. Price OQ represents the price at which both duopolists sell their maximum possible outputs.

Assume that the two duopolists happen to charge the price OP, then producers 1 and 2 will be producing and selling OA and OA' amounts of output respectively. Suppose now producer 1 thinks of revising his price policy. Producer 1 will believe that producer 2 will keep his price unchanged at OP regardless of whatever price he himself might charge.

With producer 2's price remaining fixed at OP, producer 1 realises that if he sets the price slightly lower than OP, he will be able to attract a sufficient number of producer 2's customers so that the he can sell his whole maximum output which he can produce. This would yield greater profits to producer 1 than he is making at present.

Thus in Fig. 29A.4 if producer 1 lowers his price from OP to OR, he will be able to sell his entire maximum and will be earning profits equal to the area OBSR which are greater than OAEP. Thus A would increase his profit by lowering his price.

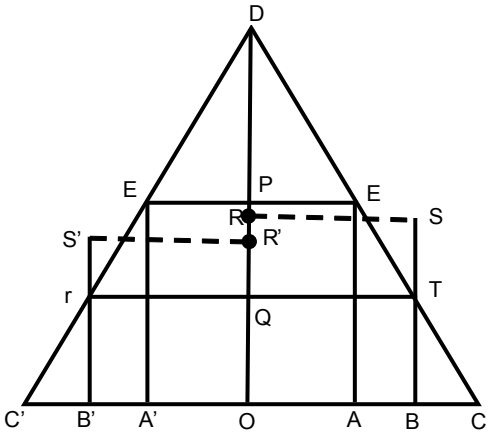

Fig. 16.10: Edgeworths Duopoly Sulotion

But when producer 1 reduces his price, producer 2 will find most of his customers deserting him and his sales considerably reduced. Profits of producer 2 will therefore fall considerably. As a result, producer 2 will think of making a counter move, but he too will assume that producer 1 will hold his price constant at OR.

Producer 2 sees that if he cuts his price slightly below producer 1's price OR, say he fixes OR' he can take away enough customers of A to sell his entire maximum possible output OB'. Thus when producer 2 cuts his price to OR', he sells his

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entire output OB' and makes profits equal to OR'S'B which are greater than the profits he was making before.

As a result of this, sales and profits of producer 1 will greatly decline. Producer 1 will then react and will think that if he reduces his price a bit below OR', he will be able to sell his whole maximum possible output OB by attracting customers of producer 2, still believing that producer 2 will keep his price fixed at OR'.

Thus when producer 1 reduces his price, his profits will rise for a moment. But producer 2 will then reacts and reduce his price further in order to increase his profits. In this way, according to Edgeworth, the price cutting by two producers will continue until the price falls to the level OQ at which both producers sell their entire maximum possible outputs.

It will be seen in Fig. 16.10 that at price OQ, producers 1 and 2 are selling OB and OB' respectively 0OB = OB') and are making profits equal to OBTQ and OB'TQ respectively. When the price has been bid down to the level OQ, none of the producers will see any advantage to cut the price further.

Since at price OQ each is selling the entire output he can produce, he will not be able to increase his profits because of his inability to increase his output further. But, according to Edgeworth, equilibrium is not attained at price OQ. Edgeworth argues that each producer will have no incentive to lower the price below OQ, but each will have incentive to raise it above OQ.

Thus, Edgeworth says: "At this point it might seem that equilibrium would have been reached. Certainly it is not in the interest of either monopolist to lower the price still further. But it is in the interest of each to raise it." At price OQ, one of the two producers, say producer 1, may realise that his rival producer 2 is selling his entire possible output OB' and serving half of the customers and cannot increase his output further to serve more customers.

Thus producer 1 realises that he can serve the other half of the customers at the price which is most profitable for him and he will accordingly raise the price to OP at which he sells OA and earns profits OAEP which are larger than profits OBTQ at price OQ.

Thus knowing that his rival has done his worst by putting his entire possible output on the market and that producer 2 cannot attract any of his OA units of demand because of his inability to produce more, producer 1 raises the price to OP and thereby increases his profits.

But when producer 1 has raised the price to OP, producer 2 will realise that if he sets his price slightly below OP, he would still be able to sell OB' by attracting enough customers of producer 1 who is charging the price OP and, will therefore increase his profits.

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Accordingly, producer 2 raises his price to the level slightly below OP. But producer 1 then finding his customers deserting him and sales being reduced will believe that he can increases his profits by reducing his price slightly below producer 2's level.

When he does so, then producer 2 will react, and so on. Thus, once again the process of competitive price cutting starts and the price again ultimately reaches the level OQ. But once the price has reached OQ, any of the producers will again raise it to OP and so on.

In this way, price will oscillate between OP and OQ, gradually downward but upward in a jump. As said above, price OP is the monopoly price and price OQ is the competitive price. It follows from above that Edgeworth duopoly solution is one of perpetual disequilibrium, price constantly oscillating between the monopoly price and competitive price. Thus no determinant and unique equilibrium of duopoly is suggested by edgeworth's duopoly model.

Comments over the above Classical Models of Duopoly (Oligopoly):

In our analysis of three classical models of duopoly we saw that one common assumption in them is that the duopolists have zero conjectural variation, that is, while deciding about his output or price policy, each duopolist believes that his rival will hold output or price constant at the present level whatever he himself might do.

Further, a producer remains unshaken in this erroneous belief even when he constantly finds himself to be proved incorrect since after his action the rival does react and changes his output or price. This is a chief logical error in classical models.

Furthermore, by assuming zero conjectural variation on the part of the duopolists (oligopolists), classical models ignore the mutual interdependence which is the chief characteristic of oligopoly. Thus, classical models provide solution for oligopoly problem by removing from it is most important feature.

4. Chamberlin's Oligopoly Model:

In his now famous work "The Theory of Monopolistic Competition" Chamberlin made an impor-tant contribution to the explanation of pricing and output under oligopoly. His oligopoly model makes an advance over the classical models of Cournot, Edgeworth and Bertrand in that, in sharp contrast to above classical models, his model is based on the assumption that the oligopolists recognise their interdependence and act accordingly.

Chamberlin criticises the behavioural assumption of Cournot, Bertrand and Edgeworth that the oligopolists behave independently in the sense that they ignore

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their mutual dependence and while 'deciding about their output or price assume that their rivals will keep their output or price constant at the present level.

According to him, oligopolists behave quite intelligently as they recognise their interdependence and learn from the experience when they find that their action in fact causes the rivals to react and adjust their output level.

This realisation of mutual dependence on the part of the oligopolists leads to the monopoly output being produced jointly and thus charging of the monopoly price. In this way, according to Chamberlin, maximisation of joint profits and stable equilibrium are achieved by the oligopolists even though they act in a non-collusive manner. Given identical costs, they will also equally share these monopoly profits.

Chamberlin's Approach to Stable Joint Profit-Maximising Equilibrium under Oligopoly:

The process by which stable equilibrium under oligopoly is reached in Chamberlin's oligopoly model is illustrated in Figure 16.11. Chamberlin considers the case of a duopoly with zero cost of production of the two producers, A and B. Like Cournot he also assumes that the market demand curve for the product is linear.

In Figure 16.11, MD represents this linear market demand curve for the homogeneous product of the duopolists. As in Cournot's model, suppose producer A is the first to start production. He will view the whole market demand curve MD facing him and corresponding to it MR_a is the-marginal revenue curve. In order to maximise his profits he will equate marginal revenue with marginal cost (which is here taken to be equal to zero). It will be seen from Fig. 16.11 that he will be in equilibrium by making MR = MC when he pro-duces OQ output (i.e. half of OD) which is in fact the monopoly output, and will fix price equal to OP.

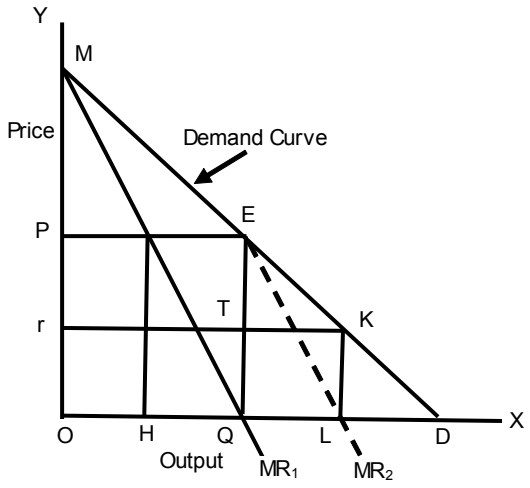

Fig. 16.11: Chamberlins Stable Model of Duopoly with Mutual Dependence Recognised

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Now, suppose producer B enters the market. He thinks, as in Cournot's model, that producer A would continue to produce OQ output and therefore views ED portion of the market demand curve as the relevant demand curve facing him and corresponding to it MR_a is the marginal revenue curve. With marginal cost being equal to zero, for maximum profits he will produce half of QD, that is, QL or at point L at which his marginal revenue curve MR inter-sects the .Y-axis along which output is measured. With aggregate output OL(OL = OQ of A + QL of B), price will fall to the level LK or OP 'with the result that profits earned by producer B will be equal to the area of rectangle QLKT, and due to the fall in price the profit of producer A will decrease from OPEQ to OP'TQ.

However, from this point onward Chamberlin's analysis deviates from Cournot's model. Whereas in Cournot's model, the firm A will readjust his output and will continue to assume that his rival will keep his output constant at QL level, but in Chamberlin's model producers learns from his experience that they are interdependent.

With the realisation of mutual dependence, producer A decides to produce output OH equal to output QL of producer B and half of monopoly output OQ so that the aggregate output of both of them is the monopoly output (OQ = OH of A + QL of B).

With OQ as the aggregate output level, price will rise to QE or OP. Firm B also realises that in view of interdependence it is in the best interest for both of them to produce half of monopoly output and will therefore maintain output at the QL or OH level which is half of the monopoly output.

Thus, each producer producing half of monopoly output will result in maximisation of joint profits though they do not enter into any formal collusion. In this way Chamberlin explains that duopolists behaving intelligently and realising their interdependence reach a stable equilibrium and together produce monopoly output and charge monopoly price each sharing profits equally.

A Critical Evaluation:

Chamberlin's model is an advance over the classical models in that the firms behave intelligently and recognise their interdependence. Their behaviour leads them to the monopoly solution of output and pricing which ensures maximisation of joint profits though they do not formally collude.

This implies that firms have full information about the market demand curve and quickly learn from the experience and realise that the ultimate consequence of alternative chain of adjustments to rival's moves will be less profitable than sharing the monopoly profits equally with him.

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Further, it is assumed in Chamberlin's model that the oligopolists know fully the costs of produc-tion of their rivals which enable them to arrive at a monopoly output and price which is in the best interest of all of them.

Thus, unless all oligopolists have identical costs and demands, it seems impossible that the oligopolists will be able to reach monopoly solution, that is, maximisation of joint profits without collusion. It may be noted that even in a formal collusion there is always incentive on the part of rival firms to cheat by under-cutting price to increase their individual profits.

In Chamberlin's model of oligopoly without collusion, incentive for the firms to undercut price to in-crease their share of profit will be relatively more. Besides, Chamberlin's model has another great flaw as it ignores the entry of new firms and is thus a closed model.

Due to the attraction of monopoly profits jointly earned by the existing firms, the new firms are likely to enter the industry. With the entry of new firms the attainment of stable equilibrium of oligopoly is unlikely to occur.

16.11 GAME THEORY APPROACH TO OLIGOPOLY

Game theory is concerned with predicting the outcome of games of strategy in which the participants (for example two or more businesses competing in a market) have incomplete information about the others' intentions

Game theory analysis has direct relevance to the study of the conduct and behaviour of firms in oligopolistic markets – for example the decisions that firms must take over pricing and levels of production, and also how much money to invest in research and development spending.

Costly research projects represent a risk for any business – but if one firm invests in R&D, can a rival firm decide not to follow? They might lose the competitive edge in the market and suffer a long term decline in market share and profitability.

The dominant strategy for both firms is probably to go ahead with R&D spending. If they do not and the other firm does, then their profits fall and they lose market share. However, there are only a limited number of patents available to be won and if all of the leading firms in a market spend heavily on R&D, this may ultimately yield a lower total rate of return than if only one firm opts to proceed.

The Prisoner's Dilemma

The classic example of game theory is the Prisoner's Dilemma, a situation where two prisoners are being questioned over their guilt or innocence of a crime.

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They have a simple choice, either to confess to the crime (thereby implicating their accomplice) and accept the consequences, or to deny all involvement and hope that their partner does likewise.

Nash Equilibrium

Nash Equilibrium is an important idea in game theory – it describes any situation where all of the participants in a game are pursuing their best possible strategy given the strategies of all of the other participants.

In a Nash Equilibrium, the outcome of a game that occurs is when player A takes the best possible action given the action of player B, and player B takes the best possible action given the action of player A

16.12 SUMMARY

An oligopoly is a market structure in which a few firms dominate. When a market is shared between a few firms, it is said to be highly concentrated. Although only a few firms dominate, it is possible that many small firms may also operate in the market.

Oligopoly is a market structure where only a few large rivals are responsible for the bulk, if not all, industry output. As in the case of monopoly, high to very high barriers to entry are typical. Under oligopoly, the price/output decisions of firms are interrelated in the sense that direct reactions from leading rivals can be expected. As a result, the decision making of individual firms is based, in part, on the likely response of competitors.

The term oligopoly is derived from two Greek words, Oleg's and 'Pollen'. Oleg's means a few and Pollen means to sell thus. Oligopoly is said to prevail when there are few firms or sellers in the market producing and selling a product. Oligopoly is often referred to as "competition among the few". In brief oligopoly is a kind of imperfect market where there are a few firm in the market, producing either and homogeneous product or producing product which are close but not perfect substitutes of each other.

The kinky demand curve model tries to explain that in non-collusive oligopolistic industries there are not frequent changes in the market prices of the products. The demand curve is drawn on the assumption that the kink in the curve is always at the ruling price. The reason is that a firm in the market supplies a significant share of the product and has a powerful influence in the prevailing price of the commodity.

Under price leadership, one firm assumes the role of a price leader and fixes the price of the product for the entire industry. The other firms in the industry simply follow the price leader and accept the price fixed by him and adjust their output to this price. The price leader is generally a very large or dominant firm or a firm with

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the lowest cost of production. It often happens that price leadership is established as a result of price war in which one firm emerges as the winner.

In oligopolistic market situation, it is very rare that prices are set independently and there is usually some understanding among the oligopolists operating in the industry. This agreement may be either tacit or explicit.

The uncertainty is respect of behaviour pattern of a firm under oligopoly arising our of their unpredictable action and reaction makes a systematic analysis of oligopoly difficult.

However, classical and modern economists have developed a variety of models based on different behavior assumptions.

Chamberlin's model of duopoly recognizes interdependence if firms in such a market. Chamberlin argues that in the real world of oligopoly firms are not so native that they will not learn from the past experience. However, he makes the same assumptions as the exponents of old classical models have done. In other words, his model is also based on the assumption of homogeneous products, firms of equal size with identical costs, no entry by new firms and full knowledge of demand.

Bertrand, a French Mathematician developed his own model of duopoly in 1883. Bertrand's model differs from Cournot's model in respect of its behavioural assumption. While under Cournot's model, each seller assumes his rival's output to remain constant, under Bertrand's model each seller determines his price on the assumption that his rival's price, rather than his output, remains constant.

Edgeworth developed his model of duopoly in 1897. Edgeworth's model follows Bertrand's assumption that each seller assumes his rival's price, instead of his output, to remain constant.

A model of oligopoly was first of all put forward by Cournota French economist, in 1838. Cournot's model of oligopoly is one of the oldest theories of the behaviour of the individual firm and relates to non-collusive oligopoly.

In Cournot model it is assumed that an oligopolist thinks that his rival will keep their output fixed regardless of what he might do. That is, each oligopolist does not take into account the possible reactions of his rivals in response to his actions.

Another important model of non-collusive oligopoly which we will discuss below was put for-ward by E.H. Chamberlin in his famous work "The Theory of Monopolistic Competition". Chamberlin made an important improvement over the classical models of oligopoly, including that of Cournot.

In sharp contrast to Cournot and other classical models Chamberlin assumes in his model that oligopoly firms recognise their inter-dependence while fixing their output and price. Through his model Cham-berlin arrives at a monopoly solution of pricing and output under oligopoly wherein oligopolistic firms in an industry jointly maximise their profits.

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John F. Nash, a noted American Mathematician and a Nobel Prize winner in economics, has put forward the concept of equilibrium known as Nash Equilibrium. Cournot duopoly equilibrium is an example of Nash equilibrium.

According to Nash equilibrium, competing firms reach their equilib-rium state when each of them thinks that it is doing its best that is, maximising its profits in response to the given strategy adopted by others which think they are also maximising their profits with the given strategies. As a result, no one has a tendency to change its strategy.

16.13 GLOSSARY

(a) Oligopoly: An oligopoly is a market structure in which a few firms dominate. When a market is shared between a few firms, it is said to be highly concentrated. Although only a few firms dominate, it is possible that many small firms may also operate in the market.

(b) Kinky demand curve: The kinky demand curve model tries to explain that in non-collusive oligopolistic industries there are not frequent changes in the market prices of the products. The demand curve is drawn on the assumption that the kink in the curve is always at the ruling price. The reason is that a firm in the market supplies a significant share of the product and has a powerful influence in the prevailing price of the commodity.

(c) Price leadership: Under price leadership, one firm assumes the role of a price leader and fixes the price of the product for the entire industry. The other firms in the industry simply follow the price leader and accept the price fixed by him and adjust their output to this price. The price leader is generally a very large or dominant firm or a firm with the lowest cost of production. It often happens that price leadership is established as a result of price war in which one firm emerges as the winner.

(d) Oligopolistic market: In oligopolistic market situation, it is very rare that prices are set independently and there is usually some understanding among the oligopolists operating in the industry. This agreement may be either tacit or explicit.

(e) Chamberlin's model of duopoly: Chamberlin's model of duopoly recognizes interdependence if firms in such a market. Chamberlin argues that in the real world of oligopoly firms are not so native that they will not learn from the past experience. However, he makes the same assumptions as the exponents of old classical models have done. In other words, his model is also based on the assumption of homogeneous products, firms of equal size with identical costs, no entry by new firms and full knowledge of demand.

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16.14 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Oligopoly?
2. What is Oligopoly market?
3. What is Duopoly?
4. What is game theory approach?

(B) Extended Answer Questions

1. Explain about oligopoly market.
2. Discuss chacteristics of oligopoly market.
3. Explain various Duopoly models.
4. Explain various Oligopoly models.

(C) True or False

1. Duopoly is a market structure where only a few large rivals are responsible for the bulk, if not all, industry output.
2. The term oligopoly is derived from two Greek words, Oleg's and 'Pollen'.
3. Bertrand, a French Mathematician developed his own model of duopoly in 1883.
4. Edgeworth developed his model of duopoly in 1897.

(D) Multiple Choice Questions

1. What is a market structure where only a few large rivals are responsible for the bulk, if not all, industry output?
   (a) Oligopoly (b) Duopoly
   (c) Pure competition (d) All the above
2. The term oligopoly is derived from two Greek words……
   (a) Oleg's (b) 'Pollen'
   (c) Both a and b (d) None of the above
3. Bertrand, a French Mathematician developed his own model of duopoly in the year……...
   (a) 1883 (b) 1884
   (c) 1885 (d) 1886

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4. Edgeworth developed his model of duopoly in the year……..

(a) 1897 (b) 1884

(c) 1885 (d) 1886

(E) Fill-in-the-blanks

1. ……is a market structure where only a few large rivals are responsible for the bulk, if not all, industry output.
2. The term oligopoly is derived from two Greek words,……...
3. Bertrand, a French Mathematician developed his own model of duopoly in……..
4. ……..developed his model of duopoly in 1897.

16.15 KEY TO CHECK YOUR ANSWER

(C) 1. False, 2. True, 3. True, 4. True

(D) 1. (a), 2. (c), 3. (a), 4. (a)

(E) 1. Oligopoly, 2. Oleg's and 'Pollen', 3. 1883, 4. Edgeworth

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14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

16.17 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

16.18 TERMINAL QUESTIONS

1. Why Oligopoly market is good for business organization? Discuss.

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2. Discuss about game theory approach to oligopoly.

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BLOCK IV: Basics of Macro Economics

UNIT 17 THE CIRCULAR FLOW MODEL OF THE ECONOMY

Structure:

Objectives

After reading this unit you will be able to understand:

- Circular flow in a simple economy model
- Circular flow of goods and money in a three sector economy
- Circular flows in a four sector model
- A model with foreign sector

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17.1 INTRODUCTION

Circular flow is a model of the economy in which the major exchanges are represented as flows of money, goods and services, etc. between economic agents. The flows of money and goods exchanges in a closed circuit and correspond in value, but run in the opposite direction. The circular flow analysis is the basis of national accounts and hence of macroeconomics.

17.2 MEANING OF CIRCULAR FLOW

The circular flow of income and expenditure refers to the process whereby the national income and expenditure of an economy flow in a circular manner continuously through time.

The various components of national income and expenditure such as saving, investment, taxation, government expenditure, exports, imports, etc. are shown on diagrams in the form of currents and cross-currents in such a manner that national income equals national expenditure.

17.3 IMPORTANCE OF THE CIRCULAR FLOW

The concept of the circular flow gives a clear-cut picture of the economy. We can know whether the economy is working efficiently or whether there is any disturbance in its smooth functioning. As such, the circular flow is of immense significance for studying the functioning of the economy and for helping the government in formulating policy measures.

1. Study of Problems of Disequilibrium:

It is with the help of circular flow that the problems of disequilibrium and the restoration of equilibrium can be studied.

2. Effects of Leakages and Inflows:

The role of leakages enables us to study their effects on the national economy. For example, imports are a leakage out of the circular flow of income because they are payments made to a foreign country. To stop this leakage, government should adopt appropriate measures so as to increase exports and decrease imports.

3. Link between Producers and Consumers:

The circular flow establishes a link between producers and consumers. It is through income that producers buy the services of the factors of production with which the latter, in turn, purchase goods from the producers.

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4. Creates a Network of Markets:

As a corollary to the above point, the linking of producers and consumers through the circular flow of income and expenditure has created a network of markets for different goods and services where problems relating to their sale and purchase are automatically solved.

5. Inflationary and Deflationary Tendencies:

Leakages or injections in the circular flow disturb the smooth functioning of the economy. For example, saving is a leakage out of the expenditure stream. If saving increases, this depresses the circular flow of income. This tends to reduce employment, income and prices, thereby leading to a deflationary process in the economy. On the other hand, consumption tends to increase employment, income, output and prices that lead to inflationary tendencies.

6. Basis of the Multiplier:

Again, if leakages exceed injections in the circular flow, the total income becomes less than the total output. This leads to a cumulative decline in employment, income, output, and prices over time. On the other hand, if injections into the circular flow exceed leakages, the income is increased in the economy. This leads to a cumulative rise in employment, income, output, and prices over a period of time. In fact, the basis of the Keynesian multiplier is the cumulative movements in the circular flow of income.

7. Importance of Monetary Policy:

The study of circular flow also highlights the importance of monetary policy to bring about the equality of saving and investment in the economy. Figure 2 shows that the equality between saving and investment comes about through the credit or capital market.

The credit market itself is controlled by the government through monetary policy. When saving exceeds investment or investment exceeds saving, money and credit policies help to stimulate or retard investment spending. This is how a fall or rise in prices is also controlled.

8. Importance of Fiscal Policy:

The circular flow of income and expenditure points toward the importance of fiscal policy. For national income to be in equilibrium desired saving plus taxes (S+T) must equal desired investment plus government spending (I + G). S+ T represents leakages from the spending stream which must be offset by injections

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of I + G into the income stream. If S + T exceed I + G, government should adopt such fiscal measures as reduction in taxes and spending more itself.

If I + G exceed S+T, the government should adjust its revenue and expenditure by encouraging saving and tax revenue. Thus the circular flow of income and expenditure tells us about the importance of compensatory fiscal policy.

9. Importance of Trade Policies:

Similarly, imports are leakages in the circular flow of money because they are payments made to a foreign country. To stop it, the government adopts such measures as to increase exports and decrease imports. Thus the circular flow points toward the importance of adopting export promotion and import control policies.

10. Basis of Flow of Funds Accounts:

The circular flow helps in calculating national income on the basis of the flow of funds accounts. The flow of funds accounts are concerned with all transactions in the economy that are accomplished by money transfers.

They show the financial transactions among different sectors of the economy, and the link between saving and investment, and lending and borrowing by them. To conclude, the circular flow of income possesses much theoretical and practical significance in an economy.

17.4 CIRCULAR FLOW IN A SIMPLE ECONOMY MODEL

A simple economy assumes the existence of only two sectors, i.e. household sector and firm sector.

1. Households are the owners of factors of production and consumers of goods and services.
2. Firms produce goods and services and sell them to the households.

It is the simplest form of closed economy, in which there is no government sector and foreign trade.

Closed Economy is an economy which has no economic relations with rest of the world. Open Economy is an economy which has economic relations with rest of the world.

In order to make our analysis simple, we take some assumptions:

1. There are only 2 sectors in the economy Households and Firms. It means, there is no government and foreign sector.

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2. Household sector supplies factor services only to firms and the firms hire factor services only from households.
3. Firms produce goods and services and sell their entire output to the households.
4. Households receive factor income for their services and spend the entire amount on consumption of goods and services.
5. There are no savings in the economy i.e. neither the households save from their incomes, nor the firms save from their profits.

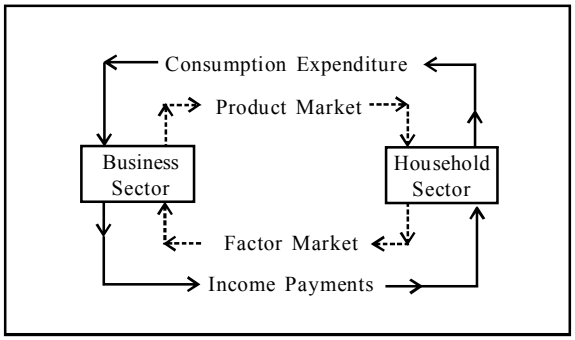

Fig. 17.1

(i) The outer loop of diagram shows the real flow, i.e. flow of factor services from households to firms and corresponding flow of goods and services from firms to households.

(ii) The inner loop shows the money flow, i.e. flow of factor payments from firms to households and the corresponding flow of consumption expenditure from households to firms.

It must be noted that entire amount of money, which is paid by firms as factor payments, is paid back by the factor owners to the firms. So, there is a circular and continuous flow of money income. In the circular flow of income, production generates factor income, which is converted into expenditure. This flow of income continues as production is a continuous activity due to never-ending human wants. It makes the flow of income circular.

Conclusions of Circular Flow in a Simple Economy:

1. Total Production = Total Consumption
2. Factor Payment = Factor Income
3. Consumption Expenditure = Factor Income
4. Real Flow = Money Flow

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17.5 CIRCULAR FLOW OF GOODS AND MONEY IN A THREE SECTOR ECONOMY

The government sector is so as to make it a three-sector closed model of circular flow of income and expenditure. For this, we add taxation and government purchases (or expenditure) in our presentation. Taxation is a leakage from the circular flow and government purchases are injections into the circular flow.

First, take the circular flow between the household sector and the government sector. Taxes in the form of personal income tax and commodity taxes paid by the household sector are outflows or leakages from the circular flow.

But the government purchases the services of the households, makes transfer payments in the form of old age pensions, unemployment relief, sickness benefit, etc., and also spends on them to provide certain social services like education, health, housing, water, parks and other facilities. All such expenditures by the government are injections into the circular flow.

Next take the circular flow between the business sector and the government sector. All types of taxes paid by the business sector to the government are leakages from the circular flow. On the other hand, the government purchases all its requirements of goods of all types from the business sector, gives subsidies and makes transfer payments to firms in order to encourage their production. These government expenditures are injections into the circular flow.

Now we take the household, business and government sectors together to show their inflows and outflows in the circular flow. As already noted, taxation is a leakage from the circular flow. It tends to reduce consumption and saving of the household sector. Reduced consumption, in turn, reduces the sales and incomes of the firms. On the other hand, taxes on business firms tend to reduce their investment and production.

Circular Flow in a Three- Sector Closed Economy

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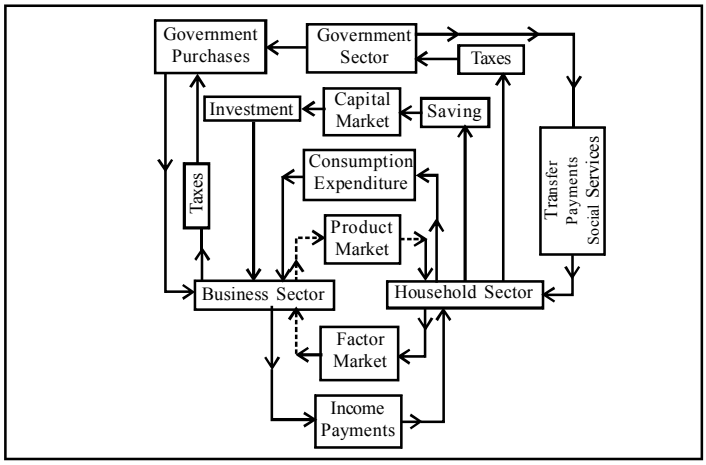

The government offsets these leakages by making purchases from the business sector and buying services of the household sector equal to the amount of taxes. Thus total sales again equal production of firms. In this way, the circular flows of income and expenditure remain in equilibrium.

Figure shows that taxes flow out of the household and business sectors and go to the government. Now the government makes investment and for this purchases goods from firms and also factors of production from households. Thus government purchases of goods and services are an injection in the circular flow of income and taxes are leakages.

If government purchases exceed net taxes then the government will incur a deficit equal to the difference between the two, i.e., government expenditure and taxes. The government finances its deficit by borrowing from the capital market which receives funds from households in the form of saving.

On the other hand, if net taxes exceed government purchases the government will have a budget surplus. In this case, the government reduces the public debt and supplies funds to the capital market which are received by firms.

17.6 CIRCULAR FLOWS IN A FOUR SECTOR MODEL (A MODEL WITH FOREIGN SECTOR)

Circular flow of income in a four-sector economy consists of households, firms, government and foreign sector.

1. Household Sector:

Households provide factor services to firms, government and foreign sector.

In return, it receives factor payments. Households also receive transfer payments from the government and the foreign sector.

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Households spend their income on:

(i) Payment for goods and services purchased from firms;

(ii) Tax payments to government;

(iii) Payments for imports.

2. Firms:

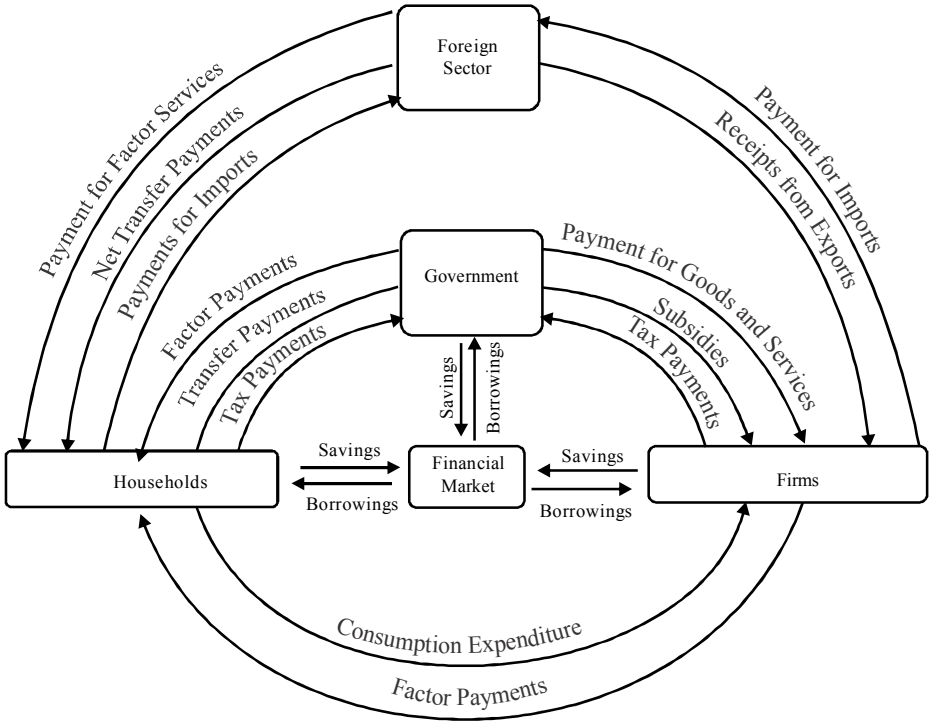
Firms receive revenue from households, government and the foreign sector for sale of their goods and services. Firms also receive subsidies from the government.

Firm makes payments for:

(i) Factor services to households;

(ii) Taxes to the government;

(iii) Imports to the foreign sector.



3. Government:

Government receives revenue from firms, households and the foreign sector for sale of goods and services, taxes, fees, etc. Government makes factor payments to households and also spends money on transfer payments and subsidies.

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4. Foreign Sector:

Foreign sector receives revenue from firms, households and government for export of goods and services. It makes payments for import of goods and services from firms and the government. It also makes payment for the factor services to the households.

The savings of households, firms and the government sector get accumulated in the financial market. Financial market invests money by lending out money to households, firms and the government. The inflows of money in the financial market are equal to outflows of money. It makes the circular flow of income complete and continuous.

17.7 SUMMARY

Circular flow is a model of the economy in which the major exchanges are represented as flows of money, goods and services, etc. between economic agents. The flows of money and goods exchanges in a closed circuit and correspond in value, but run in the opposite direction. The circular flow analysis is the basis of national accounts and hence of macroeconomics.

The circular flow of income and expenditure refers to the process whereby the national income and expenditure of an economy flow in a circular manner continuously through time.

The various components of national income and expenditure such as saving, investment, taxation, government expenditure, exports, imports, etc. are shown on diagrams in the form of currents and cross-currents in such a manner that national income equals national expenditure.

The concept of the circular flow gives a clear-cut picture of the economy. We can know whether the economy is working efficiently or whether there is any disturbance in its smooth functioning. As such, the circular flow is of immense significance for studying the functioning of the economy and for helping the government in formulating policy measures.

The government sector is so as to make it a three-sector closed model of circular flow of income and expenditure. For this, we add taxation and government purchases (or expenditure) in our presentation. Taxation is a leakage from the circular flow and government purchases are injections into the circular flow.

First, take the circular flow between the household sector and the government sector. Taxes in the form of personal income tax and commodity taxes paid by the household sector are outflows or leakages from the circular flow.

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But the government purchases the services of the households, makes transfer payments in the form of old age pensions, unemployment relief, sickness benefit, etc., and also spends on them to provide certain social services like education, health, housing, water, parks and other facilities. All such expenditures by the government are injections into the circular flow.

Firms receive revenue from households, government and the foreign sector for sale of their goods and services. Firms also receive subsidies from the government.

Government receives revenue from firms, households and the foreign sector for sale of goods and services, taxes, fees, etc. Government makes factor payments to households and also spends money on transfer payments and subsidies.

Foreign sector receives revenue from firms, households and government for export of goods and services. It makes payments for import of goods and services from firms and the government. It also makes payment for the factor services to the households.

The savings of households, firms and the government sector get accumulated in the financial market. Financial market invests money by lending out money to households, firms and the government. The inflows of money in the financial market are equal to outflows of money. It makes the circular flow of income complete and continuous.

17.8 GLOSSARY

(a) Circular flow: Circular flow is a model of the economy in which the major exchanges are represented as flows of money, goods and services, etc. between economic agents. The flows of money and goods exchanges in a closed circuit and correspond in value, but run in the opposite direction. The circular flow analysis is the basis of national accounts and hence of macroeconomics.

(b) Circular flow of income and expenditure: The circular flow of income and expenditure refers to the process whereby the national income and expenditure of an economy flow in a circular manner continuously through time.

(c) Government sector: The government sector is so as to make it a three-sector closed model of circular flow of income and expenditure. For this, we add taxation and government purchases (or expenditure) in our presentation. Taxation is a leakage from the circular flow and government purchases are injections into the circular flow.

(d) Foreign sector: Foreign sector receives revenue from firms, households and government for export of goods and services. It makes payments for

import of goods and services from firms and the government. It also makes payment for the factor services to the households.

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17.9 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. Give the meaning of Circular Flow.
2. What is Household Sector?
3. What is Firm?
4. What is Government?
5. What is Foreign Sector?

(B) Extended Answer Questions

1. Discuss importance of the Circular Flow.
2. Explain circular flow in a simple economy model.
3. Discuss circular flow of goods and money in a three sector economy.
4. Explain circular flows in a four sector model (A model with foreign sector).

(C) True or False

1. Circular flow is a model of the economy in which the major exchanges are represented as flows of money, goods and services, etc. between economic agents.
2. The circular flow of income and expenditure refers to the process whereby the national income and expenditure of an economy flow in a circular manner continuously through time.
3. Firm receives revenue from firms, households and the foreign sector for sale of goods and services, taxes, fees, etc.
4. Foreign sector receives revenue from firms, households and government for export of goods and services.

(D) Multiple Choice Questions

1. Circular flow is a model of the economy in which the major exchanges are represented as.....
   (a) Flows of money
   (b) Goods and services between economic agents

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(c) Both a and b

(d) None of the above

2. Government receives revenue from……..

(a) Firms (b) Households

(c) Foreign sector (d) All the above

3. Foreign sector receives revenue from …….

(a) Firms

(b) Households

(c) Export of goods and services

(d) All the above

(E) Fill in the Blanks

1. ……..is a model of the economy in which the major exchanges are represented as flows of money, goods and services, etc. between economic agents.
2. The circular flow of income and expenditure refers to the process whereby the national income and expenditure of an economy flow in a circular manner continuously through……....
3. ……receives revenue from firms, households and the foreign sector for sale of goods and services, taxes, fees, etc.
4. ……..receives revenue from firms, households and government for export of goods and services.

17.10 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. False, 4. True, 5. True

(D) 1. (b), 2. (d), 3. (d)

(E) 1. Circular flow, 2. Time, 3. Government, 4. Foreign sector

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17.12 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

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17.13 TERMINAL QUESTIONS

1. Discuss various sources of foreign sector revenue.

2. Discuss importance of the Circular Flow. Explain circular flow in a simple economy model.

3. Discuss circular flow of goods and money in a three sector economy.

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UNIT 18 NATIONAL INCOME: CONCEPT AND MEASUREMENT

Structure:

Objectives

After reading this unit you will be able to understand:

- Measure of national income
- Methods of measuring national income
- Choice of methods
- Measurement of national income in India
- Growth and composition of India's national income

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18.1 INTRODUCTION

National income is an uncertain term which is used interchangeably with national dividend, national output and national expenditure. On this basis, national income has been defined in a number of ways. National income means the total value of goods and services produced annually in a country.

18.2 INTRODUCTION TO NATIONAL INCOME

National income is the total net value of all goods and services produced within a nation over a specified period of time, representing the sum of wages, profits, rents, interest, and pension payments to residents of the nation. It is the total amount of income earned by the citizens of a nation. All incomes are based on production. In this sense, national income reflects the level of aggregate output.

The total net value of all goods and services produced within a nation over a specified period of time, representing the sum of wages, profits, rents, interest, and pension payments to residents of the nation. National income is a measure of the total flow of earnings of the factor-owners through the production of goods & services. In a simple way, it is the total amount of income earned by the citizens of a nation. All incomes are based on production. In this sense, national income reflects the level of aggregate output.

1. Output or Value-Added Approach:

The total value of all final goods & services (i.e. outputs) can be found by adding up the total values of outputs produced at different stages of production. This method is to avoid the so-called double-counting or an over-estimation of GNP. However, there are difficulties in the collection and calculation of data obtained.

2. Expenditure Approach:

The amount of expenditures refers to all those spending on currently-produced final goods & services only. In an economy, there are 3 main agencies which buy goods & services. They are the households, firms and the government. In economics, we have the following terms:

C = Private Consumption Expenditure (of all households)

I = Investment Expenditure (of all firms)

G = Government Consumption Expenditure (of the local government)

The expenditure approach is to measure the GNP. We could not buy all our outputs because some are exported to overseas. Similarly, our consumption expenditures

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may include the purchases of some imports. In order to find the GNP, the value of exports must be added to C, I & G whereas the value of imports must be deducted from the above amount. Finally, we have:

G N P at market prices = C + I + G + X - M

G N P = G D P + Net Income from abroad

3. Income Approach:

The income approach tries to measure the total flows of income earned by the factor-owners in the provision of final goods & services in a current period. There are 4 types of factors of production and 4 types of factor incomes accordingly.

National Income = Wages + Interest Income + Rental Income + Profit

The term profit can be further sub-divided into: Profit Tax; Dividend to all those shareholders; & Retained Profit (or retained earnings).

18.3 TRENDS IN NATIONAL INCOME

India began the process of planned development nearly thirty years ago with the start of the First Five year plan in April, 1951. The central purpose of planning was identified as that of initiating "a process of development" which will raise living standards and open out to the people new opportunities for a richer and more varied life. In a broad sense, the basic objectives of planning in India can be grouped under four heads: growth, modernization, self-reliance and social justice. Since 1951, the NNP increased at a modest rate of 3.4 percent per annum.

Between 1950-51 and 1978-79 the underlying trend rate of growth of national income was 3.5 percent, of agricultural production 2.7 percent and of industrial production 6.1 percent. In per capital terms, income has grown at a trend rate of 1.3 percent, which, after allowing for the rising share of investment in national income, has meant a modest 1.1 percent per annum rise in per capita consumption.

The growth of the economy during the planning era has to be judged in the context of the prolonged period of stagnation that preceded Independence. Judging by expert estimates of the national income of undivided India, the trend growth rate between 1900-01 and 1945-46 was 1.2 percent for national income, about 0.3 percent for agricultural production and 2.0 percent for industrial production.

The trend rate of growth suddenly picked up and for ten years during the eighties, the NNP increased at the rate of 5.6 percent per annum. In the two years 1990-91 and 1991-92 the country was trapped in a deep economic crisis and this resulted

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in a decline in the growth rate. The new economic policy of 1991 charted out a high growth path for India. The Eight Plan Period saw an increase in NNP of 6.7 percent per annum and the per capita income was as high as 4.6 percent per annum. In 2002-03, the economy slowed down and national income rose by only 4.2 percent. However, 9.0 percent increase in national income in 2003-04 kindled false hopes that the Indian economy was treading on the growth path. But high economic growth in this period was the result of remarkably good monsoon performance resulting in 9.6 percent increase in agricultural production and thus was illusory. The last three years have recorded an average annual rate of growth of national income of over 8%. The Eleventh Five year Plan has set a target for attaining an annual growth rate of 9%. Given the current trends and the general policy direction, this is a feasible proposition.

18.4 CONCEPTS OF NATIONAL INCOME

The important concepts of national income are:

1. Gross Domestic Product (GDP)
2. Gross National Product (GNP)
3. Net National Product (NNP) at Market Prices
4. Net National Product (NNP) at Factor Cost or National Income
5. Personal Income
6. Disposable Income

1. Gross Domestic Product (GDP):

Gross Domestic Product (GDP) is the total market value of all final goods and services currently produced within the domestic territory of a country in a year.

Four things must be noted regarding this definition.

First, it measures the market value of annual output of goods and services currently produced. This implies that GDP is a monetary measure.

Secondly, for calculating GDP accurately, all goods and services produced in any given year must be counted only once so as to avoid double counting. So, GDP should include the value of only final goods and services and ignores the transactions involving intermediate goods.

Thirdly, GDP includes only currently produced goods and services in a year. Market transactions involving goods produced in the previous periods such as old houses, old cars, factories built earlier are not included in GDP of the current year.

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Lastly, GDP refers to the value of goods and services produced within the domestic territory of a country by nationals or non-nationals.

2. Gross National Product (GNP):

Gross National Product is the total market value of all final goods and services produced in a year. GNP includes net factor income from abroad whereas GDP does not. Therefore,

GNP = GDP + Net factor income from abroad.

Net factor income from abroad = factor income received by Indian nationals from abroad – factor income paid to foreign nationals working in India.

3. Net National Product (NNP) at Market Price:

NNP is the market value of all final goods and services after providing for depreciation. That is, when charges for depreciation are deducted from the GNP we get NNP at market price. Therefore'

NNP = GNP – Depreciation

Depreciation is the consumption of fixed capital or fall in the value of fixed capital due to wear and tear.

4. Net National Product (NNP) at Factor Cost (National Income):

NNP at factor cost or National Income is the sum of wages, rent, interest and profits paid to factors for their contribution to the production of goods and services in a year. It may be noted that:

NNP at Factor Cost = NNP at Market Price – Indirect Taxes + Subsidies

5. Personal Income:

Personal income is the sum of all incomes actually received by all individuals or households during a given year. In National Income there are some income, which is earned but not actually received by households such as Social Security contributions, corporate income taxes and undistributed profits. On the other hand there are income (transfer payment), which is received but not currently earned such as old age pensions, unemployment doles, relief payments, etc. Thus, in moving from national income to personal income we must subtract the incomes earned but not received and add incomes received but not currently earned. Therefore,

Personal Income = National Income – Social Security contributions – corporate income taxes – undistributed corporate profits + transfer payments.

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Disposable Income:

From personal income if we deduct personal taxes like income taxes, personal property taxes etc. what remains is called disposable income. Thus,

Disposable Income = Personal income – personal taxes.

Disposable Income can either be consumed or saved. Therefore,

Disposable Income = consumption + saving.

18.5 FACTORS AFFECTING NATIONAL INCOME

1. Factors of Production:

Normally the more efficient and richer the resources, the higher the level of national income or GNP will be.

Land: Resources like coal, iron & timber are essential for heavy industries so that they must be available and accessible. In other words, the geographical location of these natural resources affects the level of GNP.

Capital: Capital is greatly determined by investment. Investment in turn depends on other factors like profitability, political stability etc.

Labour & Entrepreneur: The quality or productivity of human resources is more important than quantity. Manpower planning and education affect the productivity and production capacity of an economy.

2. Technology:

This factor is more important for nations with little natural resources. The development in technology is affected by the level of invention and innovation on production.

3. Government:

Government can help to provide a favourable business environment for investment. It provides laws and order, regulations that affect exchanges. The government promotes free trade and competition which encourage economic activities.

4. Political Stability:

A stable economic and political system helps the allocation of resources. Wars, strikes and social unrests will discourage investment and business activities.

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Uses of National Income Statistics

1. **Standard of Living:** The per capita GNP allows us to compare the standard of living of different nations. In general, a nation has a higher standard of living if its per capita GNP is greater than that of another nation.
2. **Policy Formulation:** In the compilation of GNP statistics, the government had already gathered a lot of information of the economy. The government can base on these figures to plan and decide its policies.
3. **International Comparison:** By converting the local GNP figures into a common unit, we can compare the standard of living of different nations. It helps to show the rate of growth or development of different nations.
4. **Business Decision:** The GNP figures can show the level of development of different industries and sectors of an economy. It helps the businessmen to plan for production.

18.6 METHODS OF MEASURING NATIONAL INCOME

Since factor incomes arise from production of goods and services, and since incomes are expended on goods and services produced, three alternative methods of measuring national income are possible:

1. Output or Production method
2. Income method, and
3. Expenditure method.

1. Output or Production Method:

This method is also called the value-added method. This method approaches national income from the output side. Under this method, the economy is divided into different sectors such as agriculture, fishing, mining, construction, manufacturing, trade and commerce, transport, communication and other services. Then, the gross product is found out by adding up the net values of all the production that has taken place in these sectors during a given year.

In order to arrive at the net value of production of a given industry, intermediate goods purchase by the producers of this industry is deducted from the gross value of production of that industry. The aggregate or net values of production of all the industry and sectors of the economy plus the net factor income from abroad will give us the GNP. If we deduct depreciation from the GNP we get NNP at market price.

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NNP at market price – indirect taxes + subsidies will give us NNP at factor cost or National Income.

The output method can be used where there exists a census of production for the year. The advantage of this method is that it reveals the contributions and relative importance and of the different sectors of the economy.

2. Income Method:

This method approaches national income from the distribution side. According to this method, national income is obtained by summing up of the incomes of all individuals in the country. Thus, national income is calculated by adding up the rent of land, wages and salaries of employees, interest on capital, profits of entrepreneurs and income of self-employed people. This method of estimating national income has the great advantage of indicating the distribution of national income among different income groups such as landlords, capitalists, workers, etc.

3. Expenditure Method:

This method arrives at national income by adding up all the expenditure made on goods and services during a year. Thus, the national income is found by adding up the following types of expenditure by households, private business enterprises and the government:

(a) Expenditure on consumer goods and services by individuals and households denoted by C. This is called personal consumption expenditure denoted by C.

(b) Expenditure by private business enterprises on capital goods and on making additions to inventories or stocks in a year. This is called gross domestic private investment denoted by I.

(c) Government's expenditure on goods and services i.e. government purchases denoted by G.

(d) Expenditure made by foreigners on goods and services of the national economy over and above what this economy spends on the output of the foreign countries i.e. exports – imports denoted by (X – M). Thus,

$$\mathbf{GDP = C + I + G + (X - M).}$$

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18.7 CHOICE OF METHODS OF MEASURING NATIONAL INCOME

Which method is actually employed, depends on the stage of economic development of a country or the availability of necessary statistics. In advanced countries, where the required statistical information is available, all the methods may be used. In under-developed countries, like India, complete and accurate statistics are not available.

For instance, people are not in the habit of keeping accounts of personal expenditure. Hence the use of the expenditure method is out of the question. Even statistics of personal incomes are only partially available. Industrial and business houses do maintain proper accounts, but the same thing cannot be said about agriculture which accounts for a substantial part of the national income.

Hence exclusive reliance cannot be placed on the income method. Conditions are, however, a bit favourable for the application of the output method. Statistics of production and prices are readily available.

Hence, in the case of under-developed countries like India, the output method seems to be more suitable. But it needs to be supplemented by the application of the other methods where possible to improve the credibility of national income estimates.

18.8 MEASUREMENT OF NATIONAL INCOME IN INDIA

The National Income Committee used a combination of the "Income Method" and the "Product Method" for estimating national income. In the agricultural and industrial sectors of the economy, the product method was used and the net value of production during the year was computed and incorporated into the national income estimates. But in the fields of commerce, transport, banking and the services, income method was used.

A sample of individual incomes was taken as the starting point and the total income generated in these sectors was estimated by multiplying this representative income by the number of people working in those fields. The sum total of the incomes generated in these various sectors of the economy is the national income of the country.

The National Income Unit of the Central Statistical Organization (CSO) estimates a major part of the national incomes by the product method, e.g., in sectors like agriculture, animal husbandry, forestry, fishing, mining and factory establishments.

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And the "income method" is used in the estimation of national income in the case of other sectors.

18.9 GROWTH AND COMPOSITION OF INDIA'S NATIONAL INCOME

Changes in composition of national income or structural changes in national income or changes in national income by industry of origin refers to changes in relative significance (share) of different sectors of the economy.

Generally, an economy is divided into three major sectors viz primary, secondary and tertiary. With the development of an economy, the significance of primary sector declines while that of secondary and tertiary sectors increases.

After independence India has also experienced such changes. The share of primary sector in GDP has declined from 59% in 1950-51 around 17 per cent in 2009-10.

Within the primary sector, the share of agriculture and allied activities in GDP has gone down from 57 per cent to around 15 per cent over these years. One thing is to be noted that it is a decline only in percentage share of agriculture in national income, the total volume of agriculture production is actually rising.

The growth has fallen in percentage terms because industrial output and value of products in the service sector has grown faster than the pace of growth of agricultural production. The share of the secondary sector has almost doubled from 13 per cent in 1950-51 to 24.5 per cent in 1990-91.

However, its share in GDP has not shown much change in the later years. It has varied around 24 to 26 per cent since 2000-01. The share of the registered manufacturing units has gone up from about 4 per cent in 1950-51 to over 12 per cent in 2009-10.

Within the secondary sector, the percentage share of manufacturing especially registered manufacturing and construction has been rising and that of gas, electricity and water supply has remained almost constant.

The service sector (tertiary sector) has grown substantially since 1950-51, with its share in GDP going up from 28 per cent in 1950-51 to over 57 per cent in 2009-10.

Within the tertiary sector, all sectors have been growing rapidly. Trade, hotels, transport and communication is the largest sector which contributes about 22.5% share to GDP. Financial sector has been the fastest growing sector after independence and especially after nationalisation of banks in 1969 and 1980.

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Since the 1980's growth process in India has been marked by a robust performance of services sector. Growth rate of this sector improved from 6.6 per cent during the decade 1981-90 to 7.6 per cent during 1991-2000. During 2001-02 and 2009-10, services sector grew by nearly 10 per cent.

Though both secondary and tertiary sectors have grown faster than the primary sector but increase in the share of tertiary sector has been higher than that in secondary sector. The average growth rate of primary sector has been 2.5% per annum while that of secondary sector and tertiary sector has remained around 5% during the planning period.

Earlier the primary sector was dominant but now tertiary sector is dominant in the economy. The secondary sector never remained dominant in the economy. This pattern of structural changes has deviated from the development pattern of the western countries.

Those countries experienced first a shift from primary to secondary sector and only in their advanced stage they experienced a significant shift in favour of tertiary sector.

Thai pattern of development enabled them to transfer growing labour force from primary to secondary sector. In India this has not been possible because secondary sector has not expanded fast enough to absorb growing labour force.

Public and Private Sectors:

After independence India adopted mixed economy with more place for public sector (government sector). Since then significance of public sector has been rising. At the time of independence, share of public sector in GDP was merely 7% which rose to around one fourth in 1990 91.

In 2004 05 its share stands at 23.0%. During 1990s i.e., after the introduction of the New Economic Policy the share of public sector has been almost stagnant and is expected to fall in the future in the wake of privatisation and globalisation.

18.10 DIFFICULTIES IN THE MEASUREMENT OF NATIONAL INCOME

There are many difficulties in measuring national income of a country accurately. The difficulties involved are both conceptual and statistical in nature. Some of these difficulties or problems are discuss below:

1. The first problem relates to the treatment of non-monetary transactions such as the services of housewives and farm output consumed at home. On this point, the general agreement seems to be to exclude the services

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of housewives while including the value of farm output consumed at home in the estimates of national income.

2. The second difficulty arises with regard to the treatment of the government in national income accounts. On this point the general viewpoint is that as regards the administrative functions of the government like justice, administrative and defense are concerned they should be treated as giving rise to final consumption of such services by the community as a whole so that contribution of general government activities will be equal to the amount of wages and salaries paid by the government. Capital formation by the government is treated as the same as capital formation by any other enterprise.
3. The third major problem arises with regard to the treatment of income arising out of the foreign firm in a country. On this point, the IMF viewpoint is that production and income arising from an enterprise should be ascribed to the territory in which production takes place. However, profits earned by foreign companies are credited to the parent company.

Special Difficulties of Measuring National Income in Under-developed Countries

In under-developed countries like India, we face some special difficulties in estimating national income. Some of these difficulties are:

1. The first difficulty arises because of the prevalence of non-monetized transactions in such countries so that a considerable part of the output does not come into the market at all. Agriculture still being in the nature of subsistence farming in these countries, a major part of output is consumed at the farm itself.
2. Because of illiteracy, most producers have no idea of the quantity and value of their output and do not keep regular accounts. This makes the task of getting reliable information very difficult.
3. Because of under-development, occupational specialization is still incomplete, so that there is lack of differentiation in economic functioning. An individual may receive income partly from farm ownership, partly from manual work in industry in the slack season, etc. This makes the task of estimating national income very difficult.
4. Another difficulty in measuring national income in under-developed countries arises because production, both agriculture and industrial, is unorganized and scattered in these countries. In India, agriculture, household craft, and indigenous banking are the unorganized and scattered

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sectors. An assessment of output produced by self-employed agriculturist, small producers and owners of household enterprises in the unorganized sectors requires an element of guesswork, which makes the figure of national income unreliable.

5. In under-developed countries there is a general lack of adequate statistical data. Inadequacy, non-availability and unreliability of statistics is a great handicap in measuring national income in these countries.

18.11 LIMITATIONS OF NATIONAL INCOME STATISTICS

GNP is a measure of the overall flow of goods & services, as well as to show the general welfare of the people. It aims not only at the level of cost of living but also the standard of living. It is quite correct to show the cost of living but there are some limitations on the GNP statistics to indicate the standard of living of an economy.

1. Price Changes:

A higher nominal GNP of a nation may not mean that the standard of living is better. If the prices increase at a high rate, the real GNP may even fall.

2. Omittion or Under-estimation

(i) **Voluntary Services**: GNP figures do not include the contribution of the voluntary agencies which raise the general welfare. In this respect, the GNP figures under-estimate the level of welfare. The voluntary work of housewives is also neglected by the GNP figures.

(ii) **Leisure:** It is also a source of welfare and raises our standard of living, e.g. the welfare enjoyed with a Chinese New Year Holiday. However, the monetary value is difficult to calculate.

(iii) **Illegal Activities:** Drug trafficking and illegal gambling are activities omitted in the value of GNP. It is difficult to determine its effect on the welfare of an economy.

(iv) **Undesirable Effects of Production:** GNP figures had not considered the effects of pollution, traffic congestion on the economy. They have lowered our standard of living.

3. Problems of Comparison

(i) **Output Composition:** Nations with the same GNP may have different living standard because their output composition may be different. In

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general, a higher level of consumer goods & services in the GNP indicates a higher current level of living standard.

(ii) Distribution of Income & Wealth: If income is obtained by a small rate of people in a nation, the general living standard is still low compared with a nation having a more evenly distributed income or GNP.

4. Other Limitations

(i) Population Size: A large population has a lower living standard even if its GNP is the same as that of a small population. The per capita GNP is more useful to compare the 2 nations.

(ii) National Defense: If a nation has spent a lot of resources in the production of weapons and so on, its living standard may not be improved.

18.12 THE PROBLEMS IN COMPUTATION OF NATIONAL INCOME

The several problems in computation of national income are as follows:

1. Lack of statistical data and unreliability of statistics is the major problem in measuring the national income.
2. The biggest difficulty in calculating the national income is of double counting which arises from the failure, to distinguish properly between a final and intermediate product.
3. Income earned through illegal activities such as gambling is not included in national income. Such goods and services do have value and meet the needs of the consumers. But by leaving them out, national income works out to less than actual.
4. The National income must be calculated in monetary terms. There are certain non monetary transactions which are not included in the value of a product for e.g. the unpaid personal services of a housewife cannot be included i the national product.
5. Government services such as justice, administration and defense should be treated as equivalent to any other capital formation.
6. The treatment of profits of foreign firms as income of the parent country is another difficulty in measurement of national income, because the foreign firm's production is taking place in India while the profits of the firm are not considered in the income calculation of the country.

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7. In underdeveloped countries like India, the major part of the output does not come to the market due to non monetized transaction. This results in the underestimation of the national income.
8. Due to illiteracy, regular accounts are not kept by the producers. This also makes the national income calculation difficult.
9. The agriculture and industrial sectors are unorganized and scattered in India. This does not admit easy calculation.
10. There arises difficulty of including transfer payments in calculating the national income. Individuals get pension, unemployment allowance and interest on public loan. Such payments are not given for any productive work but yet are included in calculation of national income.

18.13 SUMMARY

National income is an uncertain term which is used interchangeably with national dividend, national output and national expenditure. On this basis, national income has been defined in a number of ways. National income means the total value of goods and services produced annually in a country.

National income is the total net value of all goods and services produced within a nation over a specified period of time, representing the sum of wages, profits, rents, interest, and pension payments to residents of the nation. It is the total amount of income earned by the citizens of a nation. All incomes are based on production. In this sense, national income reflects the level of aggregate output.

The total net value of all goods and services produced within a nation over a specified period of time, representing the sum of wages, profits, rents, interest, and pension payments to residents of the nation. National income is a measure of the total flow of earnings of the factor-owners through the production of goods & services. In a simple way, it is the total amount of income earned by the citizens of a nation. All incomes are based on production. In this sense, national income reflects the level of aggregate output.

The total value of all final goods & services (i.e. outputs) can be found by adding up the total values of outputs produced at different stages of production. This method is to avoid the so-called double-counting or an over-estimation of GNP. However, there are difficulties in the collection and calculation of data obtained.

The amount of expenditures refers to all those spending on currently-produced final goods & services only. In an economy, there are 3 main agencies which buy goods & services. They are the households, firms and the government.

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The income approach tries to measure the total flows of income earned by the factor-owners in the provision of final goods & services in a current period. There are 4 types of factors of production and 4 types of factor incomes accordingly.

India began the process of planned development nearly thirty years ago with the start of the First Five year plan in April, 1951. The central purpose of planning was identified as that of initiating "a process of development" which will raise living standards and open out to the people new opportunities for a richer and more varied life. In a broad sense, the basic objectives of planning in India can be grouped under four heads: growth, modernization, self-reliance and social justice. Since 1951, the NNP increased at a modest rate of 3.4 percent per annum.

Between 1950-51 and 1978-79 the underlying trend rate of growth of national income was 3.5 percent, of agricultural production 2.7 percent and of industrial production 6.1 percent. In per capital terms, income has grown at a trend rate of 1.3 percent, which, after allowing for the rising share of investment in national income, has meant a modest 1.1 percent per annum rise in per capita consumption.

Gross Domestic Product (GDP) is the total market value of all final goods and services currently produced within the domestic territory of a country in a year.

Gross National Product is the total market value of all final goods and services produced in a year. GNP includes net factor income from abroad whereas GDP does not.

Personal income is the sum of all incomes actually received by all individuals or households during a given year. In National Income there are some income, which is earned but not actually received by households such as Social Security contributions, corporate income taxes and undistributed profits. On the other hand there are income (transfer payment), which is received but not currently earned such as old age pensions, unemployment doles, relief payments, etc. Thus, in moving from national income to personal income we must subtract the incomes earned but not received and add incomes received but not currently earned.

This method is also called the value-added method. This method approaches national income from the output side. Under this method, the economy is divided into different sectors such as agriculture, fishing, mining, construction, manufacturing, trade and commerce, transport, communication and other services. Then, the gross product is found out by adding up the net values of all the production that has taken place in these sectors during a given year.

In order to arrive at the net value of production of a given industry, intermediate goods purchase by the producers of this industry is deducted from the gross value of production of that industry. The aggregate or net values of production of all the industry and sectors of the economy plus the net factor income from abroad will

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give us the GNP. If we deduct depreciation from the GNP we get NNP at market price.

Income Method: This method approaches national income from the distribution side. According to this method, national income is obtained by summing up of the incomes of all individuals in the country. Thus, national income is calculated by adding up the rent of land, wages and salaries of employees, interest on capital, profits of entrepreneurs and income of self-employed people. This method of estimating national income has the great advantage of indicating the distribution of national income among different income groups such as landlords, capitalists, workers, etc.

Expenditure Method: This method arrives at national income by adding up all the expenditure made on goods and services during a year.

The National Income Committee used a combination of the "Income Method" and the "Product Method" for estimating national income. In the agricultural and industrial sectors of the economy, the product method was used and the net value of production during the year was computed and incorporated into the national income estimates. But in the fields of commerce, transport, banking and the services, income method was used.

A sample of individual incomes was taken as the starting point and the total income generated in these sectors was estimated by multiplying this representative income by the number of people working in those fields. The sum total of the incomes generated in these various sectors of the economy is the national income of the country.

The National Income Unit of the Central Statistical Organization (CSO) estimates a major part of the national incomes by the product method, e.g., in sectors like agriculture, animal husbandry, forestry, fishing, mining and factory establishments. And the "income method" is used in the estimation of national income in the case of other sectors.

18.14 GLOSSARY

(a) National income: National income is an uncertain term which is used interchangeably with national dividend, national output and national expenditure. On this basis, national income has been defined in a number of ways. National income means the total value of goods and services produced annually in a country.

(b) Amount of expenditures: The amount of expenditures refers to all those spending on currently-produced final goods & services only. In an economy, there are 3 main agencies which buy goods & services. They are the households, firms and the government.

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The income approach tries to measure the total flows of income earned by the factor-owners in the provision of final goods & services in a current period. There are 4 types of factors of production and 4 types of factor incomes accordingly.

(c) Gross Domestic Product: Gross Domestic Product (GDP) is the total market value of all final goods and services currently produced within the domestic territory of a country in a year.

(d) Gross National Product: Gross National Product is the total market value of all final goods and services produced in a year. GNP includes net factor income from abroad whereas GDP does not.

(e) Personal income: Personal income is the sum of all incomes actually received by all individuals or households during a given year. In National Income there are some income, which is earned but not actually received by households such as Social Security contributions, corporate income taxes and undistributed profits. On the other hand there are income (transfer payment), which is received but not currently earned such as old age pensions, unemployment doles, relief payments, etc. Thus, in moving from national income to personal income we must subtract the incomes earned but not received and add incomes received but not currently earned.

(f) Income Method: This method approaches national income from the distribution side. According to this method, national income is obtained by summing up of the incomes of all individuals in the country. Thus, national income is calculated by adding up the rent of land, wages and salaries of employees, interest on capital, profits of entrepreneurs and income of self-employed people. This method of estimating national income has the great advantage of indicating the distribution of national income among different income groups such as landlords, capitalists, workers, etc.

(g) Expenditure Method: This method arrives at national income by adding up all the expenditure made on goods and services during a year.

18.15 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is National income?
2. What is Gross Domestic Product?
3. What is Personal income?
4. What is Income Method?
5. What is Expenditure Method?

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(B) Extended Answer Questions

1. Discuss about measurement procedures of national income.
2. Explain various methods of measuring national income.
3. Explain various choices of methods for national income.
4. Discuss the preferable measurement of national income in India.
5. Explain the growth and composition of India's national income.

(C) True or False

1. National income is an uncertain term which is used interchangeably with national dividend, national output and national expenditure.
2. The amount of expenditures refers to all those spending on currently-produced final goods & services only.
3. National Income = Wages + Interest Income + Rental Income + Profit
4. Gross Domestic Product (GDP) is the total market value of all final goods and services currently produced within the domestic territory of a country in a year.
5. The National Income Committee used a combination of the "Income Method" and the "Product Method" for estimating national income.

(D) Multiple Choice Questions

1. National income is an uncertain term which is used interchangeably with .....
   (a) National dividend (b) National output
   (c) National expenditure (d) All the above
2. The amount of expenditures refers to all those spending on .....
   (a) currently-produced final goods
   (b) currently-produced final services
   (c) Both a and b
   (d) None of the above
3. What is the total market value of all final goods and services currently produced within the domestic territory of a country in a year?
   (a) Gross Domestic Product (GDP)
   (b) Gross National Product (GNP)
   (c) Both a and b
   (d) None of the above

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(E) Fill in the Blanks

1. ……...is an uncertain term which is used interchangeably with national dividend, national output and national expenditure.
2. The amount of expenditures refers to all those spending on currently-produced final goods &……...
3. National Income = Wages + Interest Income + Rental Income + ……
4. ……..is the total market value of all final goods and services currently produced within the domestic territory of a country in a year.

18.16 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True, 5. True

(D) 1. (d), 2. (c), 3. (a)

(E) 1. National income, 2. Services only, 3. Profit, 4. Gross Domestic Product (GDP)

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18.18 SUGGESTED READINGS

NOTES

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

18.19 TERMINAL QUESTIONS

1. Why National income is an uncertain term? Discuss.

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2. Explain various methods of measuring national income. Explain various choices of methods for national income.

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UNIT 19 THEORY OF NATIONAL INCOME DETERMINATION

Structure:

Objectives

After reading this unit you will understand:

- Determination of National Income
- Two Sector Model: the consumption function, derivation of saving function
- A formal model of national income determination
- Shift in aggregate demand function and multiplier

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19.1 INTRODUCTION

In order to determine national income in an open economy, Keynesian model of national income determination can be used. Under this model, equilibrium level of national income is determined at the level where aggregate demand (aggregate expenditure) equals to the national output.

19.2 DETERMINATION OF NATIONAL INCOME

It is worth noting here that the Keynesian theory is relevant in the context of the short run only since the stock of capital, techniques of production, efficiency of labour, the size of population, forms of business organisation have been assumed to remain constant in this theory.

Further in his model of income determination Keynes assumed that price level in the economy remains unchanged. Therefore, in the Keynesian theory which deals with the short run, the level of income of the country will change as a result of changes in the level of labour employment.

Thus, in free market economy in the short run, when capital stock and technology remain unchanged, income is a function of labour employment. In fact, both income and employment go together. The higher the level of employment, the higher the level of income.

As level of employment is determined by aggregate demand and aggregate supply, the level of income is also determined by aggre-gate demand and aggregate supply. In this article, we shall explain how the equilibrium level of national income is determined through Keynes's income expenditure analysis.

This analysis ex-plains determination of national income by relating income (output) to aggregate expenditure on goods and services. The, aggregate expenditure shows aggregate demand for goods and services. Keynesian theory of income determination can be explained by assuming two sectors in the economy, namely, households and business firms. Keynes focused on this simple two sector model of deter-mination of national income and derived conclusions regarding policy formulation from this basic model.

Analysis of determination of national income can be extended to incorporate Government and foreign trade. This starts with the analysis of determination of national income by taking a simple two-sector economy with a fixed price level.

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19.3TWO-SECTOR MODEL OF NATIONAL INCOME DETERMINATION

A two-sector model of income determination of an economy consists only of domestic and business sectors.

Assumptions:

The income determination in a closed economy is based on the following assumptions:

1. It is a two-sector economy where only consumption and investment expenditures take place. Thus the total output of the economy is the sum of consumption and investment expenditure.
2. Investment relates to net investment after deducting depreciation.
3. It is a closed economy in which there are no exports or imports.
4. There are no corporate firms in the economy so that there are no corporate undistributed profits.
5. There are no business taxes, no income taxes and no social security taxes so that disposable personal income equals NNP.
6. There are no transfer payments.
7. There is no government.
8. There is autonomous investment.
9. The economy is at less than full employment level of output.
10. The price level remains constant up to the level of full employment.
11. The money wage rate is constant.
12. There is stable consumption function.
13. The rate of interest is fixed.
14. The analysis relates to the short period.

Explanation:

Given these assumptions, the equilibrium level of national income can be determined by the equality of aggregate demand and aggregate supply or by the equality of saving and investment.

Aggregate demand is the summation of consumption expenditure on newly produced consumer goods by households and on their services (C), and investment expenditure on newly produced capital goods and inventories by businessmen (I).

It is shown by the following identities: $Y = C+I$ ….(1)

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Personal Income: Yd = C+S….(2)

But Y= Yd

C + I = C + S

Or I = S

Where , Y = national income, Yd = disposable income, C = consumption, S = saving, and I = investment.

In the above identities, C + I relate to consumption and investment expenditures which represent aggregate demand of an economy. C is the consumption function which indicates the relation between income and consumption expenditure.

The consumption function is shown by the slope of the C curve in Fig. 1 which is MPC (marginal propensity to consume). I is investment demand which is autonomous. When investment demands (I) is added to consumption function (C), the aggregate demand function becomes C+I.

C+S identity is related to the aggregate supply of an economy. That is why, consumer goods and services are produced from total consumption expenditure and aggregate savings are invested in the production of capital goods.

In an economy, the equilibrium level of national income is determined by the equality of aggregate demand and aggregate supply (C+I=C+S) or by the equality of saving and investment (S=I).

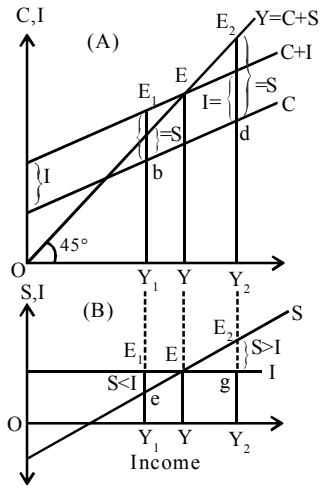

Fig. 19.1

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Equality of Aggregate Demand and Aggregate Supply:

The equilibrium level of national income is determined at a point where the aggregate demand function (curve) intersects the aggregate supply function. The aggregate demand function is represented by C+I in the figure. It is drawn by adding to the consumption function C the investment demand I.

The 45° line represents the aggregate supply function, Y = C+S. The aggregate demand function C+I intersects the aggregate supply function Y= C+S at point E in Panel (A) of Figure 1 and the equilibrium level of income OY is determined.

Suppose there is disequilibrium in aggregate supply and aggregate demand of the economy. Disequilibrium can be in either case, aggregate supply exceeding aggregate demand or aggregate demand exceeding aggregate supply. How will the equilibrium level of income be restored in the two situations?

First, take the case when aggregate supply exceeds aggregate demand. This is shown by OY2 level of income in Panel (A) of the figure. Here aggregate output or supply is Y2E2 and aggregate demand is Y2k. The disposable income is OY2 (=Y2E2). At this income level OY2, consumers will spend Y2d on consumption goods and save dE2.

But businessmen intend to make investment equal to dk in order to buy investment goods. Thus the aggregate demand for consumption goods and investment goods is Y2d + dk = Y2k. But aggregate supply (or output) Y2E2 is greater than aggregate demand Y2k by kE2 (=Y2E2 – Y2k).

Therefore, the surplus output of goods worth kE2 accumulated by businessmen in the form of unintended inventories. In order to avoid further inventory accumulation, they will reduce production. As a result of the reduction in output, income and employment will fall and the equilibrium level of income will be restored at OY where the aggregate supply equals aggregate demand at point E.

The second situation of disequilibrium when aggregate demand exceeds aggregate supply is shown by the income level of OY1 in Panel (A) of the figure. Here the aggregate demand is Y1E1 and the aggregate output is Y1a. The disposable income is OY1 (=Y1a).

At this income level, consumers spend Y1b on consumption goods and save ba. But businessmen intend to invest bE, to buy investment goods. Thus the aggregate demand is Y1b + bE1= Y1E1 which is greater than the aggregate supply of goods Y1a by aE1.

To meet this excess demand worth aE1, businessmen will have to reduce inventories by this amount. In order to stop further reduction in their inventories, businessmen will increase production. As a result of the increase in production,

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output, income and employment will increase in the economy and the equilibrium level of income OY will be restored again at point E.

Equality of Saving and Investment:

The equilibrium level of income can also be shown by the equality of the saving and investment functions. Since the equilibrium level of income is determined when aggregate supply (C+S) equals aggregate demand (C + I) in the economy, intended (or planned) saving also equals intended (or planned) investment. This can be shown algebraically

$$C + S = C + 1$$

$$S = I$$

The equilibrium level of income in terms of the equality of saving and investment is shown in Panel (B) of Figure 1, where I is the autonomous investment function and S is the saving function. The saving and investment functions intersect at point E which determines the equilibrium level of income OY.

If there is disequilibrium in the sense of inequality between saving and investment, forces will operate in the economy and the equilibrium position will be restored. Suppose the income level is OY2 which is above the equilibrium income level OY.

At this income level OY2, saving exceeds investment by gE2. It means that people are consuming and spending less. Thus aggregate demand is less than aggregate supply. This will lead to the accumulation of unintended inventories with businessmen. To avoid further accumulation of inventories, businessmen will reduce production. Consequently, output, income and employment will be reduced till the equilibrium level of income OY is reached at point E where S=I.

On the contrary, if the income level is less than the equilibrium level, investment exceeds saving. This is shown by OY1 level of income when investment Y1E1 is greater than saving. The excess of intended investment over intended saving means that aggregate demand is greater than aggregate supply by eE1.

Since aggregate output (or supply) is less than aggregate demand, businessmen will decrease inventories held by them. To stop further reduction in their inventories, they will increase production. Consequently, output, income and employment will increase in the economy and the equilibrium level of income OK will be again reached at point E.

The determination of equilibrium level of income simultaneously by the equality of aggregate demand and aggregate supply and of saving and investment is explained in Table 19.1 below.

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Table 19.1

Panel (A)			Panel (B)
Y=C+I	at the equilibrium point	E	and a=1
Y>C+I	to the right of	E	and S>I
Y<C+I	to the left of	E	and S< I

19.4 A FORMAL MODEL OF NATIONAL INCOME DETERMINATION

According to Keynes, there can be different sources of national income, such as government, foreign trade, individuals, businesses and trusts. For determining national income, Keynes had divided the different sources of income into four sectors namely' household sector, business sector, government sector, and foreign sector.

He prepared three models for the determination of national income, which are shown in Fig. 19.2:

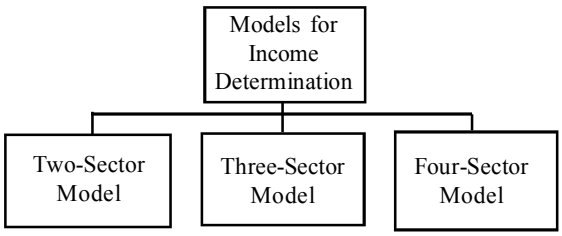

Fig. 19.2: Different Models of National Income Determination

The two-sector model of economy involves households and businesses only, while three-sector model represents households businesses, and government. On the other hand, the four-sector model contains households, businesses, government, and foreign sector.Let us discuss these three types of models of income determination given by Keynes.

Determination of National Income in Two-Sector Economy:

The determination of level of national income in the two-sector economy is based on an assumption that two-sector economy is an economy where there is no intervention of the government and foreign trade.

Apart from this, an economy can be a two-sector economy if it satisfies the following assumptions:

(a) Comprises only two sectors, namely, households and businesses. The households are the owners of factors of production and provide factor

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services to businesses to earn their livelihood in the form of wages, rents, interest, and profits. In addition the households are the consumers of final goods and services produced by businesses. On the other hand, businesses purchase factor services from households to produce goods and services and sell it to households.

(b) Does not have government interference. If government is there, it does not have any role to play in the economic activity of a country. For example, in the two-sector economy, the government is not involved in activities, such as taxation, expenditure, and consumption.

(c) Comprises a closed economy in which the foreign trade does not exist. In other words, import and export services are absent in such an economy.

(d) Contains no profit that is undistributed or savings by the organization. In other words, the profit earned by an organization is completely distributed in the form of dividends among shareholders.

(e) Keeps the prices of goods and services, supply of factors of production, and production technique constant throughout the life cycle of organization.

Keynes believed that there are two major factors that determine the national income of a country. These two factors are Aggregate Supply (AS) and Aggregate Demand (AD) of goods and services.

In addition, he believed that the equilibrium level of national income can be estimated when AD = AS. Before representing the relationship between AS and AD on a graph, let us understand these two concepts in detail.

Aggregate Supply:

AS can be defined as total value of goods and services produced and supplied at a particular point of time. It comprises consumer goods as well as producer goods. When goods and services produced at a particular point of time is multiplied by the respective prices of goods and services, it provides the total value of the national output. The national output is the aggregate supply in the form of money value. The Keynesian AS curve is drawn based on an assumption that total income is equal to total expenditure. In other words, the total income earned is fully spent on different types of goods and services.

The correlation between income and expenditure is represented by an angle of 45°, as shown in Fig. 19.3:

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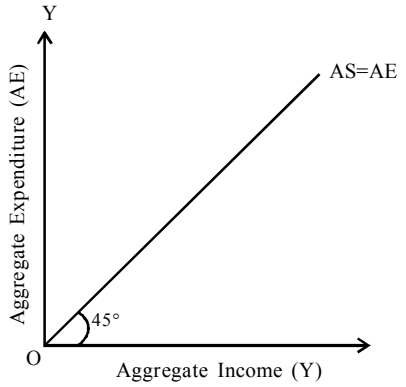

Fig. 19.3: Aggregate Supply Curve

According to Keynes theory of national income determination, the aggregate income is always equal to consumption and savings.

The formula used for aggregate income determination:

Aggregate Income = Consumption(C) + Saving (S)

Therefore, the AS schedule is usually called C + S schedule. The AS curve is also named as Aggregate Expenditure (AE) curve.

Aggregate Demand:

AD refers to the effective demand that is equal to the actual expenditure. Aggregate effective demand refers to the aggregate expenditure of an economy in a specific time frame. AD involves two concepts, namely, AD for consumer goods or consumption (C) and aggregate demand for capital goods or investment (I).

Therefore, the AD can be represented by the following formula:

AD = C + I

Therefore, AD schedule is also termed as C+I schedule. According to Keynes theory of national income determination in short-run investment (I) remains constant throughout the AD schedule, while consumption (C) keeps on changing. Therefore, consumption (C) acts as the major determinant or function of income (Y).

The consumption function can be expressed as follows:

C = a + bY

Where, a = constant (representing consumption when income is zero)

b = proportion of income consumed = "C/"Y

By substituting the value of consumption in the equation of AD, we get:

AD = a + bY + I

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Let us prepare an AD schedule by assuming that the investment is ₹ 50 billion and consumption function of a product is:

$$C = 50 + 0.5\ Y$$

Therefore, aggregate demand would be:

$$AD = a + b\ Y + I$$

$$AD = 50 + 0.5\ Y + 50$$

$$AD = 100 + 0.5\ Y$$

The aggregate demand schedule at different income levels is represented in Table 19.2:

Table 19.2: Aggregate Demand Schedule

Income (Y)	C = 50 + 0.5Y	I = 50	Aggregate Demand = C + I
0	50 + 0*0.5 = 50	50	100
50	50 + 50*0.5 = 75	50	125
100	50+ 100*0.5 = 100	50	150
200	50 + 200*0.5 = 100	50	200
300	50 + 300*0.5 = 150	50	250
400	50 + 400*0.5 = 250	50	300
500	50 + 500*0.5 = 300	50	350
600	50 + 600*0.5 = 350	50	400

In Table 19.1, the column of income represents the aggregate supply and the column of aggregate demand represents expenditure. In Table-1, it can be noticed that at ₹ 200 billion of income level, aggregate supply and aggregate demand are equal. Therefore, ₹ 200 billion is the equilibrium point for the two-sector economy.

Fig. 19.4 represents the graphical representation of national income determination in the two-sector economy:

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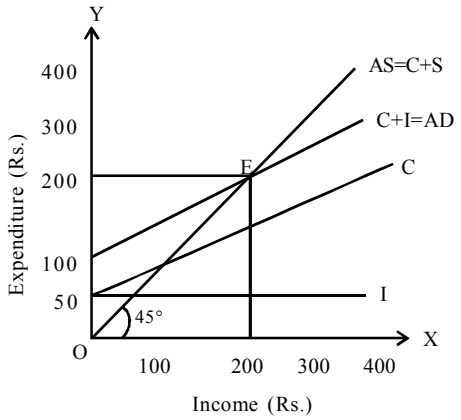

Fig. 19.4: National Income Determination

In Fig. 19.4, while drawing AS schedule it is assumed that the total income and total expenditure are equal. Therefore, the numerical value of AS schedule is one. AD schedule is prepared by adding the schedule of C and I. The aggregate demand and aggregate supply intersect each other at point E, which is termed as equilibrium point.

The income level at point E is ₹ 200 billion, which represents the national income of the economy. The schedule curve after point E represents that the AS is greater than AD (AS > AD). In such a situation, the products and services are costing more than ₹ 200 billion; therefore, households are not willing to buy them.

Therefore, the supply of products and services exceeds their demand. As a result, businesses would have a pile of unsold stocks. For example, in Table-1, when the income or aggregate supply is at ₹ 300 then the aggregate demand or expenditure is ₹ 250, which is less than the aggregate supply.

Similarly, beneath point E, the AD and AS schedules represent that the aggregate demand is more than aggregate supply. In such a case, the production by businesses is less than the demand of households. Therefore, businesses start producing more and more products and services. For example, in Table-1, when the income or aggregate supply is ₹ 100 then the aggregate demand is ₹ 150, which is more than the aggregate supply.

The equilibrium condition of national income determination can be expressed as follows:

Aggregate demand = Aggregate supply

C + I = C-HS

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Therefore, I = S

Thus, the national income can be determined by using either aggregate demand and aggregate supply schedules or investment and savings schedules. These two methods of income determination are classified as income-expenditure approach and saving- investment approach.

Income-Expenditure Approach:

Income-expenditure approach refers to the method in which the aggregate demand and aggregate supply schedules are used for the determination of national income.

In this method, the equilibrium point is achieved when the following condition is satisfied:

$$C+I = C+S$$

As, C + S = Y, therefore, the equilibrium condition of national income determination would become:

$$Y = C + I$$

At equilibrium point, the consumption is equal to:

$$C = a + bY$$

Substituting the value of C in the national income equilibrium condition, we get:

$$Y = a + bY + I$$

$$\text{Or, } Y (1- b) = a + I$$

$$\text{Thus, } Y = 1/1\text{-}b (a + I)$$

For the determination of national income with the help of income-expenditure approach, let us assume that the consumption function is

$$C = 200 + 0.50Y \text{ and } I = 150.$$

In such a case, the national income can be calculated as follows:

$$Y = C + I$$

$$Y = 200 + 0.50Y + 150\ 1$$

$$Y = 1/1\text{-}0.50(200 + 150)$$

$$Y = 1/1.50(350)$$

$$Y = 700$$

Therefore, the national income equilibrium in this case is at ₹ 700. The graphical representation of national income determination with the help of income-expenditure approach is shown in Figure 19.5:

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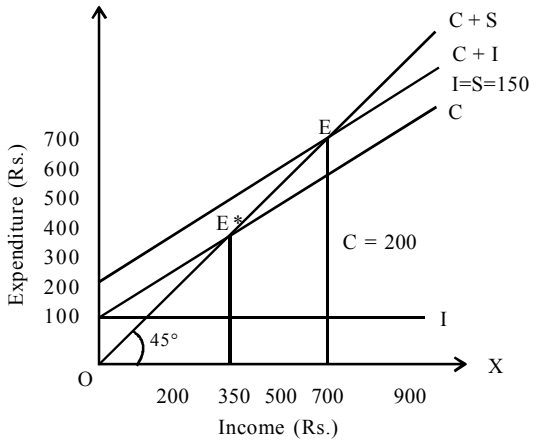

Fig. 19.5: Income-Expenditure Approach

In Fig. 19.5, the schedule of C + S shows the aggregate supply of income while the C + I schedule denotes the aggregate demand. Aggregate demand schedule is drawn by adding C and I schedules. Aggregate demand and aggregate supply schedule intersect each other at point E and the Income level at this point is ₹ 700.

This implies that the national income in the two-sector economy is ₹ 700. In short-run, the equilibrium point remains constant that is the level of national income remains constant. If there is any type of increase or decrease in the aggregate supply/ demand, then they themselves fluctuate in a manner, so that they reach back at the equilibrium point.

Saving-Investment Approach:

Saving-investment approach refers to the method in which the saving (S) and investment (I) are used for the determination of national income. The condition for achieving equilibrium with the help of saving-investment approach is that the saving and investment are equal (I = S).

Let us take the previous assumption that consumption function is equal to C = 200 + 0.50 Y and I = 150 for the determination of national income by using the saving-investment approach.

In such a case, the saving function can be determined as follows:

$$Y = C + S$$

Or,

$$S = Y\text{-}C$$

$$S = Y - (a + bY)$$

$$S = Y - a - bY$$

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$$S = -a + (1-b) Y$$

Therefore, in the present case, the saving function would be:

$$S = -200 + (1 - 0.50) Y$$

$$S = -200 + 0.50 Y$$

At equilibrium point I = S, therefore, the national income equilibrium would be:

$$150 = -200 + 0.50 Y$$

$$Y = 700$$

The national income level at equilibrium point is same in both the cases, income-expenditure approach and saving-investment approach. Fig. 19.6 provides a graphical representation of national income determination by using the saving-investment approach:

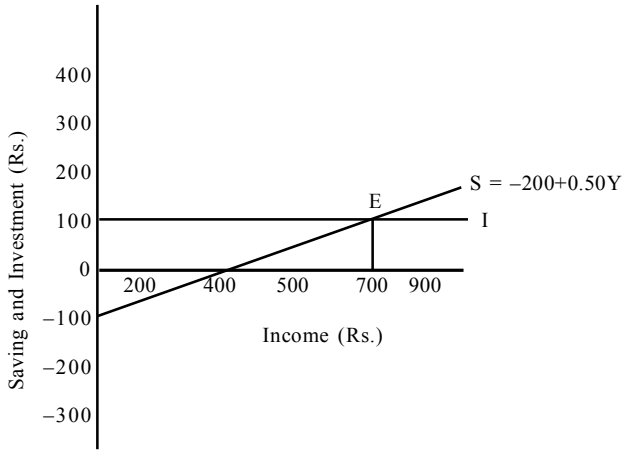

Fig. 19.6: Saving-Investment Approach

In Fig. 19.6, equilibrium point is at E where the investment and saving curve intersects each other. The national income at equilibrium level is ₹ 700.

19.5 SHIFT IN AGGREGATE DEMAND FUNCTION AND MULTIPLIER

A shift in aggregate demand schedule can produce changes in the equilibrium level of national income in the two-sector economy. Therefore, it is necessary to study and understand the shifts that arise in AD schedule and determine measures to get the equilibrium position back. In a two-sector economy, a shift in AD schedule occurs due to a shift in consumption or investment schedule or in both, simultaneously.

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However, shifts in consumption schedule are very rare as it is an income function, whereas investment schedule can fluctuate because of autonomous factors, such as risks and individual perceptions. Therefore, the shift in AD schedule is because of the shifts in investment schedule.

For understanding the impact of shift in AD schedule on equilibrium point, let us assume that the AD schedule is showing an upward shift due to a permanent upward shift in the investment schedule. The investment schedule is shifting due to the autonomous investment in some venture. As a result, the equilibrium point also shifts in the upward direction and the national income also increases.

Fig. 19.7 demonstrates the shift in national income due to shift in equilibrium point and AD schedule:

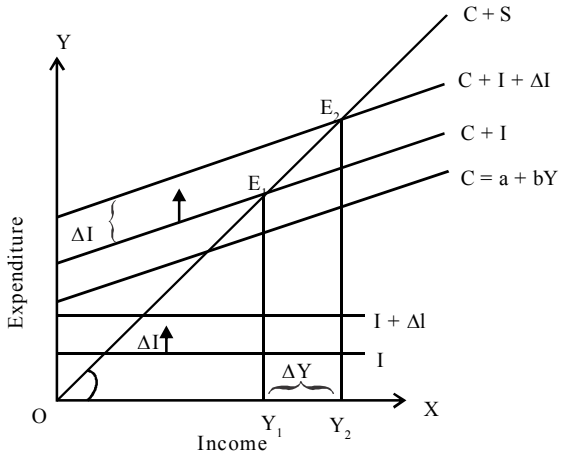

Fig. 19.7: Shifts in Aggregate Demand Function and National Income

In Figure 19.7, C + I schedule represents the initial AD schedule. The initial equilibrium is at point E, where C+S schedule or AS schedule intersects AD schedule and the level of national income is Y_1. Suppose investment increases, which leads to a movement in the investment schedule from I to I + ÄI, showing an upward shift. Consequently, the AD schedule also moves from C + I to C + I + ÄI. With the shift in AD schedule, the equilibrium point reaches to E_2 and level of national income reaches to Y_2.

The increase in national income can be calculated as follows:

$$\ddot{A}Y = Y_2 - Y_1$$

The national income increases due to increase in the investment. Let us determine the relationship between change in national income (ÄY) and change in investment (ÄI) by understanding the concept of multiplier given below.

NOTES

Concept of Multiplier:

The concept of multiplier can be understood by determining the relationship between change in national income (ÄY) and change in investment (ÄI).

According to Figure 19.7, at equilibrium point E_1, the national income is as follows:

$$Y_1 = C + I$$

The consumption is equal to:

$$C = a + bY$$

By substituting the value of C in the equation of national income at point E_1, we get:

$$Y_1 = a + bY_1 + I$$
$$Y_1 = 1/1\text{-}b\ (a + I)$$

Similarly, at equilibrium point E_2, the national income would be:

$$Y_2 = C + I + \Delta I$$
$$Y_2 = a + bY_2 + I + \Delta I$$
$$Y_2 = 1/1\text{-}b\ (a + I + \Delta I)$$

By subtracting Y_1 from Y_2, we get:

$$\Delta Y = 1/1\text{-}b\ (a + I + \Delta I) - Y_2 = 1/1\text{-}b\ (a + I)$$
$$\Delta Y = 1/1\text{-}b\ \Delta I$$

The preceding equation of ÄY determines the relationship between ΔY and ΔI. It implies that ΔY is 1/1-b times of ÄI and 1/I-b is termed as multiplier (m).

The formula used for calculating multiplier is as follows:

$$\Delta Y / \Delta I = 1/1\text{-}b$$

So, $m = 1/1\text{-}b$

In mathematical terms, the multiplier is defined as the ratio of change in national income that occurs due to change in investment. It is also termed as investment multiplier because change produced in national income is due to change in investment.

As discussed earlier that b can be calculated with the help of the following formula:

$$b = \Delta C/\Delta Y$$

This is the equation of Marginal Propensity to Consume (MPC). Therefore:

$$MPC = b = \Delta C/\Delta Y$$

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Thus, it can be said that MPC is the determinant of multiplier value. The value of multiplier would be higher if the value of MPC is greater.

The relationship between m and MPC can be represented as follows:

$$m = 1/1\text{-}b$$

$$m = 1/1\text{-MPC}$$

Multiplier can also be calculated with the help of Marginal Propensity to Save (MPS).

So, the formula for calculating multiplier with the help of MPS is as follows:

m = 1/MPS = 1/1-MPS

Therefore, multiplier can also be termed as the reciprocal of MPS.

The multiplier can be of two types on the basis of its application.

The two types of multiplier are explained in the following points:

(a) Static Multiplier:

Refers to a multiplier in which it is assumed that the change in investment and income are simultaneous. There is no time lag between change in investment with respect to change in income. For example, in Figure-6, the shift in the equilibrium position from E_1 to E_2 is result of change in investment (ΔI) without any time lag.

In case of static multiplier, when the equilibrium position shifts from one point to another, the aggregate MPC does not show any change. In addition, it is also assumed that the consumer tastes and preferences and income distribution remains constant. It is also called comparative static multiplier, simultaneous multiplier, logical multiplier, timeless multiplier, and lagless multiplier.

(b) Dynamic Multiplier:

Refers to the multiplier that analyzes the movement of equilibrium position from one point to another. In a logical sense, there is a time gap between an increase in income with the corresponding increase in autonomous investment. The income cannot rise immediately when an autonomous investment is made because there is always a time lag in increase in income and consumption expenditure.

Let us understand the process of dynamic multiplier with the help of an example. Suppose the autonomous investment increases by ₹ 100 and MPC is equal to 0.8, with no expenditure, except consumption expenditure.

The increase in investment would result in the equal increase of income, which is described as follows:

$$\Delta I = 100 = \Delta y_1$$

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When the income of individuals increases to ₹ 100, the consumption expenditure is ₹ 80 (= 100*0.8) Now, the expenditure of ₹ 80 would become the income for suppliers; therefore, an additional income for suppliers would be Δy_2 = ₹ 8o. Consequently, suppliers would spend ₹ 64 (= 80*0.8).

This produces an additional income for suppliers of consumer goods and services that is equal to Δy_3 = ₹ 64. The additional income continues to produce till the value of change in income. Δy reaches to zero. In the process, the value of Δy decreases continuously from $\Delta y_1 > \Delta y_2 > \Delta y_3$ to Δy_{n-1}.

The calculation of ÄY is shown as follows:

$\Delta Y = \Delta y_1 + \Delta y_2 + \Delta y_3 + \Delta y_4 \ldots\ldots \Delta y_{n-1}$

$\Delta Y = 100 + 100 * (0.8) + 100 * (0.8)^2 + 100 * (0.8)^3 \ldots\ldots + 100 * (0.8)^{n-1}$

$\Delta Y = 100 + 80 + 64 + 51.20 \ldots\ldots \longrightarrow 0$

$\Delta Y = 500$

The value of multiplier can be obtained by using the following formula:

$m = \Delta Y / \Delta I$

$m = 500/100$

$m = 5$

The series of national income can be generalized as follows:

$\Delta Y = \Delta y + \Delta y\,(b) + \Delta y\,(b)^2 + \Delta y\,(b)^3 \ldots\ldots\ldots\ldots \Delta y\,(b)^{n-1}$

$\Delta Y = \Delta y\,(1 + b + b^2 + b^3 \ldots\ldots\ldots\ldots\ldots b^{n-1})$

$\Delta Y = \Delta y\ 1/1\text{-}b$

As $\Delta y = \Delta I$; therefore, the formula of national income can also be written as follows:

$\Delta Y = \Delta I 1/1\text{-}b$

Thus, the formula of dynamic multiplier is as follows:

$m = \Delta Y / \Delta I = 1/1\text{-}b$

Limitations of Multiplier:

Apart from its important uses in macroeconomics, the multiplier also has certain limitations.

Some of the limitations of multiplier that need to be considered while using the concept are as follows:

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(a) Based on MPC:

Refers to the main limitation of multiplier. The value of multiplier depends upon the rate of MPC. Therefore in case the rate of MPC is lower, the value of multiplier would also be lower. Generally as compared to developed countries rate of MPC is higher in developing countries or less developed countries. Therefore, the value of multiplier is also higher in developing countries. However, it is not true in practical situations.

(b) Assumption of income and investment:

Refers to the fact the theory of multiplier is based on an assumption that additional income earned by individuals as a result of some autonomous investment is spent on the consumption of goods and services only which is not the real concept. Individuals can spend their additional income on various resources, such as clearing dues buying second-hand goods, and purchasing imported goods and shares and debentures.

All these resources are termed as leakages in the flow of consumption, which adversely affect the rate of multiplier. For example suppose Mr. A earns ₹ 1, 00,000 from a contract. He pays money to the creditor, Mr. B of his contract. Mr. B buys a second hand car with that amount from Mr. C. Further, Mr. C deposits the money in a foreign bank.

In this way, the money circulates but the demand for new consumer goods and services is not generated. In such a case, the rate of multiplier would be one. The other forms of leakages are idle cash and foreign deposits.

(c) Assumption of adequate supply:

Refers to another major limitation of multiplier. The theory of multiplier is based on an assumption that goods and services are abundant and there would be no scarcity of them in economy. However if there is a situation of scarcity in the economy, then the consumption expenditure would automatically be reduced, irrespective of the rate of MPC.

As a result, the multiplier also reduces. On the contrary, if consumption expenditure keeps on increasing, it would result in inflation, while there would be no increase in the real income.

(d) Not Applicable under the condition of full employment:

Implies that the theory of multiplier does not work in the situation of full employment. This is because in case of full employment there is no scope of producing additional goods and services and generating additional real income.

19.6 SUMMARY

NOTES

In order to determine national income in an open economy, Keynesian model of national income determination can be used. Under this model, equilibrium level of national income is determined at the level where aggregate demand (aggregate expenditure) equals to the national output.

It is worth noting here that the Keynesian theory is relevant in the context of the short run only since the stock of capital, techniques of production, efficiency of labour, the size of population, forms of business organisation have been assumed to remain constant in this theory.

Further in his model of income determination Keynes assumed that price level in the economy remains unchanged. Therefore, in the Keynesian theory which deals with the short run, the level of income of the country will change as a result of changes in the level of labour employment.

Thus, in free market economy in the short run, when capital stock and technology remain unchanged, income is a function of labour employment. In fact, both income and employment go together. The higher the level of employment, the higher the level of income.

As level of employment is deter-mined by aggregate demand and aggregate supply, the level of income is also determined by aggre-gate demand and aggregate supply. In this article, we shall explain how the equilibrium level of national income is determined through Keynes's income-expenditure analysis.

This analysis ex-plains determination of national income by relating income (output) to aggregate expenditure on goods and services. The, aggregate expenditure shows aggregate demand for goods and services. Keynesian theory of income determination can be explained by assuming two sectors in the economy, namely, households and business firms. Keynes focused on this simple two sector model of deter-mination of national income and derived conclusions regarding policy formulation from this basic model.

Analysis of determination of national income can be extended to incorporate Government and foreign trade. This starts with the analysis of determination of national income by taking a simple two-sector economy with a fixed price level.

Aggregate demand is the summation of consumption expenditure on newly produced consumer goods by households and on their services (C), and investment expenditure on newly produced capital goods and inventories by businessmen (I).

The consumption function is shown by the slope of the C curve in Fig. 1 which is MPC (marginal propensity to consume). I is investment demand which is

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autonomous. When investment demands (I) is added to consumption function (C), the aggregate demand function becomes C+I.

C+S identity is related to the aggregate supply of an economy. That is why, consumer goods and services are produced from total consumption expenditure and aggregate savings are invested in the production of capital goods.

In an economy, the equilibrium level of national income is determined by the equality of aggregate demand and aggregate supply (C+I=C+S) or by the equality of saving and investment (S=I).

The equilibrium level of national income is determined at a point where the aggregate demand function (curve) intersects the aggregate supply function. The aggregate demand function is represented by C+I in the figure. It is drawn by adding to the consumption function C the investment demand I.

The 45° line represents the aggregate supply function, Y = C+S. The aggregate demand function C+I intersects the aggregate supply function Y= C+S at point E in Panel (A) of Figure 1 and the equilibrium level of income OY is determined.

The equilibrium level of income can also be shown by the equality of the saving and investment functions. Since the equilibrium level of income is determined when aggregate supply (C+S) equals aggregate demand (C + I) in the economy, intended (or planned) saving also equals intended (or planned) investment.

According to Keynes, there can be different sources of national income, such as government, foreign trade, individuals, businesses and trusts. Keynes had divided the different sources of income into four sectors namely' household sector, business sector, government sector, and foreign sector.

The two-sector model of economy involves households and businesses only, while three-sector model represents households businesses, and government. On the other hand, the four-sector model contains households, businesses, government, and foreign sector.Let us discuss these three types of models of income determination given by Keynes.

The determination of level of national income in the two-sector economy is based on an assumption that two-sector economy is an economy where there is no intervention of the government and foreign trade.

AS can be defined as total value of goods and services produced and supplied at a particular point of time. It comprises consumer goods as well as producer goods. When goods and services produced at a particular point of time is multiplied by the respective prices of goods and services, it provides the total value of the national output. The national output is the aggregate supply in the form of money value. The Keynesian AS curve is drawn based on an assumption that total income is equal to

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total expenditure. In other words, the total income earned is fully spent on different types of goods and services.

AD refers to the effective demand that is equal to the actual expenditure. Aggregate effective demand refers to the aggregate expenditure of an economy in a specific time frame. AD involves two concepts, namely, AD for consumer goods or consumption (C) and aggregate demand for capital goods or investment (I).

Income-expenditure approach refers to the method in which the aggregate demand and aggregate supply schedules are used for the determination of national income.

Dynamic Multiplier refers to the multiplier that analyzes the movement of equilibrium position from one point to another. In a logical sense, there is a time gap between an increase in income with the corresponding increase in autonomous investment. The income cannot rise immediately when an autonomous investment is made because there is always a time lag in increase in income and consumption expenditure.

19.7 GLOSSARY

(a) Keynesian model of national income determination: In order to determine national income in an open economy, Keynesian model of national income determination can be used. Under this model, equilibrium level of national income is determined at the level where aggregate demand (aggregate expenditure) equals to the national output.

(b) Free market economy: Free market economy in the short run, when capital stock and technology remain unchanged, income is a function of labour employment. In fact, both income and employment go together.

(c) Analysis of determination of national income: Analysis of determination of national income can be extended to incorporate Government and foreign trade. This starts with the analysis of determination of national income by taking a simple two-sector economy with a fixed price level.

(d) Aggregate demand: Aggregate demand is the summation of consumption expenditure on newly produced consumer goods by households and on their services (C), and investment expenditure on newly produced capital goods and inventories by businessmen (I).

(e) Consumption function: The consumption function is shown by the slope of the C curve in which is MPC (marginal propensity to consume). I is investment demand which is autonomous. When investment demands (I) is added to consumption function (C), the aggregate demand function becomes C+I.

NOTES

19.8 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Keynesian model of national income determination?
2. What is free market economy?
3. What is analysis of determination of national income?
4. What is aggregate demand?
5. What is consumption function?

(B) Extended Answer Questions

1. Explain about determination of National Income.
2. Discuss two Sector Model: the consumption function, derivation of saving function.
3. Explain a formal model of national income determination.
4. Discuss the shift in aggregate demand function and multiplier.

(C) True or False

1. The equilibrium level of national income is determined at the level where aggregate demand (aggregate expenditure) equals to the national output.
2. The free market economy in the short run, when capital stock and technology remain unchanged, income is a function of labour employment.
3. This analysis ex-plains determination of national income by relating income (output) to aggregate expenditure on goods and services.
4. Analysis of determination of national income can be extended to incorporate Government and foreign trade.
5. Aggregate supply is the summation of consumption expenditure on newly produced consumer goods by households and on their services (C), and investment expenditure on newly produced capital goods and inventories by businessmen (I).

(D) Multiple Choice Questions

1. The equilibrium level of national income is determined at the level where aggregate demand (aggregate expenditure) equals to the……...
   (a) National output (b) National input
   (c) Both a and b (d) None of the above

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2. The free market economy in the short run, when ……
   (a) Capital stock and technology remain unchanged
   (b) Income is a function of labour employment
   (c) Both a and b
   (d) None of the above

(E) Fill in the Blanks

1. ……..is determined at the level where aggregate demand (aggregate expenditure) equals to the national output.
2. ……in the short run, when capital stock and technology remain unchanged, income is a function of labour employment.
3. This analysis ex-plains determination of national income by relating income (output) to aggregate expenditure on…….

19.9 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True, 5. False

(D) 1. (a), 2. (c)

(E) 1. The equilibrium level of national income, 2. The free market economy, 3. goods and services

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9. Keisuke Hirano (2008). "decision theory in econometrics," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
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19.11 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

19.12 TERMINAL QUESTIONS

1. Discuss in details about the consumption function and the derivation of saving function.

2. Discuss two Sector Model: the consumption function, derivation of saving function.

NOTES

3. Explain a formal model of national income determination.

*****

UNIT 20 INCOME DETERMINATION WITH GOVERNMENT AND FOREIGN TRADE

Structure:

Objectives

After reading this unit you will understand:

- Income Determination Model with Government: The three sector Model
- Income determination with foreign trade: A Four Sector Model.

NOTES

20.1 INTRODUCTION

The growth of any economy and distribution of income and wealth in a country are directly associated with exports. Exports play a crucial role in internal trade and economic stability of a country. Moreover, it helps in increasing foreign exchange reserves in a country. The exports of a country are dependent on various factors.

20.2 THREE SECTOR MODEL OF NATIONAL INCOME DETERMINATION

A three-sector model of income determination consists of a two-sector model and the government sector. The government increases aggregate demand by spending on goods and services, and by collecting taxes.

Government Expenditure:

First, we take government expenditure. To explain it, given all the above assumptions except the government sector in the two-sector model, income determination is as follows:

By adding government expenditure (G) to equation (1) of the two-sector model, Y – C + l, we have

$$Y= C+I+G$$

Similarly, by adding government expenditure (G) to the saving and investment equation, when we have

$$Y = C + I + G$$

$$Y = C + S \ [S= Y-C]$$

$$I+G=S$$

Both are illustrated in Figure 20.1(A) and (B). In Panel (A), C+I+G is the new aggregate demand curve which intersects the aggregate supply curve 45° line at point E1 where OY1 is the equilibrium level of income. This income level is more than the income level OY without government expenditure.

Similarly, according to the concept of saving and investment, the new investment curve I+G intersect the saving curve 5 at point in Panel (B). Consequently, the income level OY1 is determined which is more than the income level OY without government expenditure.

It should be noted that by adding government expenditure to consumption and investment expenditure (C + I), the national income increases by YY1 which is more than the government expenditure, "Y>G in Panel (A) of the figure. This is

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due to the multiplier effect which depends upon the value of MPC or MPS where MPC or MPS < 1.

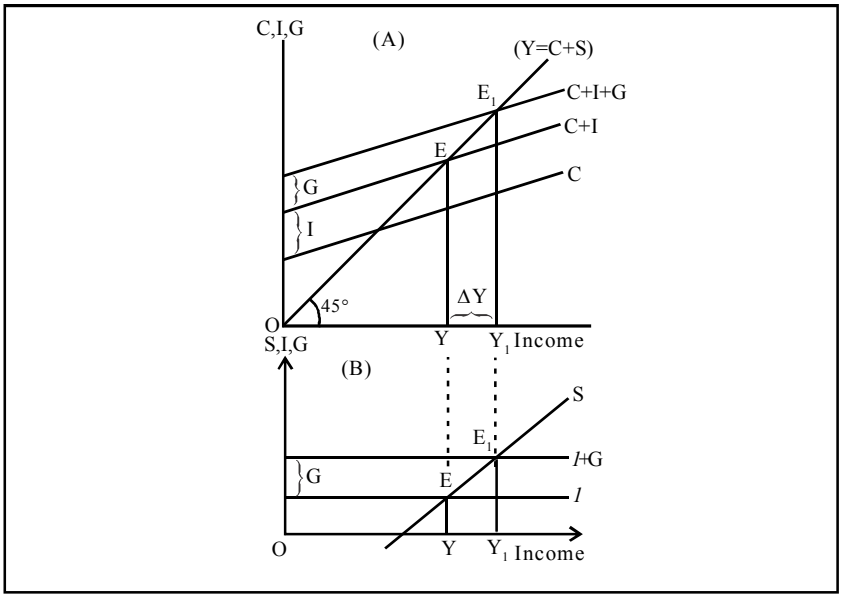

Fig. 20.1

Taxation:

Now we explain the effects of taxes on the level of national income. When the government imposes a tax, the amount of tax is reduced from the national income and what remains is the disposable income. Thus

$$Y-T=Y_d$$

Where Y-national income, T=tax, and Y_d = disposable income. Now disposable income will be less than national income by the amount of tax, $Y_d<Y$. With the fall in disposable income, people will reduce expenditure on consumption. This will lead to reduction in national income, which will depend on the amount or rate of tax and the value of MPC.

Given all the above mentioned assumptions in which government expenditure is constant, the effects of taxes on national income are illustrated in the following figures.

First, the effect of a lump-sum tax on income is shown in Fig. 20.2. The equilibrium level of income without a tax is at point E where the aggregate demand curve (C+I+G) intersects the aggregate supply curve 45° line and the income level OY is determined. By imposing a lump-sum tax, the consumption function is reduced by the amount of tax.

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As a result, the aggregate demand curve C+I+G shifts downwards to C_1 + I +G and intersects the aggregate supply curve 45° line at point E_1. This result in the reduction of income level from OY to OY_1 Thus with the imposition of a lump-sum tax, the national income is reduced by YY_1.

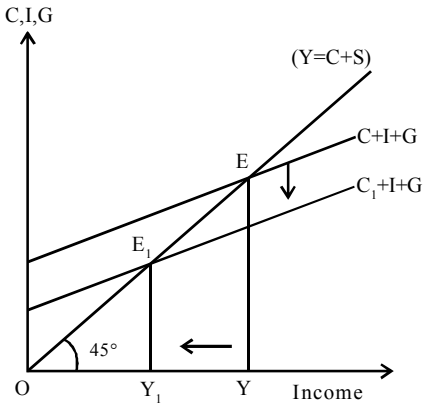

Fig. 20.2

Now we take a proportional tax which is imposed on income as a constant percentage. With the increase in the rate of tax, consumption and national income will decrease and vice versa. The effect of such a tax on income level is shown in Figure 20.3.

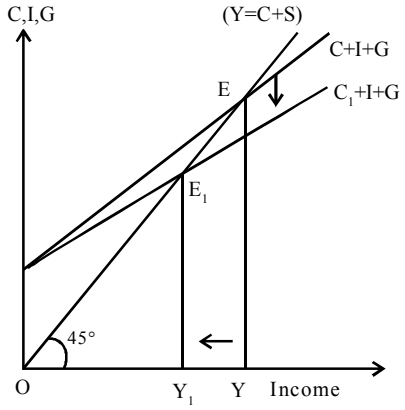

Fig. 20.3

The aggregate demand curve C+I+G before the imposi-tion of tax intersects the aggregate supply curve 45° line at point E and the income level OY is determined. After imposing the tax, the C+I+G curve shifts downward to C_1+I+G due to a fall in consumption, and it intersects the 45° line at point E_1 consequently, the equilibrium level of national income is reduced by YY_1.

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Effect on Saving and Investment:

The effect of a tax on saving and investment also determines the equilibrium of national income as follows:

$$Y = C+I+G$$

And $Y=C+S+T$

$$Y= C+I+G=C+S+T$$

Or $K=I+G=S+T$

It is clear from the above equation that when planned investment (I) plus government expenditure on goods and services (G) equal planned saving (S) plus tax (T), the equilibrium of national income is established. I+G are inflows or injections in the national income and S+T are outflows or leakages. If they are equal to each other, the national income is in equilibrium.

This is shown in Fig. 5. Here, E is the equilibrium point before imposing the tax where S and I+G curve intersects and the income level OY is determined. With the imposition of a tax, the S curve shifts upward to the left as S + T and the new equilibrium is established at point E_1 with I+G and the national income falls from OK to OY_1.

20.3 FOUR SECTOR MODEL: INCOME DETERMINATION IN OPEN ECONOMY

It may be noted that government expenditures are like investment because they raise the demand for goods. They are injections in the national income. On the other hand, taxes are leakages in the national income like savings because they tend to reduce the demand for consumer goods.

The impact of exports and imports is similar to that of the government expenditure. Exports are injections because they increase the demand for goods in the same economy. Imports, on the other hand, are leakages in the national income because they represent the supply of goods to the given economy.

Assumptions:

The analysis of the determination of income in an open economy is based on the following assumptions:

1. The domestic economy's international trade is small relative to total world trade.
2. There is less than full employment in the economy.
3. The general price level is constant up to the full employment level.

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4. Exchange rates are fixed.
5. There are no tariffs, trade and exchange restrictions.
6. Gross exports are determined by external factors.
7. Exports (A), investment (I) and government expenditure (G) are autonomous.
8. Consumption (C), imports (M), savings (S) and taxes (I) are each a fixed proportion of national income (Y) and their relationships with national income are linear.

Determination of Equilibrium Level of Income:

Given these assumptions, an open economy is in equilibrium when its national expenditure (E) is equal to its national income (Y).

This can be shown in the following equation for the equilibrium level of income:

$$Y = E = C+I+G+(X-M)$$

But $Y = C+S+T$

$C+S+T = C+I+G+(X-M)$

In the above analysis, C+S+T is gross national income (GNI) and C+I+G+(X-M) is gross national expenditure (GNE). Thus the equilibrium level of income in an economy is determined when aggregate supply, GNI = GNE, aggregate demand, or, C+S+T = C+I+G+(X-M).

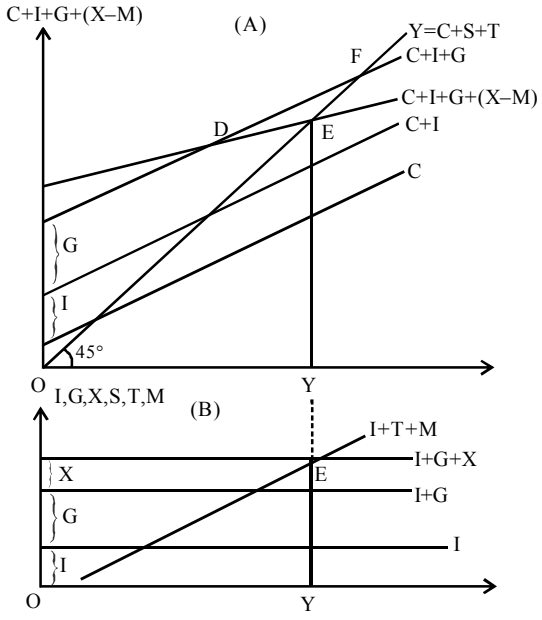

Fig. 20.4

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This is shown in Figure 20.4 where C is the consumption function. On this curve, T autonomous investment is superimposed to form the C+I function, and autonomous government expenditure G is superimposed on C+I to form the C+I+G function. When net exports of X-M are superimposed on C+I+G, we get the aggregate demand function C+I+G+(X-M). The 45° line is the aggregate supply function which rep-resents C+S+T.

It should be noted that so long as C+I+G+(X-M)>C+I+G, exports exceed imports and there is net addition to aggregate demand. At point D in Panel (A) of the figure, X-M=O. Beyond point D,C+I+G>C+I+G+(X- M) and imports exceed exports, and this gap continues to grow as income increases. This leads to net reduction in aggregate demand so that the aggregate demand function C+I+G+(X-M) lies below the domestic demand function C+I+G.

The equilibrium level of income in an open economy, OY is determined at point E where the aggregate demand function C+I+G+(X-M) intersects the aggregate supply function C+S+T.

This analysis shows that in the absence of foreign trade, the equilibrium level of income would have been at a higher level, as determined by the equality of C+I+G = C+S+T at point F whereas with foreign trade it is at a lower point E.

There is also an alternative method for determining the equilibrium level of income in an open economy in terms of saving and investment equality.

Accordingly,

$$C+S+T = C+I+G+(X-M)$$

Or $$S+T = I+G+(X-M)$$

Or $$S+T+M = I+G+X$$

Where, S+T+M refers to total income and I+G+X to total expenditure. When S+T+M is equal to I+G+X, the equilibrium level of income is determined. This is shown in Panel (B) of Fig. 6 where the S+T+M curve intersects the I+G+X curve at point E and the equilibrium level of income OY is determined.

20.4 SUMMARY

Keynesian model In the keynesian theory , there are two approaches to the determination of income and output: aggregate demand-Aggregate supply Approach and saving-investment Approach.

Aggregate expenditure is the total expenditure which at given fixed prices all households and business firms want to make on goods and services in a period at various levels of national income. Though J.M. Keynes used the term aggregate

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demand, in modern macroeconomics, the term aggre-gate expenditure is generally used.

The terms of aggregate demand and aggregate supply are now generally used in the model with variable price level. In this article however we use the term aggregate demand and aggregate expenditure interchangeably but assume that price level remains constant.

The growth of any economy and distribution of income and wealth in a country are directly associated with exports. Exports play a crucial role in internal trade and economic stability of a country. Moreover, it helps in increasing foreign exchange reserves in a country. The exports of a country are dependent on various factors.

A three-sector model of income determination consists of a two-sector model and the government sector. The government increases aggregate demand by spending on goods and services, and by collecting taxes.

It may be noted that government expenditures are like investment because they raise the demand for goods. They are injections in the national income. On the other hand, taxes are leakages in the national income like savings because they tend to reduce the demand for consumer goods.

The impact of exports and imports is similar to that of the government expenditure. Exports are injections because they increase the demand for goods in the same economy. Imports, on the other hand, are leakages in the national income because they represent the supply of goods to the given economy.

Foreign trade is exchange of capital, goods, and services across international borders or territories. In most countries, it represents a significant share of gross domestic product (GDP).

20.5 GLOSSARY

(a) Keynesian model: In the Keynesian theory, there are two approaches to the determination of income and output: aggregate demand-Aggregate supply Approach and saving-investment Approach.

(b) Aggregate expenditure: Aggregate expenditure is the total expenditure which at given fixed prices all households and business firms want to make on goods and services in a period at various levels of national income. Though J.M. Keynes used the term aggregate demand, in modern macroeconomics, the term aggre-gate expenditure is generally used.

(c) Three-sector model of income determination: A three-sector model of income determination consists of a two-sector model and the government sector. The government increases aggregate demand by spending on goods and services, and by collecting taxes.

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It may be noted that government expenditures are like investment because they raise the demand for goods. They are injections in the national income. On the other hand, taxes are leakages in the national income like savings because they tend to reduce the demand for consumer goods.

(d) Foreign trade: Foreign trade is exchange of capital, goods, and services across international borders or territories. In most countries, it represents a significant share of gross domestic product (GDP).

20.6 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Income Determination?
2. What is Government?
3. What is Foreign Trade?

(B) Extended Answer Questions

1. Discuss about Income Determination Model with Government: The three sector Model.
2. Explain in details about Income determination with foreign trade: A Four Sector Model.

(C) True or False

1. Aggregate expenditure is the total expenditure which at given fixed prices all households and business firms want to make on goods and services in a period at various levels of national income.
2. Though J.M. Keynes used the term aggregate demand, in modern macroeconomics, the term aggre-gate expenditure is generally used.
3. The growth of any economy and distribution of income and wealth in a country are directly associated with exports.
4. A three-sector model of income determination consists of a two-sector model and the government sector.
5. Foreign trade is exchange of capital, goods, and services across international borders or territories.

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(D) Multiple Choice Questions

1. What is the total expenditure which at given fixed prices all households and business firms want to make on goods and services in a period at various levels of national income?
   (a) Aggregate expenditure
   (b) Aggregate income
   (c) Both a and b
   (d) None of the above
2. The growth of any economy and distribution of income and wealth in a country are directly associated with……
   (a) Import (b) Exports
   (c) Intre-port (d) All the above

(E) Fill in the Blanks

1. ……is the total expenditure which at given fixed prices all households and business firms want to make on goods and services in a period at various levels of national income.
2. The growth of any economy and distribution of income and wealth in a country are directly associated with……...
3. A ……..consists of a two-sector model and the government sector.

20.7 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. False, 5. True

(D) 1. (a), 2. (b)

(E) 1. Aggregate expenditure, 2. Exports, 3. Three-sector model of income determination

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20.10 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

20.11 TERMINAL QUESTIONS

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1. How three-sector model of income determination consists of a two-sector model and the government sector? Discuss.

2. Discuss about Income Determination Model with Government: The three sector Model.

3. Explain in details about Income determination with foreign trade: A Four Sector Model.

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UNIT 21 THEORIES OF AGGREGATE CONSUMPTION

Structure:

Objectives

After reading this unit you will understand:

- The absolute income hypothesis
- The relative income hypothesis
- The permanent income hypothesis
- The life-cycle hypothesis

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21.1 INTRODUCTION

The study of consumption behaviour plays a central role in both macroeconomics and microeconomics. Macroeconomists are interested in aggregate consumption for two distinct reasons. First, aggregate consumption determines aggregate saving, because saving is defined as the portion of income that is not consumed.

21.2 THE ABSOLUTE INCOME HYPOTHESIS

Keynes' consumption function has come to be known as the 'absolute income hypothesis' or theory. His statement of the relationship be-tween income and consumption was based on the 'fundamental psychological law'.

He said that consumption is a stable function of cur-rent income (to be more specific, current dis-posable income—income after tax payment).

Because of the operation of the 'psychological law', his consumption function is such that $0 < MPC < 1$ and $MPC < APC$. Thus, a non- proportional relationship (i.e., $APC > MPC$) between consumption and income exists in the Keynesian absolute income hypothesis. His consumption function may be rewritten here with the form **$C = a + bY$, where $a > 0$ and $0 < b < 1$.**

It may be added that all the characteristics of Keynes' consumption function are based not on any empirical observation, but on 'fun-damental psychological law', i.e., experience and intuition.

(i) Consumption Function in the Light of Empirical Observations:

Meanwhile, at-tempts were made by the empirically-oriented economists in the late 1930s and early 1940s for testing the conclusions made in the Keynesian consumption function.

(ii) Short Run Budget Data and Cyclical Data:

Let us consider first the budget studies data or cross-sectional data of a cross section of the population and then time-series data. The first set of evidence came from budget studies for the years 1935-36 and 1941-42. These budget studies seemed consistent with the Keynes' own conclusion on consumption-income relationship. The time-series data of the USA for the years 1929-44 also gave reasonably good support to the Keynesian theoretical consumption function.

Since the time period covered is not long enough, this empirical consumption function derived from the time- series data for 1929-44 may be called 'cyclical' consumption function. Anyway, we may conclude now that these two sets of data that generated consumption function consistent with the Keynesian consumption equation, $C = a + bY$.

Further, $0 < b < 1$ and $AMC < APC$.

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(iii) Long Run Time-Series Data:

However, Simon Kuznets (the 1971 Nobel prize winner in Economics) considered a long period cov-ering 1869 to 1929. His data may be described as the long run or secular time-series data. This data indicated no long run change in con-sumption despite a very large increase in in-come during the said period. Thus, the long run historical data that generated long run or secular consumption function were inconsist-ent with the Keynesian consumption function.

From Kuznets' data what is obtained is that:

(a) There is no autonomous consumption, i.e., 'a' term of the consumption function and

(b) A proportional long run consumption func-tion in which APC and MPC are not different. In other words, the long run consumption function equation is C = bY.

As a = 0, the long run consumption func-tion is one in which APC does not change over time and MPC = APC at all levels of income as contrasted to the short run non-propor-tional (MPC < APC) consumption-income re-lationship. Being proportional, the long run consumption function starts form the origin while a non-proportional short run consump-tion function starts from point above the ori-gin. Keynes, in fact, was concerned with the long run situation.

But what is baffling and puzzling to us that the empirical studies suggest two different consumption functions a non-proportional cross-section function and a proportional long run time-series function.

21.3 THE RELATIVE INCOME HYPOTHESIS

Studies in consumption then were directed to resolve the apparent conflict and inconsistencies between Keynes' absolute income hy-pothesis and observations made by Simon Kuznets. Former hypothesis says that in the short run MPC < APC, while Kuznets' obser-vations say that MPC = APC in the long run.

One of the earliest attempts to offer a reso-lution of the conflict between short run and long run consumption functions was the 'rela-tive income hypothesis' (henceforth R1H) of).S. Duesenberry in 1949. Duesenberry be-lieved that the basic consumption function was long run and proportional. This means that average fraction of income consumed does not change in the long run, but there may be variation between consumption and in-come within short run cycles.

Duesenberry's RIH is based on two hypotheseis first is the relative income hy-pothesis and second is the past peak income hypothesis.

Duesenberry's first hypothesis says that consumption depends not on the 'absolute' level of income but on the 'relative' income— income relative to the income of the society in which an individual lives. It is the relative position in the income distribution among families influences consumption decisions of individuals.

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A households consumption is determined by the income and expenditure pattern of his neighbours. There is a tendency on the part of the people to imitate or emulate the consumption standards maintained by their neighbours. Specifically, people with relatively low incomes attempt to 'keep up with the Joneses'—they consume more and save less. This imitative or emulative nature of consumption has been described by Duesenberry as the "demonstration effect."

The outcome of this hypothesis is that the individuals' APC depends on his relative position in income distribution. Families with relatively high incomes experience lower APCs and families with relatively low incomes experience high APCs. If, on the other hand, income distribution is relatively constant (i.e., keeping each families relative position unchanged while incomes of all families rise). Duesenberry then argues that APC will not change.

Thus, in the aggregate we get a proportional relationship between aggregate income and aggregate consumption. Note MPC = APC. Hence the R1H says that there is no apparent conflict between the results of cross-sectional budget studies and the long run aggregate time-series data.

In terms of the second hypothesis short run cyclical behaviour of the Duesenberry's aggregate consumption function can be explained. Duesenberry hypothesised that the present consumption of the families is influenced not just by current incomes but also by the levels of past peak incomes, i.e., $C = f(Y_{ri}, Y_{pi})$, where Y_{ri} is the relative income and Y_{pi} is the peak income.

This hypothesis says that consumption spending of families is largely motivated by the habitual behavioural pattern. It current incomes rise, households tend to consume more but slowly. This is because of the relatively low habitual consumption patterns and people adjust their consumption standards established by the previous peak income slowly to their present rising income levels.

On other hand, if current incomes decline these households do not immediately reduce their consumption as they find if difficult to reduce their consumption established by the previous peak income. Thus, during depression consumption rises as a fraction of income and during prosperity consumption does increase slowly as a fraction of income. This hypothesis thus generates a non-proportional consumption function.

Duesenberry's explanation of short run and long run consumption function and then, finally, reconciliation between these two types of consumption function can now be demon-strated in terms of Fig. 3.39. Cyclical rise and fall in income levels produce a non-propor-tional consumption-income relationship, la-belled as C_{SR}. In the long run as such fluctua-tions of income levels are get smoothened, one gets a proportional consumption-income re-lationship, labelled as C_{LR}.

As national income rises consumption grows along the long run consumption, C_{LR}. Note that at income OY_0 aggregate consumption is OC_0. As income increases to

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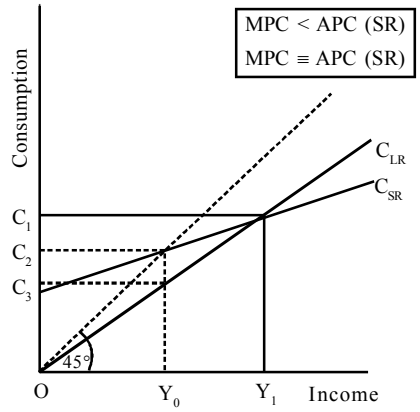

Fig. 21.1: Duesenberry's Consumption Function

OY_1, consumption rises to OC_1. This means a constant APC consequent upon a steady growth of national income.

Now, let us assume that recession occurs leading to a fall in income level to OY_0 from the previously attained peak income of OY_1. Duesenberry's second hypothesis now comes into operation: households will maintain the previous consumption level what they enjoyed at the past peak income level. That means, they hesitate in reducing their consumption standards along the C_{LR}. Consumption will not decline to OC_0, but to OC'_1 ($> OC_0$) at income OY_0. At this income level, APC will be higher than what it was at OY_1 and the MPC will be lower.

If income rises consequent upon economic recovery, consumption rises along C_{SR} since people try to maintain their habitual or accustomed consumption standards influenced by previous peak income. Once OY_1 level of income is reached consumption would then move along C_{LR}. Thus, the short run consumption is subject to what Duesenberry called 'the ratchet effect'. It ratchets up following an increase in income levels, but it does not fall back downward in response to income declines.

21.4 THE PERMANENT INCOME HYPOTHESIS

The three sets of apparently contradictory data (cross-sectional data or budget studies data, cyclical or short run time-series data and Kuznets' long run time-series data) was made by Nobel Prize winning Economist, Milton Friedman in 1957. Like Duesenberry's RIH, Friedman's hypothesis holds that the basic relationship between consumption and income is proportional.

But consumption, according to Friedman, de-pends neither on 'absolute' income, nor on 'relative' income but on 'permanent' income, based on expected future income. Thus, he finds a relationship between consumption and permanent income. His hypothesis is then de-scribed as the 'permanent income hypothesis' (henceforth PIH). In PIH, the relationship between permanent consumption and perma-nent income is shown.

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Friedman divides the current measured income (i.e., income actually received) into two: permanent income (Y_p) and transitory income (Y_t). Thus, $Y = Y_p + Y_t$. Permanent in-come may be regarded as 'the mean income', determined by the expected or anticipated income to be received over a long period of time. On the other hand, transitory income consists of unexpected or unanticipated or windfall rise or fall in income (e.g., income received from lottery or race). Similarly, he distinguishes between permanent consumption (C_p) and transistory consumption (C_t). Transistory consumption may be regarded as the unanticipated spending (e.g., unexpected illness). Thus, measured consumption is the sum of permanent and transitory components of consumption. That is, $C = C_p + C_t$.

Friedman's basic argument is that perma-nent consumption depends on permanent income. The basic relationship of PIH is that permanent consumption is proportional to permanent income that exhibits a fairly con-stant APC. That is, $C = kY_p$ where k is con-stant and equal to APC and MPC.

While reaching the above conclusion, Friedman assumes that there is no correlation between Y_p and Y_t, between Y_t and C_t and between C_p and C_t. That is

$$RY_t . Y_p = RY_t . C_t = RC_t . Cp = 0.$$

Since Y_t is uncorrected with Y_p, it then follows that a high (or low) permanent income is not correlated with a high (or low) transitory income. For the entire group of house-holds from all income groups transitory incomes (both positive and negative) would cancel each over out so that average transitory income would be equal to zero. This is also true for transitory components of consumption. Thus, for all the families taken together the average transitory income and average transitory consumption are zero, that is,

$Y_t = C_t = 0$ where Y and C are the average values. Now it follows that

$Y = Y_p$ and $C = C_p$

Let us consider some families, rather than the average of all families, with above-aver-age measured incomes. This happens because these families had enjoyed unexpected in-comes thereby making transitory incomes positive and $Y_p < Y$. Similarly, for a sample of families with below-average measured in- come, transitory incomes become negative and $Y_p > Y$.

Now, we are in a position to resolve the apparent conflict between the cross-section and the long run time-series data to show a stable permanent relationship between per-manent consumption and permanent income.

The line $C_p = kY_p$ in Fig 3.40 shows the proportional relationship between permanent consumption and permanent income. This line cuts the C_{SR} line at point L that corresponds to the average measured income of the popu-lation at which $Y_t = 0$. This average measured income produces average measured and per-manent consumption, C_p.

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Let us first consider a sample group of population having an average income above the population average. For this population group, transistory income is positive.

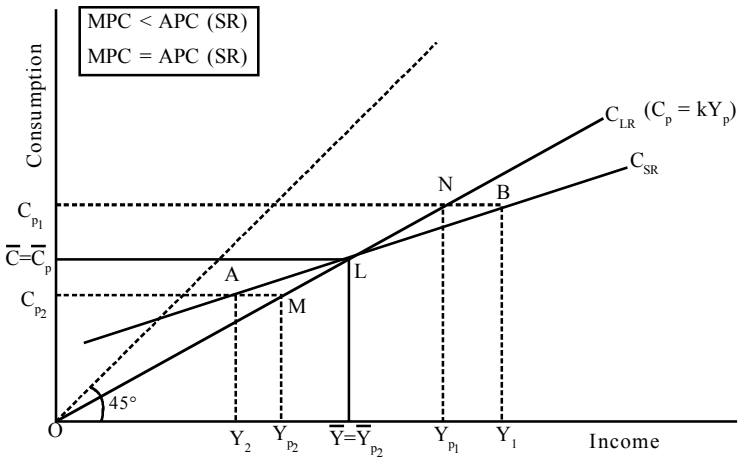

Fig. 21.2: Friedman's Consumption Function

The hori-zontal difference between the short run and long run consumption functions (points N and B and points M and A) describes the transi-tory income. Measured income equals perma-nent income at that point at which these two consumption functions intersect, i.e., point L in the figure where transitory income in zero.

For a sample group with average income above the national average measured income (Y_1) exceeds permanent income (Y_{P1}). At (C_{P1}) level of consumption (i.e., point B) average measured income for this sample group ex-ceeds permanent income, Y_{P1}. This group thus now has a positive average transitory income.

Next, we consider another sample group of population whose average measured in-come is less than the national average. For this sample group, transitory income component is negative. At C_{p2} level of consumption (i.e., point A lying on the C_{SR}) average measured income falls short of permanent income, Y_{p2}. Now joining points A and B we obtain a cross- section consumption function, labelled as C_{SR}. This consumption function gives an MPC that has a value less than long run proportional consumption function, $C_p = kY_p$. Thus, in the short run, Friedman's hypothesis yields a consumption function similar to the Keynesian one, that is, MPC < APC.

However, over time as the economy grows transitory components reduce to zero for the society as a whole. So the measured consump-tion and measured income values are perma-nent consumption and permanent income. By joining points M, L and N we obtain a long run proportional consumption function that relates permanent consumption with the per-manent income. On this line, APC is fairly con-stant, that is, APC = MPC.

21.5 THE LIFE-CYCLE HYPOTHESIS

The life-cycle hypothesis has been utilized extensively to examine savings and retirement behavior of older persons. This hypothesis begins with the observation

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that consumption needs and income are often unequal at various points in the life cycle. Younger people tend to have consumption needs that exceed their income. Their needs tend to be mainly for housing and education, and therefore they have little savings. In middle age, earnings generally rise, enabling debts accumulated earlier in life to be paid off and savings to be accumulated. Finally, in retirement, incomes decline and individuals consume out of previously accumulated savings.

Empirical studies of the life-cycle hypothesis have generated a large literature. Studies that have focused on the savings behavior of older persons, however, have been inconclusive regarding the correspondence between observed savings behavior and the pattern of saving and dissaving predicted by the life-cycle hypothesis. Many studies seemingly in conflict with the life-cycle hypothesis, have found that older persons continue to save in retirement. Several explanations have been offered for this. King (1985), for example, notes that saving in retirement is not necessarily inconsistent with the life-cycle hypothesis, if one accounts for the aversion of individuals to uncertainty about the future (e.g., how long they will live and future inflation). Another explanation is that the generosity of pensions reduces the need to save in preparation for retirement and to dissave while in retirement. Life-cycle savings patterns in some European countries that have generous pension systems such as France, Germany, and Italy appear to be consistent with this explanation. Another related explanation for lack of dissaving in retirement is that deteriorating health may limit the ability of individuals to consume at levels that are higher than their pension income. Moreover, the pension wealth that retired persons hold is not liquid and they are not able to draw down their pension wealth any faster than the annuity payments that they receive. This health aspect of life cycle savings and consumption patterns raises an interesting question: Should payments for health insurance also be viewed as a form of savings, and receipt of health care services as drawing down one's "health insurance wealth"?

A number of other studies, however, have found evidence of a hump-shaped pattern of savings that is consistent with the life-cycle hypothesis. It is important to note that most studies have tended to underestimate the degree of dissaving among older persons, because these studies have not generally accounted for the decumulation of pension wealth associated with Social Security and private pension payments.

Pension payments are probably the best example of decumulation of savings in the latter stages of the life cycle. Under Social Security and defined benefit pension plans, older persons have established a claim on a future stream of income payments that is generally some function of each person's earnings history and life expectancy. The expected total value of this stream of income payments in current dollars over their remaining lifetime is known as their pension wealth. Thus, as retirees receive pension payments, they draw down their pension wealth. This factor has generally not been taken into account in studies that have examined whether older persons dissave in retirement, as would be predicted by the life-cycle hypothesis. After

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accounting for personal contributions and withdrawal of benefits from pensions, Jappelli and Modigliani (1998) find evidence for the expected hump-shaped savings profile.

In an analysis of the savings behavior of the baby boom generation, Gist et al. (1999) estimate that Social Security and pension wealth accounted for more than half of all wealth for 90 percent of the pre-retired population. As a consequence, it seems clear that failing to account for the reduction in pension wealth implied by the receipt of Social Security or other defined benefit pension payments leads to a substantial underestimation of dissaving in retirement. Moreover, in countries such as the United States, where outof-pocket health care costs are rising more rapidly than the value of pension payments, one might expect to observe dissaving in the retirement years. In particular, among the old-old population, rising medical and long-term care expenditures are likely to occur at a point in the life cycle where, for many, the real value of their pension income has eroded over time and may be inadequate to cover out-of-pocket health care costs.

21.6 SUMMARY

The study of consumption behaviour plays a central role in both macroeconomics and microeconomics. Macroeconomists are interested in aggregate consumption for two distinct reasons. First, aggregate consumption determines aggregate saving, because saving is defined as the portion of income that is not consumed.

Keynes' consumption function has come to be known as the 'absolute income hypothesis' or theory. His statement of the relationship be-tween income and consumption was based on the 'fundamental psychological law'.

Studies in consumption then were directed to resolve the apparent conflict and inconsistencies between Keynes' absolute income hy-pothesis and observations made by Simon Kuznets. Former hypothesis says that in the short run MPC < APC, while Kuznets' obser-vations say that MPC = APC in the long run.

One of the earliest attempts to offer a reso-lution of the conflict between short run and long run consumption functions was the 'rela-tive income hypothesis' (henceforth R1H) of).S. Duesenberry in 1949. Duesenberry be-lieved that the basic consumption function was long run and proportional. This means that average fraction of income consumed does not change in the long run, but there may be variation between consumption and in-come within short run cycles.

Duesenberry's RIH is based on two hypotheseis first is the relative income hy-pothesis and second is the past peak income hypothesis.

Duesenberry's first hypothesis says that consumption depends not on the 'absolute' level of income but on the 'relative' income— income relative to the income of the society in which an individual lives. It is the relative position in the income distribution among families influences consumption decisions of individuals.

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A households consumption is determined by the income and expenditure pattern of his neighbours. There is a tendency on the part of the people to imitate or emulate the consumption standards maintained by their neighbours. Specifically, people with relatively low incomes attempt to 'keep up with the Joneses'—they consume more and save less. This imitative or emulative nature of consumption has been described by Duesenberry as the "demonstration effect."

The outcome of this hypothesis is that the individuals' APC depends on his relative position in income distribution. Families with relatively high incomes experience lower APCs and families with relatively low incomes experience high APCs. If, on the other hand, income distribution is relatively constant (i.e., keeping each families relative position unchanged while incomes of all families rise). Duesenberry then argues that APC will not change.

Thus, in the aggregate we get a proportional relationship between aggregate income and aggregate consumption. Note MPC = APC. Hence the R1H says that there is no apparent conflict between the results of cross-sectional budget studies and the long run aggregate time-series data.

The three sets of ap-parently contradictory data (cross-sectional data or budget studies data, cyclical or short run time-series data and Kuznets' long run time-series data) was made by Nobel Prize winning Economist, Milton Friedman in 1957. Like Duesenberry's RIH, Friedman's hypoth-esis holds that the basic relationship between consumption and income is proportional.

Friedman divides the current measured income (i.e., income actually received) into two: permanent income (Y_p) and transitory income (Y_t). Thus, $Y = Y_p + Y_t$. Permanent in-come may be regarded as 'the mean income', determined by the expected or anticipated income to be received over a long period of time. On the other hand, transitory income consists of unexpected or unanticipated or windfall rise or fall in income (e.g., income re-ceived from lottery or race). Similarly, he dis-tinguishes between permanent consumption (C_p) and transistory consumption (C_t). Transistory consumption may be regarded as the unanticipated spending (e.g., unexpected illness). Thus, measured consumption is the sum of permanent and transitory components of consumption. That is, $C = C_p + C_t$.

Friedman's basic argument is that perma-nent consumption depends on permanent in-come. The basic relationship of PIH is that permanent consumption is proportional to permanent income that exhibits a fairly con-stant APC. That is, $C = kY_p$ where k is con-stant and equal to APC and MPC.

The life-cycle hypothesis has been utilized extensively to examine savings and retirement behavior of older persons. This hypothesis begins with the observation that consumption needs and income are often unequal at various points in the life cycle. Younger people tend to have consumption needs that exceed their income. Their needs tend to be mainly for housing and education, and therefore they have little savings. In middle age, earnings generally rise, enabling debts accumulated

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earlier in life to be paid off and savings to be accumulated. Finally, in retirement, incomes decline and individuals consume out of previously accumulated savings.

21.7 GLOSSARY

(a) Consumption behaviour: Consumption behaviour is the study of individuals, groups, or organizations and the processes they use to select, secure, use, and dispose of products, services.

(b) Aggregate consumption: Aggregate consumption determines aggregate saving, because saving is defined as the portion of income that is not consumed.

(c) Keynes' consumption function: Keynes' consumption function has come to be known as the 'absolute income hypothesis' or theory. His statement of the relationship be-tween income and consumption was based on the 'fundamental psychological law'.

(d) Households consumption: A household's consumption is determined by the income and expenditure pattern of his neighbours. There is a tendency on the part of the people to imitate or emulate the consumption standards maintained by their neighbours. Specifically, people with relatively low incomes attempt to 'keep up with the Joneses' they consume more and save less. This imitative or emulative nature of consumption has been described by

(e) Life-cycle hypothesis: The life-cycle hypothesis has been utilized extensively to examine savings and retirement behavior of older persons. This hypothesis begins with the observation that consumption needs and income are often unequal at various points in the life cycle.

21.8 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is absolute income?
2. What is relative income?
3. What is permanent income?
4. What is life-cycle hypothesis?

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(B) Extended Answer Questions

1. Discuss the absolute income hypothesis.
2. Explain the relative income hypothesis.
3. Explain the permanent income hypothesis.
4. Explain the life-cycle hypothesis.

(C) True or False

1. Aggregate consumption determines aggregate saving, because saving is defined as the portion of income that is not consumed.
2. Keynes' consumption function has come to be known as the 'absolute income hypothesis' or theory.
3. A household's consumption is determined by the income and expenditure pattern of his neighbours.
4. The outcome of this hypothesis is that the individuals' APC depends on his relative position in income distribution.
5. Friedman's basic argument is that perma-nent consumption depends on permanent in-come.

(D) Multiple Choice Questions

1. What determines aggregate saving, because saving is defined as the portion of income that is not consumed?
   (a) Aggregate consumption (b) Aggregate demand
   (c) Both a and b (d) None of the above
2. Keynes' consumption function has come to be known as the ……..
   (a) Absolute income hypotheses or theory
   (b) Aggregate consumption
   (c) Both a and b
   (d) None of the above

(E) Fill in the Blanks

1. ……determines aggregate saving, because saving is defined as the portion of income that is not consumed.
2. ……..function has come to be known as the 'absolute income hypothesis' or theory.
3. The outcome of this hypothesis is that the individuals' APC depends on his relative position in…….

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21.9 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True, 5. True

(D) 1. (a), 2. (a)

(E) 1. Aggregate consumption, 2. Keynes' consumption,
3. Income distribution

21.10 BIBLIOGRAPHY

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4. M. L. Trivedi (2002). Managerial Economics: Theory & Applications, 2nd ed., Tata McGraw-Hill. Chapter-preview links.
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8. James O. Berger (2008)."statistical decision theory," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
9. Keisuke Hirano (2008). "decision theory in econometrics," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
10. Vassilis A. Hajivassiliou (2008). "computational methods in econometrics," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.

21.11 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

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1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

21.12 TERMINAL QUESTIONS

1. Discuss about Friedman's basic argument is that perma-nent consumption depends on permanent in-come.

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2. Discuss the absolute income, relative income and permanent income hypothesis.

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UNIT 22 KEYNESIAN THEORY OF INTEREST

Structure:

Objectives

After reading this unit you will understand:

- Money demand and supply
- The Keynesian approach
- The Keynesian theory of interest
- Drawbacks of the Keynesian theory of interest

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22.1 INTRODUCTION

The rate of interest is deter-mined by the interaction of the forces of demand for capital (or investment) and the supply of savings. The rate of interest at which the demand for capital (or demand for savings to invest in capital goods) and the supply of savings are in equilibrium, will be the rate determined in the market.

22.2 MONEY DEMAND AND MONEY SUPPLY

The demand curve for money illustrates the quantity of money demanded at a given interest rate. Notice that the demand curve for money is downward sloping, which means that people want to hold less of their wealth in the form of money the higher that interest rates on bonds and other alternative investments are.

The central bank controls the supply of money, and they interact with other financial institutions. This interaction is part of the money market, and we can illustrate it using a supply curve.

The supply curve for money illustrates the quantity of money supplied at a given interest rate, and here's what that looks like. Notice that unlike a typical supply curve in the product market, the supply curve for money is vertical, because it does not depend on interest rates. It depends entirely on decisions made by the central bank.

22.3 THE KEYNESIAN APPROACH OF DEMAND FOR MONEY

Keynesian theory of the demand for money was first formulated by Keynes in his well-known book, The Genera Theory of Employment, Interest and Money (1936). It has developed further by other economists of Keynesian persuasion. In understanding Keynes' theory two questions need to separate.

22.4 WHY IS MONEY DEMANDED?

The question to be asked in full is why is money demanded when money does not earn its holders any income whereas there are competing non-money financial assets in the economy which yield some income to their holders?

One general answer can be that money yields its holders conveniences yield of non-pecuniary nature. This yield is rooted in the peculiar characteristic of money as the only generally acceptable means of payment, and so it's perfect liquidity.

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More concretely, Keynes said that money was demanded due to three main motives:

(1) The transactions motive,

(2) The precautionary motive and

(3) The speculative motive.

Ever since this threefold classification of motives has become standard stock-in-trade of monetary economists. Later efforts to add other motives such as the finance motive by Keynes (1937) and Robertson (1938) and the diversification motive by Gurley and Shaw (1960) have not been successful.

The three motives and corresponding demands for money are explained briefly first, to be followed by somewhat extended discus-sion of the individual components of the demand for money. The transactions motive gives rise to the transactions demand for money which refers to the demand for cash of the public for making current transactions of all kinds. This is inextricably bound with the use of money as the medium of exchange in a money-exchange economy.

The precautionary motive induces the public to hold money to provide for contingencies requiring sudden expenditure and for unforeseen opportunities of advantageous purchase. This motive (demand) is a product of uncertainties of all kinds. The speculative motive giving rise to the speculative demand for money is the most important contribution Keynes made to the theory of the demand for money.

It explains why the public may hold surplus cash (over and above that demanded due to the other two motives) in the face of interest- earning bonds (and other financial assets). The reason is that the holders of such speculative balances may anticipate such fall in future prices as will make the loss of foregone interest earnings look relatively smaller.

So they wait with cash for bond prices to fall, avoid expected capital losses, and switch into bonds when the anticipated bond prices have been realized. The speculative demand for money is sometimes also called the asset demand for money—not a happy term, because, money being an asset, the entire demand for it is an asset demand.

Related to the above is the distinction between active and idle balances made in the Keynesian literature. The active balances are defined as balances used as means of payments in national income- generating transactions. The rest are called idle balances. The distinction is useful to explain how changes in' the income velocity of money come about and how the same quantity of money can support higher or lower levels of money expenditure when idle balances are converted into active balances or vice versa.

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The Determinants of the Demand for Money:

Keynes made the demand for money a function of two variables, namely income (Y)[4] and the rate of interest (r). Being a Cambridge economist, Keynes retained the influence of the Cambridge approach to the demand for money under which M^d is hypothesised to be a function of Y. But he argued that this explained only the transactions and the precautionary demand for money, and not the entire demand for money.

The truly novel and revolutionary element of Keynes' theory of the demand for money is the component of the speculative demand for money. Through it Keynes made (a part of) the demand for money a declining function of the rate of interest, the latter a purely monetary phenomenon and the sole carrier of monetary influences in the economy. Thus the speculative demand for money constitutes the main pillar of Keynes' revolution in monetary theory and Keynes' attack on the quantity theory of money. This is explained below.

The speculative demand for money arises from the speculative motive for holding money. The latter arises from the variability of interest rates in the market and uncertainty about them. For simplicity Keynes -assumed that perpetual bonds are the only non-money financial asset in the economy, which compete with money in the asset portfolio of the public.

Money does not earn its holders any interest income, but its capital value in terms of itself is always fixed. Bonds, on the other hand, yield interest income to their holders. But this income can be more than wiped out if bond prices fall in future. It can be shown algebraically that the price of a (perpetual) bond is given by the reciprocal of the market rate of interest times the coupon rate of interest.

Suppose the coupon rate (i.e. interest payable on a bond) is Re 1 per year and the market rate f interest is 4 per cent per year. Then the market (price of the bond will) be ₹ 1/.04 X 1 = ₹ 25. If the market rate of interest rises to 5 per cent per year, the market price of the bond will fall to ₹ 1/.05 X I ₹ 20. Thus, bond price is seen as an inverse function of the rate interest.

Economic units hold a part of their wealth in the form of financial assets. In the two-asset model of Keynes, these assets are money and (perpetual) bonds. Bond prices keep on changing from time to time. Therefore, they are subject to capital gains or losses. Thus, to a bond-holder the return from bond-holding per unit period (say a year) per Rs 1, is the rate of interest ± capital gain or loss per year, the time of making investment in bonds, the market rate of interest will be a given datum to an individual, but the future rate of interest or bond price, and so the expected rate of capital gain or loss will have to be anticipated. Hence the element of speculation in the bond market and as shown below, also in the money market.

The speculators are of two kinds: bulls and bears. Bulls are those who expect the bond prices to rise in the future. Bears expect these prices to fall. In Keynes'

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model, these expectations are assumed to be held with certainty. Bulls, then, are assumed to invest all their idle cash into bonds.

Bears instead will move out of bonds into cash if their expected capital losses on bonds exceed interest income from bond-holding. Thereby they minimise their losses. Thus, the specula-tive demand for money arises only from bears. It is the demand for bearish hoards. These bears build up their cash balances to move into bonds when either bond prices have fallen as expected or when they come to expect that bond prices will rise in future.

The above model implies an all-or-nothing behaviour on the part of individual asset holders. Either they are entirely into bonds (bulls) or entirely into cash (bears). That is, their portfolios are pure and not diversified.

To move to the aggregate speculative demand for money, Keynes assumed that different asset holders have different interest-rate expectations. Thus, at a certain very high rate of interest (and very low price of bonds), all may be bulls. Then, the speculative demand for money will be equal to hero. But at a lower rate of interest (higher bond price) some bulls will become bears and positive demand for speculative balances will emerge.

At a still lower rate of interest (and still higher bond price), Tie more bulls will become bears and the speculative demand for higher still. Thus, Keynes derived a downward-sloping aggregate speculative demand curve for money with respect to the "a rate of interest, as shown in Figure.

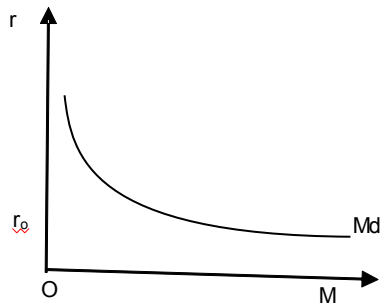

Fig. 22.1: Keynes Speculative Demand for Money

Keynes also suggested the possibility of the existence of what is called the liquidity trap. This refers to a situation when at a certain rate of interest the (speculative) demand for money becomes perfectly elastic. This will come about when at that rate all the asset holders turn bears, so that none is willing to hold bonds and everyone wants to move into cash.

In Figure 11.2, such a situation occurs at the rate of interest r_o. Then, no amount of expansion of money-supply can lower the rate of interest further. The public is willing to hold the entire extra amount of money at r_o. The extra liquidity created by

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the monetary authority gets trapped in the asset portfolios of the public without lowering r. The r_o serves as the minimum r below which it cannot be lowered.

Another element in Keynes' theory of the speculative demand for money is the concept of the 'normal' rate of interest. Keynes postulated that at any moment there was a certain r which the asset holders regard as 'normal', as the r which will tend to prevail in the market under 'normal conditions'. This 'normal' r acts as the benchmark with respect to which any actual r is judged as high or low.

Differences of r expectations among asset holders then can be interpreted as differences about the level of the 'normal' r. The amount of money demanded for speculative purposes depends on the current level of r relative to this 'normal' r as seen by various individuals. If the latter changes, the quantity of money demanded at any particular r will also change.

Since 'normal' r, or people's expectation about it, cannot be taken as a time constant, Keynes argument implies that the relation between the demand for money and r will not be stable over time. This is an important result which has not been fully appreciated even by Keynes' followers. It can be seen to damage Keynes' own theory of the interest rate determination but more so the quantity theory of money and the effectiveness o monetary policy.

Keynes' micro theory of the speculative demand tor money has been called into question by Tobin (1958). It was noted above that for an individual Keynes' explanation leads to a pure asset portfolio of either money or bonds. This is contrary to experience. In actual life mixed asset portfolios are the rule. Tobin's alternative formulation yields such portfolios even at individual level. For this, unlike Keynes, he assumes that an individual does not hold his interest-rate expectations with certainty.

Then liquidity preference is analysed as behaviour towards risk under uncertainty. Acting on uncertain interest-rate expectations means assuming some risk of capital loss. The degree of risk increases with every increase in the proportion of bonds in the asset portfolio. Normally, asset holders are risk averters, so that they will require a higher compensation (rate of interest) for undertaking higher risk.

Thus, at a higher r more bonds and less money will be held in the portfolio and at a lower r less bonds and more money will be preferred. The result is a , diversified asset portfolio and a downward sloping asset demand curve for money with respect to r even at the micro level. On suitable assumptions, the aggregate asset demand for money is also shown as a declining function of r.

Keynes' theory of the speculative demand for money has also been criticised on the ground that it treats all non-money financial assets (NMFAs) as bonds. Such treatment is an unwarranted simplification, because a large number of such assets are unlike bonds in that their capital values are nominally fixed and do not vary (inversely) with r.

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In India, the examples of such NMFAs are fixed deposits with commercial banks, post offices, and public limited companies, nation-al savings certificates, UTI units, etc. Substitution between them and money does not entail Keynes' speculative motive, because they are not subject to variation in their nominal capital values. In their case, their rates of return influence as simple opportunity-cost variables without any element of speculation.

Gurley and Shaw (1960) also do not favour keeping the M^d function confined to a simple two-asset world. In their analysis of the effects of financial growth, exhibited by security differentiation and the growth of secondary securities, they have stressed the growing competition or asset substitution which money has to face from the NMFAs in the asset portfolios of wealth-holders.

According to them, things being the same, this ever-growing asset substitution has to downward displacements of the demand for money, has made demand less stable, and made monetary policy less effective than before.

Much systematic empirical work has not been done on these hypotheses. Most empirical studies on the demand for money have tended to ignore them. What little empirical work has been done for the USA (Fiege, 1964) does not lend definite support to the Gurley and Shaw hypotheses.

After a fairly long detour, we come back to Keynes' theory of the demand for money.

This is summed up in the following equa-tion:

$$\mathbf{M^d = L_1(Y) + L(r). \ (11.3)}$$

It is an additive demand function with two separate components. $L_1(Y)$ represents the' transactions and precautionary demand for money. Keynes made both an increasing function of the level of money income. In the Cambridge tradition, he tended to assume that $L_1(Y)$ had proportional form of the kind represented in Figure 22.1. The second component $L_2(r)$ represents the speculative demand for money, which, as shown above, Keynes argued to be a declining function of r. As shown in Figure 22.2, this relation was not assumed to be linear.

Keynes' additive form of the demand function for money of equation $M^d = L_1(Y) + L(r)$. (11.3) has been discarded by Keynesians and other econo-mists. It has been argued that money is one asset, not two, three, or many. The motives to hold it may be of any number. The same unit of money can serve all these motives. So the demand for it cannot be compartmenalised into separate components independent of each other.

Also, as in Baumol-Tobin theory, the transactions demand for money also is interest elastic. The same can be argued for the precautionary demand for money too. The explanation of the speculative demand for money shows that this kind of demand will be an increasing function of total assets or wealth. If income is taken as a

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proxy for wealth, the speculative demand also becomes a function of both income and the rate of interest.

These arguments have led to the following revised form of the Keynesian demand function for money:

$$M^d = L(Y,r), \quad (11.4)$$

where' it is hypothesised that M^d is an increasing function of Y and a declining function of r.

The replacement of the simple M^d function of equation $M^d = K Y$, (11.1) by that of equation $M^d = L(Y,r)$, (11.4) has been the single most important revolution- any development in the field of monetary theory. It has also been the use of many battles between the neoclassical economists and the Keynesians. It has necessitated integration of value theory with monetary theory or of the real sector with the monetary sector, of which Hicks' IS-LM model is a well-known example.

This makes the simple quantity theory of money model suspect by making the income-velocity of money responsive to changes in the rate of interest. The latter changes can come about by any number of factors originating in the money market or the commodity market. Our main purpose in adding this paragraph to the text is to emphasise once again the importance of the demand function for money in monetary theory.

22.5 SUPPLY OF MONEY

There are two basic assumptions that govern the determination of money supply (Ms):

(1) Exogenous money supply: The money supply may be determined by the monetary authority or central bank. I.e. disregarding the interest rate the money supply is fixed.

(2) Endogenous money supply: The money supply may be also determined by forces such the level of interest rate. I.e. the Ms and the interest rate is positively related as the financial agents will find it profitable to expand the volume of loans. It is a function of interest rate.

In practice, the money supply is partly endogenous and partly exogenous. However, to make thing simple, we assume the Ms as exogenous (I.e. in accordance with the change in central monetary authority's policy).

22.6 THE KEYNESIAN THEORY OF INTEREST

Keynes defines the rate of interest as the reward for parting with liquidity for a specified period of time. According to him, the rate of interest is determined by the demand for and supply of money.

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Demand for money:

Liquidity preference means the desire of the public to hold cash. According to Keynes, there are three motives behind the desire of the public to hold liquid cash: (1) the transaction motive, (2) the precautionary motive, and (3) the speculative motive.

Transactions Motive:

The transactions motive relates to the demand for money or the need of cash for the current transactions of individual and business exchanges. Individuals hold cash in order to bridge the gap between the receipt of income and its expenditure. This is called the income motive.

The businessmen also need to hold ready cash in order to meet their current needs like payments for raw materials, transport, wages etc. This is called the business motive.

Precautionary motive:

Precautionary motive for holding money refers to the desire to hold cash balances for unforeseen contingencies. Individuals hold some cash to provide for illness, accidents, unemployment and other unforeseen contingencies. Similarly, businessmen keep cash in reserve to tide over unfavourable conditions or to gain from unexpected deals.

Keynes holds that the transaction and precautionary motives are relatively interest inelastic, but are highly income elastic. The amount of money held under these two motives (M_1) is a function (L_1) of the level of income (Y) and is expressed as $M_1 = L_1(Y)$

Speculative Motive:

The speculative motive relates to the desire to hold one's resources in liquid form to take advantage of future changes in the rate of interest or bond prices. Bond prices and the rate of interest are inversely related to each other. If bond prices are expected to rise, i.e., the rate of interest is expected to fall, people will buy bonds to sell when the price later actually rises. If, however, bond prices are expected to fall, i.e., the rate of interest is expected to rise, people will sell bonds to avoid losses.

According to Keynes, the higher the rate of interest, the lower the speculative demand for money, and lower the rate of interest, the higher the speculative demand for money. Algebraically, Keynes expressed the speculative demand for money as

$$M_2 = L_2(r)$$

Where, L_2 is the speculative demand for money, and r is the rate of interest.

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Geometrically, it is a smooth curve which slopes downward from left to right.

Now, if the total liquid money is denoted by M, the transactions plus precautionary motives by M_1 and the speculative motive by M_2, then

$M = M_1 + M_2$. Since $M_1 = L_1 (Y)$ and $M_2 = L_2 (r)$, the total liquidity preference function is expressed as $M = L (Y, r)$.

Supply of Money:

The supply of money refers to the total quantity of money in the country. Though the supply of money is a function of the rate of interest to a certain degree, yet it is considered to be fixed by the monetary authorities. Hence the supply curve of money is taken as perfectly inelastic represented by a vertical straight line.

Determination of the Rate of Interest:

Like the price of any product, the rate of interest is determined at the level where the demand for money equals the supply of money. In the following figure, the vertical line QM represents the supply of money and L the total demand for money curve. Both the curve intersects at E_2 where the equilibrium rate of interest OR is established.

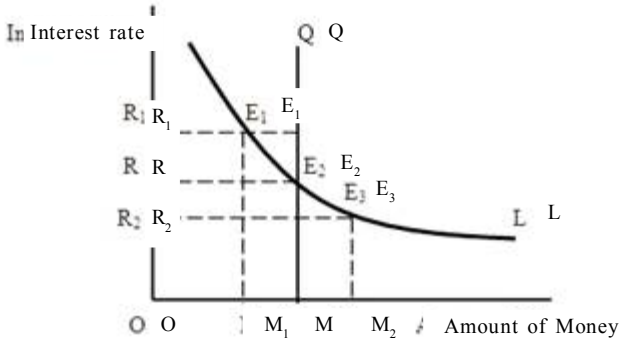

Fig. 22.2

If there is any deviation from this equilibrium position an adjustment will take place through the rate of interest, and equilibrium E_2 will be re-established.

At the point E_1 the supply of money OM is greater than the demand for money OM_1. Consequently, the rate of interest will start declining from OR_1 till the equilibrium rate of interest OR is reached. Similarly at OR_2 level of interest rate, the demand for money OM_2 is greater than the supply of money OM. As a result, the rate of interest OR_2 will start rising till it reaches the equilibrium rate OR.

It may be noted that, if the supply of money is increased by the monetary authorities, but the liquidity preference curve L remains the same, the rate of interest will fall. If the demand for money increases and the liquidity preference curve sifts upward, given the supply of money, the rate of interest will rise.

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22.7 DRAWBACKS OF THE KEYNESIAN THEORY OF INTEREST

Keynes theory of interest has been criticized on the following grounds:

1. It has been pointed out that the rate of interest is not purely a monetary phenomenon. Real forces like productivity of capital and thriftiness or saving by the people also play an important role in the determination of the rate of interest.
2. Liquidity preference is not the only factor governing the rate of interest. There are several other factors which influence the rate of interest by affecting the demand for and supply of investible funds.
3. The liquidity preference theory does not explain the existence of different rates of interest prevailing in the market at the same time.
4. Keynes ignores saving or waiting as a means or source of investible fund. To part with liquidity without there being any saving is meaningless.
5. The Keynesian theory only explains interest in the short-run. It gives no clue to the rates of interest in the long run.
6. Keynes theory of interest, like the classical and loanable funds theories, is indeterminate. We cannot know how much money will be available for the speculative demand for money unless we know how much the transaction demand for money is.

22.8 SUMMARY

The rate of interest is deter-mined by the interaction of the forces of demand for capital (or investment) and the supply of savings. The rate of interest at which the demand for capital (or demand for savings to invest in capital goods) and the supply of savings are in equilibrium, will be the rate determined in the market.

The demand curve for money illustrates the quantity of money demanded at a given interest rate. Notice that the demand curve for money is downward sloping, which means that people want to hold less of their wealth in the form of money the higher that interest rates on bonds and other alternative investments are.

The central bank controls the supply of money, and they interact with other financial institutions. This interaction is part of the money market, and we can illustrate it using a supply curve.

The supply curve for money illustrates the quantity of money supplied at a given interest rate, and here's what that looks like. Notice that unlike a typical supply curve in the product market, the supply curve for money is vertical, because it

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does not depend on interest rates. It depends entirely on decisions made by the central bank.

Keynesian theory of the demand for money was first formulated by Keynes in his well-known book, The Genera Theory of Employment, Interest and Money (1936). It has developed further by other economists of Keynesian persuasion. In understanding Keynes' theory two questions need to separate.

Keynes made the demand for money a function of two variables, namely income (Y)[4] and the rate of interest (r). Being a Cambridge economist, Keynes retained the influence of the Cambridge approach to the demand for money under which M^d is hypothesised to be a function of Y. But he argued that this explained only the transactions and the precautionary demand for money, and not the entire demand for money.

The truly novel and revolutionary element of Keynes' theory of the demand for money is the component of the speculative demand for money. Through it Keynes made (a part of) the demand for money a declining function of the rate of interest, the latter a purely monetary phenomenon and the sole carrier of monetary influences in the economy. Thus the speculative demand for money constitutes the main pillar of Keynes' revolution in monetary theory and Keynes' attack on the quantity theory of money. This is explained below.

The speculative demand for money arises from the speculative motive for holding money. The latter arises from the variability of interest rates in the market and uncertainty about them. For simplicity Keynes -assumed that perpetual bonds are the only non-money financial asset in the economy, which compete with money in the asset portfolio of the public.

Money does not earn its holders any interest income, but its capital value in terms of itself is always fixed. Bonds, on the other hand, yield interest income to their holders. But this income can be more than wiped out if bond prices fall in future. It can be shown algebraically that the price of a (perpetual) bond is given by the reciprocal of the market rate of interest times the coupon rate of interest.

Keynes' theory of the speculative demand for money has also been criticised on the ground that it treats all non-money financial assets (NMFAs) as bonds. Such treatment is an unwarranted simplification, because a large number of such assets are unlike bonds in that their capital values are nominally fixed and do not vary (inversely) with r.

Keynes defines the rate of interest as the reward for parting with liquidity for a specified period of time. According to him, the rate of interest is determined by the demand for and supply of money.

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Demand for Money:

Liquidity preference means the desire of the public to hold cash. According to Keynes, there are three motives behind the desire of the public to hold liquid cash: (1) the transaction motive, (2) the precautionary motive, and (3) the speculative motive.

Transactions Motive:

The transactions motive relates to the demand for money or the need of cash for the current transactions of individual and business exchanges. Individuals hold cash in order to bridge the gap between the receipt of income and its expenditure. This is called the income motive.

The businessmen also need to hold ready cash in order to meet their current needs like payments for raw materials, transport, wages etc. This is called the business motive.

Precautionary Motive:

Precautionary motive for holding money refers to the desire to hold cash balances for unforeseen contingencies. Individuals hold some cash to provide for illness, accidents, unemployment and other unforeseen contingencies. Similarly, businessmen keep cash in reserve to tide over unfavourable conditions or to gain from unexpected deals.

Keynes holds that the transaction and precautionary motives are relatively interest inelastic, but are highly income elastic. The amount of money held under these two motives (M_1) is a function (L_1) of the level of income (Y) and is expressed as $M_1 = L_1(Y)$

Speculative Motive:

The speculative motive relates to the desire to hold one's resources in liquid form to take advantage of future changes in the rate of interest or bond prices. Bond prices and the rate of interest are inversely related to each other. If bond prices are expected to rise, i.e., the rate of interest is expected to fall, people will buy bonds to sell when the price later actually rises. If, however, bond prices are expected to fall, i.e., the rate of interest is expected to rise, people will sell bonds to avoid losses.

Supply of Money:

The supply of money refers to the total quantity of money in the country. Though the supply of money is a function of the rate of interest to a certain degree, yet it is considered to be fixed by the monetary authorities. Hence the supply curve of money is taken as perfectly inelastic represented by a vertical straight line.

22.9 GLOSSARY

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(a) Rate of interest: The rate of interest is determined by the interaction of the forces of demand for capital (or investment) and the supply of savings. The rate of interest at which the demand for capital (or demand for savings to invest in capital goods) and the supply of savings are in equilibrium, will be the rate determined in the market.

(b) Demand curve for money: The demand curve for money illustrates the quantity of money demanded at a given interest rate. Notice that the demand curve for money is downward sloping, which means that people want to hold less of their wealth in the form of money the higher that interest rates on bonds and other alternative investments are.

The central bank controls the supply of money, and they interact with other financial institutions. This interaction is part of the money market, and we can illustrate it using a supply curve.

(c) Supply curve for money: The supply curve for money illustrates the quantity of money supplied at a given interest rate, and here's what that looks like. Notice that unlike a typical supply curve in the product market, the supply curve for money is vertical, because it does not depend on interest rates. It depends entirely on decisions made by the central bank.

(d) Speculative demand: The speculative demand for money arises from the speculative motive for holding money. The latter arises from the variability of interest rates in the market and uncertainty about them. For simplicity Keynes -assumed that perpetual bonds are the only non-money financial asset in the economy, which compete with money in the asset portfolio of the public.

(e) Demand for money: Liquidity preference means the desire of the public to hold cash. According to Keynes, there are three motives behind the desire of the public to hold liquid cash: (1) the transaction motive, (2) the precautionary motive, and (3) the speculative motive.

(f) Transactions Motive: The transactions motive relates to the demand for money or the need of cash for the current transactions of individual and business exchanges. Individuals hold cash in order to bridge the gap between the receipt of income and its expenditure. This is called the income motive.

(g) Precautionary motive: Precautionary motive for holding money refers to the desire to hold cash balances for unforeseen contingencies. Individuals hold some cash to provide for illness, accidents, unemployment and other

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unforeseen contingencies. Similarly, businessmen keep cash in reserve to tide over unfavourable conditions or to gain from unexpected deals.

(h) Supply of Money: The supply of money refers to the total quantity of money in the country. Though the supply of money is a function of the rate of interest to a certain degree, yet it is considered to be fixed by the monetary authorities. Hence the supply curve of money is taken as perfectly inelastic represented by a vertical straight line.

22.10 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Money demand?
2. What is money supply?
3. What is Keynesian approach?
4. What is Keynesian theory of interest?

(B) Extended Answer Questions

1. Discuss in details money demand and supply.
2. Discuss about the Keynesian approach.
3. Explain about the Keynesian theory of interest.
4. Explain the drawbacks of the Keynesian theory of interest.

(C) True or False

1. The rate of interest is determined by the interaction of the forces of demand for capital (or investment) and the supply of savings.
2. The central bank controls the supply of money, and they interact with other financial institutions.
3. Keynesian theory of the demand for money was first formulated by Keynes in his well-known book, The Genera Theory of Employment, Interest and Money (1936).
4. Liquidity preference means the desire of the public to hold cash.
5. The supply of money refers to the total quantity of money in the country.

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(D) Multiple Choice Questions

1. What is determined by the interaction of the forces of demand for capital (or investment) and the supply of savings?
   (a) Rate of interest (b) Cost
   (c) Investment (d) None of the above
2. Who controls the supply of money, and they interact with other financial institutions?
   (a) SBI (b) The central bank
   (c) UBI (d) Axis Bank
3. Keynesian theory of the demand for money was first formulated by Keynes in his well-known book, The Genera Theory of Employment, Interest and Money in the year…….
   (a) 1936 (b) 1937
   (c) 1938 (d) 1939

(E) Fill in the Blanks

1. …… is determined by the interaction of the forces of demand for capital (or investment) and the supply of savings.
2. ……..controls the supply of money, and they interact with other financial institutions.
3. …….of the demand for money was first formulated by Keynes in his well-known book, The Genera Theory of Employment, Interest and Money (1936).

22.11 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. True, 4. True, 5. True

(D) 1. (a), 2. (b), 3. (a)

(E) 1.The rate of interest, 2. The Central Bank, 3. Keynesian theory

22.12 BIBLIOGRAPHY

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13. Maria Moschandreas (2000). Business Economics, 2nd Edition, Thompson Learning. Description and chapter-preview links.
14. Prof. M.S. BHAT, and mk RAU.Managerial economic and financial analysis.Hyderabad.ISBN 978-81-7800-153-1

22.13 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

22.14 TERMINAL QUESTIONS

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1. Discuss about Liquidity Preference the supply of money.

2. Discuss in details money demand and supply.

3. Explain about the Keynesian theory of interest. Explain the drawbacks of the Keynesian theory of interest.

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UNIT 23 INVESTMENT THEORY AND ACCELERATION PRINCIPLE

Structure:

Objectives

After reading this unit you will understand:

- Basic concepts
- Investment decisions
- Change in interest rates
- MEC and Capital Accumulation
- The acceleration principle

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23.1 INTRODUCTION

Investment theory encompasses the body of knowledge used to support the decision-making process of choosing investments for various purposes. It includes portfolio theory, the capital asset pricing model, arbitrage pricing theory, efficient-market hypothesis, and rational pricing.

23.2 BASIC CONCEPT OF INVESTMENT THEORY

Investment theory encompasses the body of knowledge used to support the decision-making process of choosing investments for various purposes. It includes portfolio theory, the capital asset pricing model, arbitrage pricing theory, efficient-market hypothesis, and rational pricing.

When it comes to investing, there is no shortage of theories on what makes the markets tick or what a particular market move means. The two largest factions on Wall Street are split along theoretical lines into adherents to an efficient market theory and those who believe the market can be beat. Although this is a fundamental split, many other theories attempt to explain and influence the market and the actions of investors in the markets. In this article, we will look at some common (and uncommon) financial theories.

Very few people are neutral on efficient market hypothesis (EMH). You either believe in it or adhere to passive, broad market investing strategies, or you detest it and focus on picking stocks based on growth potential, undervalued assets and so on. The EMH states that the market price for shares incorporates all the known information about that stock. This means that the stock is accurately valued until a future event changes that valuation. Because the future is uncertain, an adherent to EMH is far better off owning a wide swath of stocks and profiting from the general rise of the market.

The fifty percent principle predicts that, before continuing, an observed trend will undergo a price correction of one-half to two-thirds of the change in price. This means that if a stock has been on an upward trend and gained 20%, it will fall back 10% before continuing its rise. This is an extreme example, as most times this rule is applied to the short-term trends that technical analysts and traders buy and sell on.

This correction is thought to be a natural part of the trend, as it's usually caused by skittish investors taking profits early to avoid getting caught in a true reversal of the trend later on. If the correction exceeds 50% of the change in price, it's considered a sign that the trend has failed and the reversal has come prematurely.

The greater fool theory proposes that you can profit from investing as long as there is a greater fool than yourself to buy the investment at a higher price. This means

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that you could make money from an overpriced stock as long as someone else is willing to pay more to buy it from you.

The odd lot theory uses the sale of odd lots small blocks of stocks held by individual investors as an indicator of when to buy into a stock. Investors following the odd lot theory buy in when small investors sell out. The main assumption is that small investors are usually wrong.

The odd lot theory is contrarian strategy based off a very simple form of technical analysis – measuring odd lot sales. How successful an investor or trader following the theory is depends heavily on whether he checks the fundamentals of companies that the theory points toward or simply buys blindly. Small investors aren't going to be right or wrong all the time, so it's important to distinguish odd lot sales that are occurring from a low-risk tolerance from odd lot sales that are due to bigger problems. Individual investors are more mobile than the big funds and thus can react to severe news faster, so odd lot sales can actually be a precursor to a wider sell-off in a failing stock instead of just a mistake on the part of small-time investors.

Prospect theory states that people's perceptions of gain and loss are skewed. That is, people are more afraid of a loss than they are encouraged by a gain. If people are given a choice of two different prospects, they will pick the one that they think has less chance of ending in a loss, rather than the one that offers the most gains. For example, if you offer a person two investments, one that has returned 5% each year and one that has returned 12%, lost 2.5%, and returned 6% in the same years, the person will pick the 5% investment because he puts an irrational amount of importance on the single loss, while ignoring the gains that are of a greater magnitude. In the above example, both alternatives produce the net total return after three years.

Prospect theory is important for financial professionals and investors. Although the risk/reward trade-off gives a clear picture of the risk amount an investor must take on to achieve the desired returns, prospect theory tells us that very few people understand emotionally what they realize intellectually. For financial professionals, the challenge is in suiting a portfolio to the client's risk profile, rather than reward desires. For the investor, the challenge is to overcome the disappointing predictions of prospect theory and become brave enough to get the returns you want.

Rational expectations theory states that the players in an economy will act in a way that conforms to what can logically be expected in the future. That is, a person will invest, spend, etc. according to what he or she rationally believes will happen in the future. By doing so, that person creates a self-fulfilling prophecy that helps bring about the future event.

Although this theory has become quite important to economics, its utility is doubtful. For example, an investor thinks a stock is going to go up, and by buying it, this act actually causes the stock to go up. This same transaction can be framed outside of rational expectations theory. An investor notices that a stock is undervalued, buys

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it, and watches as other investors notice the same thing, thus pushing the price up to its proper market value. This highlights the main problem with rational expectations theory: it can be changed to explain everything, but it tells us nothing.

Short interest theory posits that a high short interest is the precursor to a rise in the stock's price and, at first glance, appears to be unfounded. Common sense suggests that a stock with a high short interest – that is, a stock that many investors are short selling – is due for a correction. The reasoning goes that all those traders, thousands of professionals and individuals scrutinizing every scrap of market data, surely can't be wrong. They may be right to an extent, but the stock price may actually rise by virtue of being heavily shorted. Short sellers have to eventually cover their positions by buying the stock they've shorted. Consequently, the buying pressure created by the short sellers covering their positions will push the share price upward.

Every theory is an attempt to impose some type of consistency or frame to the millions of buy and sell decisions that make the market swell and ebb daily. While it is useful to know these theories, it is also important to remember that no unified theory can explain the financial world. During certain time periods, one theory seems to hold sway only to be toppled the next instant. In the financial world, change is the only true constant.

23.3 INVESTMENT DECISIONS

Investment decisions are made by investors and investment managers. Investors commonly perform investment analysis by making use of fundamental analysis, technical analysis and gut feel. Investment decisions are often supported by decision tools.

An investment decision revolves around spending capital on assets that will yield the highest return for the company over a desired time period. In other words, the decision is about what to buy so that the company will gain the most value. To do so, the company needs to find a balance between its short-term and long-term goals. In the very short-term, company needs money to pay its bills, but keeping its entire cash means that it isn't investing in things that will help it grow in the future. On the other end of the spectrum is a purely long-term view. A company that invests all of its money will maximize its long-term growth prospects, but if it doesn't hold enough cash, it can't pay its bills and will go out of business soon. Companies thus need to find the right mix between long-term and short-term investment.

The investment decision also concerns what specific investments to make. Since there is no guarantee of a return for most investments, the finance department must determine an expected return. This return is not guaranteed, but is the average return on an investment if it were to be made many times.

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The investments must meet three main criteria:

(i) It must maximize the value of the firm, after considering the amount of risk the company is comfortable with (risk aversion).

(ii) It must be financed appropriately (we will talk more about this shortly).

(iii) If there is no investment opportunity that fills (1) and (2), the cash must be returned to shareholder in order to maximize shareholder value.

23.4 MARGINAL EFFICIENCY OF CAPITAL (MEC)

The MEC is the net rate of return that is expected from the purchase of additional capital. It is calculated as the profit that a firm is expected to earn considering the cost of inputs and the depreciation of capital. It is influenced by expectations about future input costs and demand.

The effect of an upward shift in the MEC schedule on investment and the process of capital accumulation, with a given interest is the graphical analysis of the effect of an upward shift in the MEC schedule on investment demand and on the capital stock is presented that the initial MEC schedule is given as MEC, in panel (a) of the figure and the market rate of interest is given at 8 percent. Given the schedule MEC and 8 percent interest rate, the optimum stock of capital is determined at ₹ 500 million. The optimality of capital stock means that net investment is zero. Now let the MEC schedule shift upward from MEC to MEC.

The increase in the demand for additional capital warrants an increase in the production of additional capital goods. How the question arises: how much capital goods can be produced in the first period? As shown in panel (a) of the figure, given the interest rate at 8 percent and the stock of capital at ₹ 500 millions, the award shift in the MEC schedule increases MEC to 12 percent, 4 percent higher than the previous MEC. The MEL schedule associated with this stock of capital and MEC is shown by the schedule MEL in panel (b) of the figure. The schedule MEL intersects the 8 percent line at point N determining the additional capital production at ₹ 40 million; it means that the net investment in the first period will increase by ₹ 40 million. The increases the stock of capital to ₹ 540 million, as a result MEC falls to 10 percent. If capital stock were to be maintained at ₹ 540 million. As a result MEC falls to 10 percent. If capital stock were to be maintained at ₹ 540 million, net investment would be equal to zero.

At zero net investment there will be another MEL schedule that is schedule MEI. The MEC at 10 percent is still higher than the interest rate (8 percent). It can be seen in panel (b) that MEI intersects the 8 percent interest line at point M. this implies an additional net investment of ₹ 25 million in the second period increasing the stock of capital to ₹ 565 million, since MEC is still higher that the interest rate, further investment is still warranted, by the logic explained shove, the MEL schedule will shift downward increasing the net investment by ₹ 15 million. The net investment

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of ₹ 15 million in the third period relapses the stock of capital to tits desired level at ₹ 500 million. At this stock of capital MEC= I = MEL, therefore, the net investment falls once again to zero level.

The marginal efficiency of capital (MEC) is that rate of discount which would equate the price of a fixed capital asset with its present discounted value of expected income.

The term "marginal efficiency of capital" was introduced by John Maynard Keynes in his General Theory, and defined as "the rate of discount which would make the present value of the series of annuities given by the returns expected from the capital asset during its life just equal its supply price".

The MEC is the net rate of return that is expected from the purchase of additional capital. It is calculated as the profit that a firm is expected to earn considering the cost of inputs and the depreciation of capital. It is influenced by expectations about future input costs and demand. The MEC and capital outlays are the elements that a firm takes into account when deciding about an investment project.

The MEC needs to be higher than the rate of interest, r, for investment to take place. This is because the present value PV of future returns to capital needs to be higher than the cost of capital, Ck. These variables can be expressed as follows:

PV = Rn / (1 + r)n, where n is the number of years considered and Rn is the net return per year

Ck = Rn / (1 + MEC)n, where Ck is the capital outlays.

Hence, for investment to take place, the following condition is necessary: PV > Ck that is MEC > r. As a consequence, an inverse relationship between the rate of interest and investment is found (i.e.: a higher rate of interest generates less investment).

23.5 CAPITAL ACCUMULATION

Capital accumulation refers to profits that a company uses to increase its capital base. Capital accumulation involves acquiring more assets that can be used to create more wealth or that will appreciate in value.

1. Capital Accumulation and Diminishing Returns

Growth models based on Solow's models argue that increasing capital stock can soon lead to diminishing returns. They argue that economic growth is fundamentally determined by population growth and technological innovation.

2. Capital Accumulation and Endogenous Growth Models

Endogenous growth models hold that capital accumulation can increase the long run trend rate of economic growth. However, to permit capital accumulation it is necessary to increase the savings ratios.

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3. Capital Accumulation Plans

Capital accumulation is often suggested as a means for developing countries to increase their long term growth rates. To increase capital accumulation it is necessary to:

Increase savings ratios

Maintain good banking system and system of loans.

Avoid corruption

Good infrastructure to make investment more worthwhile

23.6 THE ACCELERATION PRINCIPLE OF INVESTMENT

The accelerator principle states that an increase in the rate of output of a firm will require a proportionate increase in its capital stock. The capital stock refers to the desired or optimum capital stock, K. Assuming that capital-output ratio is some fixed constant, v, the optimum capital stock is a constant proportion of output so that in any period t,

$K_t = vY_t$

Where K_t is the optimal capital stock in period t, v (the accelerator) is a positive constant, and Y is output in period t.

Any change in output will lead to a change in the capital stock. Thus

$K_t - K_{t-1} = v\,(Y_t - Y_{t-1})$

and $I_{nt} = v\,(Y_t - Y_{t-1})$ $[I_{nt} = K_t - K_{t-1}] = v\Delta Y_t$

Where "$Y_t = Y_t - Y_{t-1}$, and I_{nt} is net investment.

This equation represents the naive accelerator.

In the above equation, the level of net investment is proportional to change in output. If the level of output remains constant ($\Delta Y = 0$), net investment would be zero. For net investment to be a positive constant, output must increase.

This is illustrated in Figure 23.1 where in the upper portion, the total output curve Y increases at an increasing rate up to t + 4 periods, then at a decreasing rate up to period t + 6. After this, it starts diminishing. The curve I_n in the lower part of the figure, shows that the rising output leads to increased net investment up to t + 4 period because output is increasing at an increasing rate.

But when output increases at a decreasing rate between t + 4 and t + 6 periods, net investment declines. When output starts declining in period t + 7, net investment becomes negative. The above explanation is based on the assumption that there is symmetrical reaction for increases and decreases of output.

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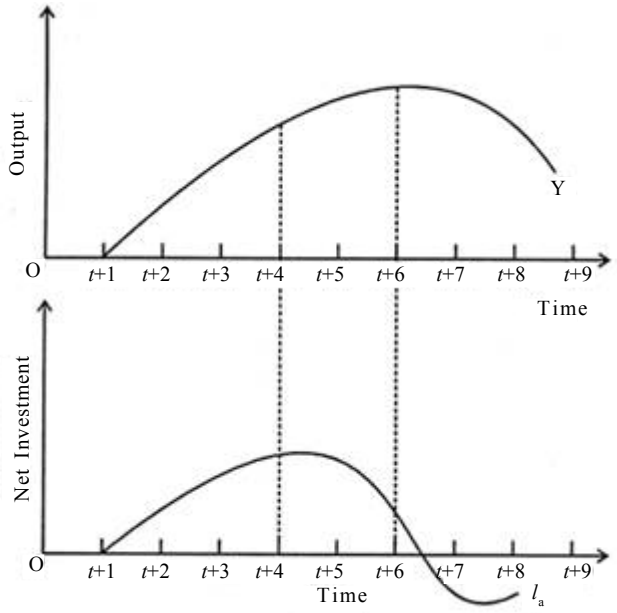

Fig. 23.1

In the simple acceleration principle, the proportionality of the optimum capital stock to output is based on the assumption of fixed technical coefficients of production. This is illustrated in Figure 23.2 where Y and Y_1 are the two isoquants.

The firm produces T output with K optimal capital stock. If it wants to produce Y_1 output, it must increase its optimal capital stock to K_1. The ray OR shows constant returns to scale. It follows that if the firm wants to double its output, it must increase its optimal capital stock by two-fold.

Eckaus has shown that under the assumption of constant returns to scale, if the factor-price ratios remain constant, the simple accelerator would be constant. Suppose the firm's production involves the use of only two factors, capital and labour whose factor-price ratios are constant.

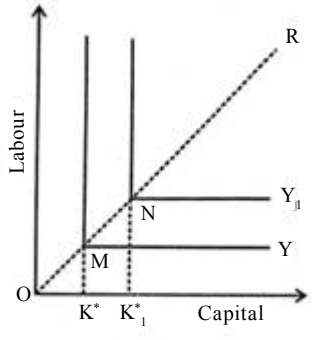

Fig. 23.2

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In Figure 23.3, Y, Y_1 and Y_2 are the firms' isoquants and C, C_1 and C_2 are the isocost lines which are parallel to each other, thereby showing constant costs. If the firm decides to increase its output from Y to Y_1, it will have to increase the units of labour from L to L_1 and of capital from K to K_1 and so on.

The line OR joining the points of tangency e, e_1 and e_2 is the firms' expansion path which shows investment to be proportional to the change in output when capital is optimally adjusted between the iosquants and isocosts.

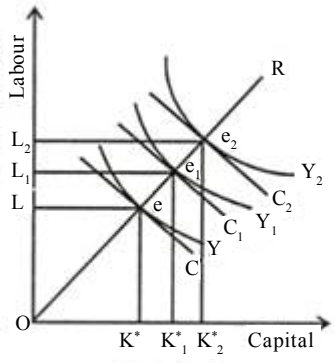

Fig. 23.3

23.7 THE FLEXIBLE ACCELERATOR THEORY OR LAGS IN INVESTMENT

The flexible accelerator theory removes one of the major weaknesses of the simple acceleration principle that the capital stock is optimally adjusted without any time lag. In the flexible accelerator, there are lags in the adjustment process between the level of output and the level of capital stock.

This theory is also known as the capital stock adjustment model. The theory of flexible accelerator has been developed in various forms by Chenery, Goodwin, Koyck and Junankar. But the most accepted approach is by Koyck.

Junankar has discussed the lags in the adjustment between output and capital stock. He explains them at the firm level and extends them to the aggregate level. Suppose there is an increase in the demand for output. To meet it, first the firm will use its inventories and then utilise its capital stock more intensively.

If the increase in the demand for output is large and persists for some time, the firm would increase its demand for capital stock. This is the decision-making lag. There may be the administrative lag of ordering the capital.

As capital is not easily available and in abundance in the financial capital market, there is the financial lag in raising finance to buy capital. Finally, there is the delivery lag between the ordering of capital and its delivery.

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Assuming "that different firms have different decision and delivery lags then in aggregate the effect of an increase in demand on the capital stock is distributed over time. This implies that the capital stock at time t is dependent on all the previous levels of output, i.e.

$$K_t = f(Y_t, Y_{t-1} \ldots\ldots, Y_{t-n}).$$

This is illustrated in Figure 4 where initially in period t_0, there is a fixed relation between the capital stock and the level of output. When the demand for output increases, the capital stock increases gradually after the decision and delivery lags, as shown by the K curve, depending on the previous levels of output. The increase in output is shown by the curve T. The dotted line K is the optimal capital stock which equals the actual capital stock K in period t.

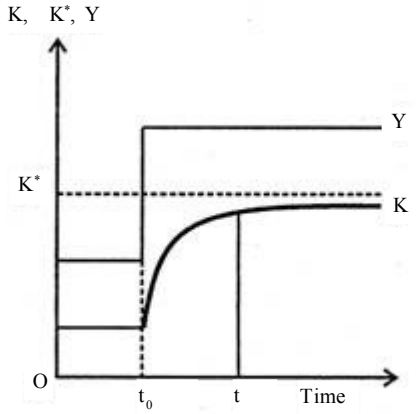

Fig. 23.4

23.8 THE PROFITS THEORY OF INVESTMENT

The profits theory regards profits, in particular undistributed profits, as a source of internal funds for financing investment. Investment depends on profits and profits, in turn, depend on income. In this theory, profits relate to the level of current profits and of the recent past.

If total income and total profits are high, the retained earnings of firms are also high, and vice versa, Retained earnings are of great importance for small and large firms when the capital market is imperfect because it is cheaper to use them.

Thus if profits are high, the retained earnings are also high. The cost of capital is low and the optimal capital stock is large. That is why firms prefer to reinvest their extra profit for making investments instead of keeping them in banks in order to buy securities or to give dividends to shareholders. Contrariwise, when their profits fall, they cut their investment projects. This is the liquidity version of the profits theory.

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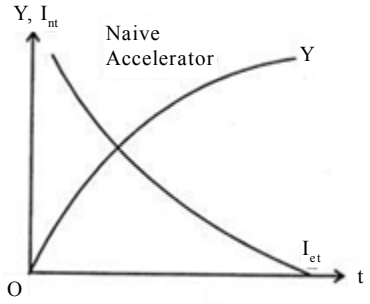

Fig. 23.5

Another version is that the optimal capital stock is a function of expected profits. If the aggregate profits in the economy and business profits are rising, they may lead to the expectation of their continued increase in the future. Thus expected profits are some function of actual profits in the past,

$$K_t = f(_{t-1})$$

Where, K is optimal capital stock and $f(_{t-1})$ is some function of past actual profits.

Edward Shapiro has developed the profits theory of investment in which total profits vary directly with the income level. For each level of profits, there is an optimal capital stock. The optimal capital stock varies directly with level of profits.

The interest rate and the level of profits, in turn, determine the optimal capital stock. For any particular level of profits, the higher the interest rate, the smaller will be the optimal capital stock, and vice versa. This version of the profits theory is explained in terms of Figure 23.6.

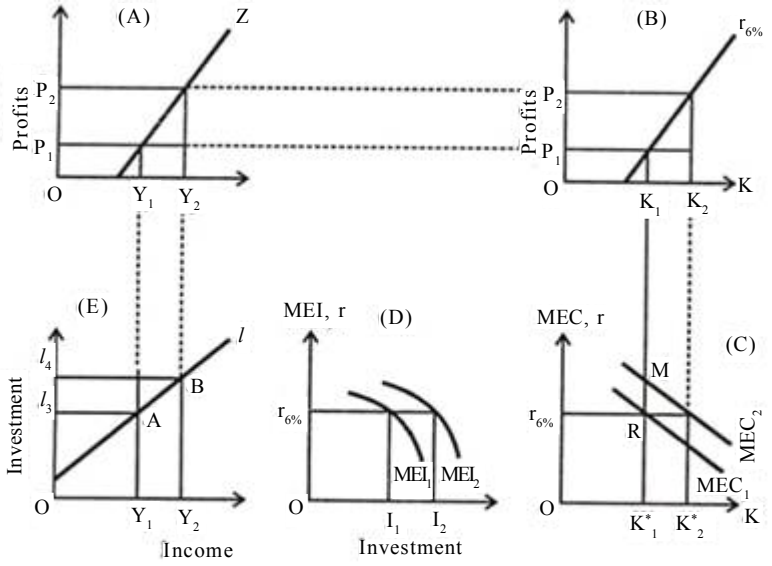

Fig. 23.6

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The curve Z in Panel (A) shows that total profits vary directly with income. When the income is Y_1, profits are P_1 and with increase in income to Y_2 profits rise to P_2. Panel (B) shows that the interest rate and the profits level determine the capital stock. At P_2 profits levels and r6% interest rate, the actual capital stock is K_2 and at the lower profits level P and interest rate r6%, the actual capital stock declines to K_1.

In Panel (C), the MEC curve is drawn for each level of profits, given the actual capital stock and the rate of interest. As such, the curve MEC_1 relates the profits level P_1 to the optimal capital stock K_1 when r6% is the interest rate. The higher curve MEC_2 relates the profit level P_2 to the higher optimal capital stock K_2, given the same rate of interest r 6%.

Suppose that the level of profits is P_1, the market interest rate is r6% and the actual capital stock is K_1. With this combination of the variables, the optimal capital stock in Panel (C) is K so that the actual capital stock, $K_1 = K_1$ the optimal capital stock.

As a result, net investment is zero. But there is still I_1 replacement investment at r6%, as indicated by MEI_1 curve in Panel (D). The combination of I_2 investment and Y_1 income level establishes point A on the investment curve I in Panel (E) of the figure.

Now begin with P_2 level of profits and Y_2 income level in Panel (A) so that at r6% interest rate in Panel (C), the optimal capital stock is K_2. Assuming again that the actual capital stock is K_1, the optimal capital stock is greater than the actual, $K_2 > K_1$ at this profit-income combination.

Here the MEC_2 is higher than r6% interest rate by RM. As a result, the MEI_1 curve shifts upward to MEI_2 in Panel (D). Since $K_2 > K_1$ net investment is positive. This is shown by $I_1 - I_2$ in Panel (D). So when profits increase to P_2 with the rise in income to Y_2, the optimal capital stock K_2 being greater than the actual capital stock K_1 at r6% interest rate, investment increases from I_3 to I_4 in Panel (E) which is equal to net investment I_1I_2 in Panel (D). The combination of I_4 and Y_2, establishes point B on the upward sloping I curve.

To sum up, in the profits theory of investment, the level of aggregate profits varies with the level of national income, and the optimal capital stock varies with the level of aggregate profits. If at a particular level of profits, the optimal capital stock exceeds the actual capital stock, there is increase in investment to meet the demand for capital. But the relationships between investment and profits and between aggregate profits and income are not proportional.

It's Criticism:

The theory is based on the assumption that profits are related to the level of current profits and of the recent past. But there is no possibility that the firm's current profit of this year or of the next few years can measure the profits of the next year

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or of the next few years. A rise in current profits may be the result of unexpected changes of a temporary nature. Such temporary profits do not induce investment.

23.9 DUESENBERRY'S ACCELERATOR THEORY OF INVESTMENT

J.S. Duesenberry in his book Business Cycles and Economic Growth presents an extension of the simple accelerator and integrates the profits theory and the acceleration theory of investment.

Duesenberry has based his theory on the following propositions:

(1) Gross investment starts exceeding depreciation when capital stock grows.

(2) Investment exceeds savings when income grows.

(3) The growth rate of income and the growth rate of capital stock are determined entirely by the ratio of capital stock to income. He regards investment as a function of income (Y), capital stock (K), profits () and capital consumption allowances (R). All these are independent variables and can be represented as

$$I = f(Y_{t-1}, K_{t-1}, {}_{t-1}, R_t)$$

Where, t refers to the current period and (t-1) to the previous period. According to Duesenberry, profits depend positively on national income and negatively on capital stock.

$$= aY - bK$$

Taking account of lags, this becomes $= aY_{t-1} - b\,K_{t-1}$

Where t refers to profits during period t, Y_{t-1} and K_{t-1} are income and capital stock of the previous period respectively and a and b are constants. Capital consumption allowances are expressed as

$$R, = kK_{t-1}$$

The above equation shows that capital consumption allowances are a fraction (k) of capital stock (K_{t-1}).

Duesenberry's investment function is a modified version of the accelerator principle,

$$I_t = áY_{t-1} + âK_{t-1}.... (1)$$

Where, investment in period t is a function of income (X) and capital stock (K) of the previous period (t—1). The parameter (a) represents the effect of changes in income on investment, while the parameter ((3) represents the influence of capital stock on investment working through both the marginal efficiency of investment and profits.

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Since the determinants of investment also affect consumption, the consumption function can be written as,

$$C_t = f(Y_{t-1} - {}_{t-1} - R_{t-1} + d_t)$$

Where d_t stands for dividend payments in period t. Since = f (Y, K), R = kY and d=f ("), these independent variables can be subsumed under Y and K. Thus

$$C_t = a\,Y_{t-1} + bK_{t-1} \ldots. (2)$$

The parameter, a, in equation (2) is MPC and it also reflects increase in profits. This increase is reduced by the effect of profits on dividends and the effect of changes in dividends on consumption. The influence of changes in capital stock on consumption is reflected by the parameter b. This influence results from the influence of capital stock on profits through the influence of profits on dividends on consumption.

23.10 SUMMARY

Investment theory encompasses the body of knowledge used to support the decision-making process of choosing investments for various purposes. It includes portfolio theory, the capital asset pricing model, arbitrage pricing theory, efficient-market hypothesis, and rational pricing.

Investment theory encompasses the body of knowledge used to support the decision-making process of choosing investments for various purposes. It includes portfolio theory, the capital asset pricing model, arbitrage pricing theory, efficient-market hypothesis, and rational pricing.

When it comes to investing, there is no shortage of theories on what makes the markets tick or what a particular market move means. The two largest factions on Wall Street are split along theoretical lines into adherents to an efficient market theory and those who believe the market can be beat. Although this is a fundamental split, many other theories attempt to explain and influence the market and the actions of investors in the markets. In this article, we will look at some common (and uncommon) financial theories.

Very few people are neutral on efficient market hypothesis (EMH). You either believe in it or adhere to passive, broad market investing strategies, or you detest it and focus on picking stocks based on growth potential, undervalued assets and so on. The EMH states that the market price for shares incorporates all the known information about that stock. This means that the stock is accurately valued until a future event changes that valuation. Because the future is uncertain, an adherent to EMH is far better off owning a wide swath of stocks and profiting from the general rise of the market.

The fifty percent principle predicts that, before continuing, an observed trend will undergo a price correction of one-half to two-thirds of the change in price. This

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means that if a stock has been on an upward trend and gained 20%, it will fall back 10% before continuing its rise. This is an extreme example, as most times this rule is applied to the short-term trends that technical analysts and traders buy and sell on.

This correction is thought to be a natural part of the trend, as it's usually caused by skittish investors taking profits early to avoid getting caught in a true reversal of the trend later on. If the correction exceeds 50% of the change in price, it's considered a sign that the trend has failed and the reversal has come prematurely.

The greater fool theory proposes that you can profit from investing as long as there is a greater fool than yourself to buy the investment at a higher price. This means that you could make money from an overpriced stock as long as someone else is willing to pay more to buy it from you.

The odd lot theory uses the sale of odd lots small blocks of stocks held by individual investors as an indicator of when to buy into a stock. Investors following the odd lot theory buy in when small investors sell out. The main assumption is that small investors are usually wrong.

The odd lot theory is contrarian strategy based off a very simple form of technical analysis – measuring odd lot sales. How successful an investor or trader following the theory is depends heavily on whether he checks the fundamentals of companies that the theory points toward or simply buys blindly. Small investors aren't going to be right or wrong all the time, so it's important to distinguish odd lot sales that are occurring from a low-risk tolerance from odd lot sales that are due to bigger problems. Individual investors are more mobile than the big funds and thus can react to severe news faster, so odd lot sales can actually be a precursor to a wider sell-off in a failing stock instead of just a mistake on the part of small-time investors.

Prospect theory states that people's perceptions of gain and loss are skewed. That is, people are more afraid of a loss than they are encouraged by a gain. If people are given a choice of two different prospects, they will pick the one that they think has less chance of ending in a loss, rather than the one that offers the most gains. For example, if you offer a person two investments, one that has returned 5% each year and one that has returned 12%, lost 2.5%, and returned 6% in the same years, the person will pick the 5% investment because he puts an irrational amount of importance on the single loss, while ignoring the gains that are of a greater magnitude. In the above example, both alternatives produce the net total return after three years.

Investment decisions are made by investors and investment managers. Investors commonly perform investment analysis by making use of fundamental analysis, technical analysis and gut feel. Investment decisions are often supported by decision tools.

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An investment decision revolves around spending capital on assets that will yield the highest return for the company over a desired time period. In other words, the decision is about what to buy so that the company will gain the most value. To do so, the company needs to find a balance between its short-term and long-term goals. In the very short-term, company needs money to pay its bills, but keeping its entire cash means that it isn't investing in things that will help it grow in the future. On the other end of the spectrum is a purely long-term view. A company that invests all of its money will maximize its long-term growth prospects, but if it doesn't hold enough cash, it can't pay its bills and will go out of business soon. Companies thus need to find the right mix between long-term and short-term investment.

The MEC is the net rate of return that is expected from the purchase of additional capital. It is calculated as the profit that a firm is expected to earn considering the cost of inputs and the depreciation of capital. It is influenced by expectations about future input costs and demand.

The effect of an upward shift in the MEC schedule on investment and the process of capital accumulation, with a given interest is the graphical analysis of the effect of an upward shift in the MEC schedule on investment demand and on the capital stock is presented that the initial MEC schedule is given as MEC, in panel (a) of the figure and the market rate of interest is given at 8 percent. Given the schedule MEC and 8 percent interest rate, the optimum stock of capital is determined at ₹ 500 million. The optimality of capital stock means that net investment is zero. Now let the MEC schedule shift upward from MEC to MEC.

The term "marginal efficiency of capital" was introduced by John Maynard Keynes in his General Theory, and defined as "the rate of discount which would make the present value of the series of annuities given by the returns expected from the capital asset during its life just equal its supply price".

Capital accumulation refers to profits that a company uses to increase its capital base. Capital accumulation involves acquiring more assets that can be used to create more wealth or that will appreciate in value.

Growth models based on Solow's models argue that increasing capital stock can soon lead to diminishing returns. They argue that economic growth is fundamentally determined by population growth and technological innovation.

The accelerator principle states that an increase in the rate of output of a firm will require a proportionate increase in its capital stock. The flexible accelerator theory removes one of the major weaknesses of the simple acceleration principle that the capital stock is optimally adjusted without any time lag. In the flexible accelerator, there are lags in the adjustment process between the level of output and the level of capital stock.

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The profits theory regards profits, in particular undistributed profits, as a source of internal funds for financing investment. Investment depends on profits and profits, in turn, depend on income. In this theory, profits relate to the level of current profits and of the recent past.

J.S. Duesenberry in his book Business Cycles and Economic Growth presents an extension of the simple accelerator and integrates the profits theory and the acceleration theory of investment.

23.11 GLOSSARY

(a) Investment theory: Investment theory encompasses the body of knowledge used to support the decision-making process of choosing investments for various purposes. It includes portfolio theory, the capital asset pricing model, arbitrage pricing theory, efficient-market hypothesis, and rational pricing.

(b) Investment decisions: Investment decisions are made by investors and investment managers. Investors commonly perform investment analysis by making use of fundamental analysis, technical analysis and gut feel. Investment decisions are often supported by decision tools. An investment decision revolves around spending capital on assets that will yield the highest return for the company over a desired time period.

(c) MEC: The MEC is the net rate of return that is expected from the purchase of additional capital. It is calculated as the profit that a firm is expected to earn considering the cost of inputs and the depreciation of capital. It is influenced by expectations about future input costs and demand.

(d) Capital accumulation: Capital accumulation refers to profits that a company uses to increase its capital base. Capital accumulation involves acquiring more assets that can be used to create more wealth or that will appreciate in value.

(e) Accelerator principle: The accelerator principle states that an increase in the rate of output of a firm will require a proportionate increase in its capital stock. The flexible accelerator theory removes one of the major weaknesses of the simple acceleration principle that the capital stock is optimally adjusted without any time lag. In the flexible accelerator, there are lags in the adjustment process between the level of output and the level of capital stock.

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23.12 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Investment Theory?
2. What is Investment decision?
3. What is interest rate?
4. What is MEC?
5. What is Capital Accumulation?

(B) Extended Answer Questions

1. Discuss about basic concepts of Investment Theory.
2. Explain in details about Investment Decisions.
3. Discuss about change in interest rates.
4. Discuss about MEC and Capital Accumulation.

(C) True or False

1. Economic theory encompasses the body of knowledge used to support the decision-making process of choosing investments for various purposes.
2. The fifty percent principle predicts that, before continuing, an observed trend will undergo a price correction of one-half to two-thirds of the change in price
3. Investment decisions are made by investors and investment managers.
4. The MEC is the net rate of return that is expected from the purchase of additional capital.
5. Capital accumulation refers to profits that a company uses to increase its capital base.

(D) Multiple Choice Questions

1. What encompasses the body of knowledge used to support the decision-making process of choosing investments for various purposes?
   (a) Business
   (b) Investment theory
   (c) Economics theory
   (d) All the above

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2. The fifty percent principle predicts that, before continuing, an observed trend will undergo a price correction of one-half to two-thirds of the……

(a) Change in price (b) Change of rate

(c) Both a and b (d) None of the above

(E) Fill in the Blanks

1. ……..encompasses the body of knowledge used to support the decision-making process of choosing investments for various purposes.
2. Investment decisions are made by investors and…….
4. ……is the net rate of return that is expected from the purchase of additional capital.
5. ……..refers to profits that a company uses to increase its capital base.

23.13 KEY TO CHECK YOUR ANSWER

(C) 1. False, 2. True, 3. True, 4. True, 5. True

(D) 1. (b), 2. (a)

(E) 1. Investment theory, 2. Investment managers, 3. The MEC, 4. Capital accumulation

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8. James O. Berger (2008)."statistical decision theory," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
9. Keisuke Hirano (2008). "decision theory in econometrics," The New Palgrave Dictionary of Economics, 2nd Edition. Abstract.
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23.15 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

23.16 TERMINAL QUESTIONS

1. Explain in details about the acceleration principle.

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2. Discuss about basic concepts of Investment Theory. Explain in details about Investment Decisions.

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UNIT 24 MONEY AND BANKING

Structure:

Objectives

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After reading this unit you will able to understand:

- Money
- Definition and function
- Types of Money, M1, M2, M3 and M4, high power money
- Banks
- Banking in India
- Reserve Bank of India and its functions
- Repo, Reverse Repo, CRR, SLR, MSF, credit creation by banks

24.1 INTRODUCTION

Money is any item or verifiable record that is generally accepted as payment for goods and services and repayment of debts in a particular country or socio-economic context, or is easily converted to such a form. The main functions of money are distinguished as: a medium of exchange; a unit of account; a store of value; and, sometimes, a standard of deferred payment. Any item or verifiable record that fulfils these functions can be considered as money.

24.2 INTRODUCTION TO MONEY

Money is any object or record that is generally accepted as payment for goods and services for repayment of debts in a given country or socio-economic context. The main functions of money are distinguished as: a medium of exchange; a unit of account; a store of value; and, occasionally in the past, a standard of deferred payment. Any kind of object or secure verifiable record that fulfills these functions can serve as money.

Money originated as commodity money, but nearly all contemporary money systems are based on fiat money. Fiat money is without intrinsic use value as a physical commodity, and derives its value by being declared by a government to be legal tender; that is, it must be accepted as a form of payment within the boundaries of the country, for "all debts, public and private". The money supply of a country consists of currency (banknotes and coins) and bank money (the balance held in check accounts and savings accounts). Bank money usually forms by far the largest part of the money supply.

24.3 DEFINITIONS OF MONEY

Money is an officially-issued legal tender generally consisting of notes and coin, and is the circulating medium of exchange as defined by a government. Money is

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often synonymous with cash and includes various negotiable instruments such as cheques.

"Money is anything that is habitually and widely used as means of payment and is generally acceptable in the settlement of debts." - G D H Cole.

"Money constitutes all those things which are at any time and place, generally current without doubt or special enquiry as a means of purchasing commodities and services and of defraying expenses." - Alfred Marshal

By money is to be understood "that by delivery of which debt contracts and price contracts are discharged, and in the shape of which a store of General Purchasing Power is held." - J M Keynes

"Money can be anything that is generally acceptable as a means of exchange and that the same time acts as a measure and a store of value." - Crowther

24.4 FUNCTIONS OF MONEY

The various functions of money are as follows:

1. Static Function

These include the functions performed by money in the static role or as a passive technical device. The static functions of money include:

(a) Money as a medium of exchange: Money acts as a medium of exchange and it facilitates the quick and easy exchange of goods and services. It has help discontinue the barter system and one need not make a simultaneous purchase while making a sale.

(b) Money as a Unit of Account: Money helps in expressing various things in terms of its value and has hence given rise to the price system. It acts as a common measure of value and helps in the smooth operation of the price system in the modern economic society.

(c) Money as a store of value: Money acts as a store of value as it can be held by oneself for present as well as future use. It is convenient means of holding the income for the purpose of spending i.e. it has high liquidity value.

(d) Money as a standard of deferred payments: It helps in settlement of debts and future transactions which was not possible in the barter system.

2. Dynamic Function

(a) Money plays a dynamic role in determining the economic trends.

(b) The volume and velocity of money can cause a rise or a fall in the general price level. It also influences consumption and production.

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(c) Money encourages the division of labour: Since, money acts as the medium of exchange and gives purchasing power to one; one may not have to produce various goods and can specialize in producing a particular commodity.

24.5 TYPES OF MONEY

1. Standard Money:

Standard Money is that form of money in terms of which all other forms of money in the country are measured.

It is unlimited legal tender and is subject to free coinage, i.e., anybody can bring his metal and get coins made of it. Usually it's real or 'intrinsic value' is equal to its face value. It is either made of gold or silver, or sometimes both. At present, no country has such a money in Standard Money.

2. Token Money:

Token money is made of cheaper metal; it is limited legal tender; it is not subject to free coinage and its face value is greater than its intrinsic or metallic value. Token money consists of small coins. The rupee is the standard unit of money in India, but its face value is greater today than its real value. Nor is the rupee subject to free coinage. It cannot, therefore, be called standard money. It is a mixture of the standard and token money.

3. Bank Money:

Bank money refers to bank deposits, the bank deposits can be turned into money by their depositors by means of cheques. In advanced countries the cheques are as good as money and circulate as such. Bank money or 'cheque-created money' is, however, quantitatively the most important now in all modern communities.

Just as metallic money superseded the other commodities as money and was in course of time superseded by paper money; in the same manner bank money has superseded all types of money in modern times. Cheques or bank money are superior to other forms of money in that they are convenient for mailing, for paying exact sums, for providing receipts in the form of counterfoils and on account of being safe against being stolen or misplaced.

4. Money of Account:

Money of account is the monetary unit in terms of which the accounts of a country are kept and transactions made, i.e., in which general purchasing power, debts are prices are expressed. The rupee, for instance is our money of account. Sterling, dollar, frank and mark are the moneys of account respectively of Great Britain, the United States, France and West Germany.

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5. Coins and Coinage:

Metallic money consists of coins made of gold, silver, nickel, or copper. The coins may be:

(a) Standard coins and

(b) Token coins.

(a) Standard Coins:

The standard coins, as already mentioned, are:

(1) Unlimited legal tender.

(2) Subject to free coinage, and

(3) Have their face value equal to their metallic or intrinsic value

The proportion of pure metal to weight in the coin is spoken of as "so much tine". The Indian rupee was at one time made of silver weighing 180 grains and was 11/12 fine. During the war, new rupee (quaternary coins) were issued ½ fine and in 1947 nickel rupees were issued. The edges of the new rupee were slightly raised to avoid too much wear.

In addition, the edge was milled to avoid clipping or filing. At present, very few rupee coins are found in circulation. They have been replaced by rupee notes. All the world over, the State has the right of issuing coins which are made in a government mint There are mints at Bombay Calcutta in India.

(b) Token Coins:

A coin has value because it is made of a valuable metal. It is full-bodied if its face value is equal to the metal contained in it. Sometimes however, a coin has value only because the government has stamped it. When the value given to a coin by government is in excess of its contents, it is called a 'token coin'.

There cannot be free coinage in the case of token coins. They have a higher face value than the metal they contain and no private individual can permitted to make profit from coinage. It is only the privilege of the Govern-ment to do Token coins are also limited legal tender.

Our silver rupee was such a token coin till 1942. Then the price of silver rose so high that the intrinsic value of the rupee grew greater than its face value and it became what is called an 'over-valued coin'. Hence it became profitable for people to melt down rupees and sell the silver contained in them.

The old rupees wholly disappeared from circulation and the Government had to issue new rupees (and half-rupees) of lesser fineness to enable ordinary business to be carried on. All coins circulating in India are token coins including the rupee and paise coins.

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24.6 TYPES OF MONEY SUPPLY (M0, M1, M2, M3, M4)

1. M0 - Reserve Money

M0 = Currency in Circulation + Bankers' Deposits with RBI + Other deposits with RBI

2. M1 - Narrow Money

M1 = Currency with public + Demand deposits with the Banking system + Other deposits with RBI

M1 = Currency with the Public + Current Deposits with the Banking System + Demand Liabilities Portion of Savings Deposits with the Banking System + 'Other' Deposits with the RBI

3. M2

M2 = M1 + Time Liabilities Portion of Savings Deposits with the Banking System + Certificates of Deposit issued by Banks + Term Deposits of residents with a contractual maturity of up to and including one year with the Banking System (excluding CDs)

M2 = Currency with the Public + Current Deposits with the Banking System + Savings Deposits with the Banking System + Certificates of Deposit issued by Banks + Term Deposits of residents with a contractual maturity up to and including one year with the Banking System (excluding CDs) + 'Other' Deposits with the RBI

4. M3 - Broad Money

M3 = M2 + Term Deposits of residents with a contractual maturity of over one year with the Banking System + Call/Term borrowings from 'Non-depository' Financial Corporations by the Banking System

5. M4

M4 = M3 + All deposits with post office savings banks

24.7 HIGH POWERED MONEY

High Powered Money (HPM) is the net or total liability of the monetary authority of any nation, in India it is the liability of RBI. It is simply the sum of all currency in circulation with the people of country; cash kept in the commercial bank vaults along with the deposits of govt. of the country and commercial banks.

High-powered money is important because it represents net wealth to the private sector. In a contrast, checking account money, called demand deposits, represents

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an asset to the owner of the checking account, but represents a liability from the perspective of the bank, which owes that money to a customer on demand. The liability cancels out the asset, leaving a net effect of zero on the net wealth of the private sector. Commercial bank deposits at a central bank represent a liability to the central bank. However, a central bank is a government or quasi-government agency that is not considered part of the private sector.

The narrowest definition of the money stock, called M1, includes checkable deposits and circulating currency, but not vault cash at commercial banks. Because M1 includes checking deposits and excludes vault cash, it is possible for the supply of high-powered money to change without a change in a money stock measure such as M1. Normally, a 1 percent increase in the supply of high-powered money will lead to a 1 percent increase in M1, the most narrowly defined measure of the money supply in the United States.

The concept of high-powered money is important because central banks directly control high-powered money, and exert only indirect control over measures of the money supply, which are influenced by the willingness of commercial banks to make loans out of reserves

24.8 BANKS

A bank is an institution which deals with money & credit. It accepts from the public, makes the funds available to those who need them, & helps in the remittance of money from one place to another.

Definition of Bank

According to Crowther, a bank "collects money from those who have it to spare or those who are saving it out of their incomes, and it lends this money to those who require it."

24.9 BANKING IN INDIA

Banking in India, in the mod sense, originated in the last decades of the 18th century. Among the first banks were the Bank of Hindustan, which was established in 1770 and liquidated in 1829-32; and the General Bank of India, established in 1786 but failed in 1791.

The largest bank, and the oldest still in existence, is the State Bank of India (S.B.I). It originated as the Bank of Calcutta in June 1806. In 1809, it was renamed as the Bank of Bengal. This was one of the three banks funded by a presidency government, the other two were the Bank of Bombay and the Bank of Madras. The three banks were merged in 1921 to form the Imperial Bank of India, which upon India's independence, became the State Bank of India in 1955. For many years the presidency banks had acted as quasi-central banks, as did their successors,

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until the Reserve Bank of India was established in 1935, under the Reserve Bank of India Act, 1934.

In 1960, the State Banks of India was given control of eight state-associated banks under the State Bank of India (Subsidiary Banks) Act, 1959. These are now called its associate banks. In 1969 the Indian government nationalised 14 major private banks. In 1980, 6 more private banks were nationalised. These nationalised banks are the majority of lenders in the Indian economy. They dominate the banking sector because of their large size and widespread networks.

The Indian banking sector is broadly classified into scheduled banks and non-scheduled banks. The scheduled banks are those included under the 2nd Schedule of the Reserve Bank of India Act, 1934. The scheduled banks are further classified into: nationalised banks; State Bank of India and its associates; Regional Rural Banks (RRBs); foreign banks; and other Indian private sector banks. The term commercial banks refers to both scheduled and non-scheduled commercial banks regulated under the Banking Regulation Act, 1949.

Generally banking in India is fairly mature in terms of supply, product range and reach-even though reach in rural India and to the poor still remains a challenge. The government has developed initiatives to address this through the State Bank of India expanding its branch network and through the National Bank for Agriculture and Rural Development with facilities like microfinance.

24.10 RESERVE BANK OF INDIA

The Reserve Bank of India (RBI) is India's central banking institution, which controls the monetary policy of the Indian rupee. The RBI plays an important part in the development strategy of the Government of India. It is a member bank of the Asian Clearing Union. The general superintendence and direction of the RBI is entrusted with the 21-member-strong Central Board of Directors the Governor, four Deputy Governors, two Finance Ministry representatives, ten Government-nominated Directors to represent important elements from India's economy, and four Directors to represent Local Boards headquartered at Mumbai, Kolkata, Chennai and New Delhi. Each of these Local Boards consists of five members who represent regional interests, as well as the interests of co-operative and indigenous banks.

24.11 FUNCTIONS OF RBI

The main functions of Reserve Bank of India are as follows:

1. Monetary Authority

The Reserve Bank of India is the main monetary authority of the country and beside that the central bank acts as the bank of the national and state governments.

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It formulates implements and monitors the monetary policy as well as it has to ensure an adequate flow of credit to productive sectors. Objectives are maintaining price stability and ensuring adequate flow of credit to productive sectors. The national economy depends on the public sector and the central bank promotes an expansive monetary policy to push the private sector since the financial market reforms of the 1990s.

The institution is also the regulator and supervisor of the financial system and prescribes broad parameters of banking operations within which the country's banking and financial system functions. Objectives are to maintain public confidence in the system, protect depositors' interest and provide cost-effective banking services to the public. The Banking Ombudsman Scheme has been formulated by the Reserve Bank of India (RBI) for effective addressing of complaints by bank customers. The RBI controls the monetary supply, monitors economic indicators like the gross domestic product and has to decide the design of the rupee banknotes as well as coins.

2. Manager of exchange control

The central bank manages to reach the goals of the Foreign Exchange Management Act, 1999. Objective: to facilitate external trade and payment and promote orderly development and maintenance of foreign exchange market in India.

3. Issuer of Currency

The bank issues and exchanges or destroys currency and coins not fit for circulation. The objectives are giving the public adequate supply of currency of good quality and to provide loans to commercial banks to maintain or improve the GDP. The basic objectives of RBI are to issue bank notes, to maintain the currency and credit system of the country to utilize it in its best advantage, and to maintain the reserves. RBI maintains the economic structure of the country so that it can achieve the objective of price stability as well as economic development, because both objectives are diverse in themselves.

4. Developmental role

The central bank has to perform a wide range of promotional functions to support national objectives and industries. The RBI faces a lot of inter-sectoral and local inflation-related problems. Some of these problems are results of the dominant part of the public sector.

5. Related Functions

The RBI is also a banker to the government and performs merchant banking function for the central and the state governments. It also acts as their banker. The National Housing Bank (NHB) was established in 1988 to promote private real

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estate acquisition. The institution maintains banking accounts of all scheduled banks, too.

24.12 REPURCHASE AGREEMENT (REPO)

A repurchase agreement (repo) is a form of short-term borrowing for dealers in government securities. The dealer sells the government securities to investors, usually on an overnight basis, and buys them back the following day.

For the party selling the security, and agreeing to repurchase it in the future, it is a repo; for the party on the other end of the transaction, buying the security and agreeing to sell in the future, it is a reverse repurchase agreement.

24.13 REVERSE REPO

Reverse repo is the exact opposite of repo. In a reverse repo transaction, banks purchase government securities form RBI and lend money to the banking regulator, thus earning interest. Reverse repo rate is the rate at which RBI borrows money from banks.

24.14 CASH RESERVE RATIO (CRR)

CRR - Cash Reserve Ratio - Banks in India are required to hold a certain proportion of their deposits in the form of cash. However Banks don't hold these as cash with themselves, they deposit such cash(aka currency chests) with Reserve Bank of India , which is considered as equivalent to holding cash with themselves. This minimum ratio (that is the part of the total deposits to be held as cash) is stipulated by the RBI and is known as the CRR or Cash Reserve Ratio.

When a bank's deposits increase by Rs100, and if the cash reserve ratio is 9%, the banks will have to hold ₹ 9 with RBI and the bank will be able to use only Rs 91 for investments and lending, credit purpose. Therefore, higher the ratio, the lower is the amount that banks will be able to use for lending and investment. This power of Reserve bank of India to reduce the lendable amount by increasing the CRR, makes it an instrument in the hands of a central bank through which it can control the amount that banks lend. Thus, it is a tool used by RBI to control liquidity in the banking system.

24.15 STATUTORY LIQUIDITY RATIO (SLR)

SLR - Statutory Liquidity Ratio - Every bank is required to maintain at the close of business every day, a minimum proportion of their Net Demand and Time Liabilities as liquid assets in the form of cash, gold and un-encumbered approved securities. The ratio of liquid assets to demand and time liabilities is known as Statutory Liquidity Ratio (SLR). RBI is empowered to increase this ratio up to

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40%. An increase in SLR also restricts the bank's leverage position to pump more money into the economy.

Net Demand Liabilities - Bank accounts from which you can withdraw your money at any time like your savings accounts and current account.

Time Liabilities - Bank accounts where you cannot immediately withdraw your money but have to wait for certain period. e.g. Fixed deposit accounts.

24.16 MARGINAL STANDING FACILITY (MSF)

MSF - Marginal Standing Facility - It is a special window for banks to borrow from RBI against approved government securities in an emergency situation like an acute cash shortage. MSF rate is higher than Repo rate. Current MSF Rate: 7% Marginal standing facility (MSF) is a window for banks to borrow from the Reserve Bank of India in an emergency situation when inter-bank liquidity dries up completely.

Description:

Banks borrow from the central bank by pledging government securities at a rate higher than the repo rate under liquidity adjustment facility or LAF in short. The MSF rate is pegged 100 basis points or a percentage point above the repo rate. Under MSF, banks can borrow funds up to one percentage of their net demand and time liabilities (NDTL).

24.17 CREDIT CREATION BY BANKS

A central bank is the primary source of money supply in an economy through circulation of currency. It ensures the availability of currency for meeting the transaction needs of an economy and facilitating various economic activities, such as production, distribution, and consumption.

However, for this purpose, the central bank needs to depend upon the reserves of commercial banks. These reserves of commercial banks are the secondary source of money supply in an economy. The most important function of a commercial bank is the creation of credit.

Therefore, money supplied by commercial banks is called credit money. Commercial banks create credit by advancing loans and purchasing securities. They lend money to individuals and businesses out of deposits accepted from the public. However, commercial banks cannot use the entire amount of public deposits for lending purposes. They are required to keep a certain amount as reserve with the central bank for serving the cash requirements of depositors. After keeping the required amount of reserves, commercial banks can lend the remaining portion of public deposits.

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According to Benham's, "a bank may receive interest simply by permitting customers to overdraw their accounts or by purchasing securities and paying for them with its own cheques, thus increasing the total bank deposits."

Let us learn the process of credit creation by commercial banks with the help of an example.

Suppose you deposit ₹ 10,000 in a bank A, which is the primary deposit of the bank. The cash reserve requirement of the central bank is 10%. In such a case, bank A would keep ₹ 1000 as reserve with the central bank and would use remaining ₹ 9000 for lending purposes.

The bank lends ₹ 9000 to Mr. X by opening an account in his name, known as demand deposit account. However, this is not actually paid out to Mr. X. The bank has issued a check-book to Mr. X to withdraw money. Now, Mr. X writes a check of ₹ 9000 in favor of Mr. Y to settle his earlier debts.

The check is now deposited by Mr. Y in bank B. Suppose the cash reserve requirement of the central bank for bank B is 5%. Thus, ₹ 450 (5% of 9000) will be kept as reserve and the remaining balance, which is ₹ 8550, would be used for lending purposes by bank B.

Thus, this process of deposits and credit creation continues till the reserves with commercial banks reduce to zero.

The process of credit creation can also be learned with the help of following formulae:

Total Credit Creation = Original Deposit * Credit Multiplier Coefficient

Credit multiplier coefficient= 1 / r where r = cash reserve requirement also called as Cash Reserve Ratio (CRR)

Credit multiplier co-efficient = 1/10% = 1/ (10/100) = 10

Total credit created = 10,000 *10 = 100000

If CRR changes to 5%,

Credit multiplier co-efficient = 1/5% = 1/ (5/100) = 20

Total credit creation = 10000 * 20 = 200000

Thus, it can be inferred that lower the CRR, the higher will be the credit creation, whereas higher the CRR, lesser will be the credit creation. With the help of credit creation process, money multiplies in an economy. However, the credit creation process of commercial banks is not free from limitations.

24.18 SUMMARY

Money is any item or verifiable record that is generally accepted as payment for goods and services and repayment of debts in a particular country or socio-economic context, or is easily converted to such a form. The main functions of

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money are distinguished as: a medium of exchange; a unit of account; a store of value; and, sometimes, a standard of deferred payment. Any item or verifiable record that fulfils these functions can be considered as money.

Money is any object or record that is generally accepted as payment for goods and services for repayment of debts in a given country or socio-economic context. The main functions of money are distinguished as: a medium of exchange; a unit of account; a store of value; and, occasionally in the past, a standard of deferred payment. Any kind of object or secure verifiable record that fulfills these functions can serve as money.

Money originated as commodity money, but nearly all contemporary money systems are based on fiat money. Fiat money is without intrinsic use value as a physical commodity, and derives its value by being declared by a government to be legal tender; that is, it must be accepted as a form of payment within the boundaries of the country, for "all debts, public and private". The money supply of a country consists of currency (banknotes and coins) and bank money (the balance held in check accounts and savings accounts). Bank money usually forms by far the largest part of the money supply.

Standard Money is that form of money in terms of which all other forms of money in the country are measured.

It is unlimited legal tender and is subject to free coinage, i.e., anybody can bring his metal and get coins made of it. Usually it's real or 'intrinsic value' is equal to its face value. It is either made of gold or silver, or sometimes both. At present, no country has such a money in Standard Money.

Token money is made of cheaper metal; it is limited legal tender; it is not subject to free coinage and its face value is greater than its intrinsic or metallic value. Token money consists of small coins. The rupee is the standard unit of money in India, but its face value is greater today than its real value. Nor is the rupee subject to free coinage. It cannot, therefore, be called standard money. It is a mixture of the standard and token money.

Bank money refers to bank deposits, the bank deposits can be turned into money by their depositors by means of cheques. In advanced countries the cheques are as good as money and circulate as such. Bank money or 'cheque-created money' is, however, quantitatively the most important now in all modern communities.

High Powered Money (HPM) is the net or total liability of the monetary authority of any nation, in India it is the liability of RBI. It is simply the sum of all currency in circulation with the people of country; cash kept in the commercial bank vaults along with the deposits of govt. of the country and commercial banks.

High-powered money is important because it represents net wealth to the private sector. In a contrast, checking account money, called demand deposits, represents an asset to the owner of the checking account, but represents a liability from the

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perspective of the bank, which owes that money to a customer on demand. The liability cancels out the asset, leaving a net effect of zero on the net wealth of the private sector. Commercial bank deposits at a central bank represent a liability to the central bank. However, a central bank is a government or quasi-government agency that is not considered part of the private sector.

A bank is an institution which deals with money & credit. It accepts from the public, makes the funds available to those who need them, & helps in the remittance of money from one place to another.

Banking in India, in the mod sense, originated in the last decades of the 18th century. Among the first banks were the Bank of Hindustan, which was established in 1770 and liquidated in 1829-32; and the General Bank of India, established in 1786 but failed in 1791.

The largest bank, and the oldest still in existence, is the State Bank of India (S.B.I). It originated as the Bank of Calcutta in June 1806. In 1809, it was renamed as the Bank of Bengal. This was one of the three banks funded by a presidency government, the other two were the Bank of Bombay and the Bank of Madras. The three banks were merged in 1921 to form the Imperial Bank of India, which upon India's independence, became the State Bank of India in 1955. For many years the presidency banks had acted as quasi-central banks, as did their successors, until the Reserve Bank of India was established in 1935, under the Reserve Bank of India Act, 1934.

The Reserve Bank of India (RBI) is India's central banking institution, which controls the monetary policy of the Indian rupee. The RBI plays an important part in the development strategy of the Government of India. It is a member bank of the Asian Clearing Union. The general superintendence and direction of the RBI is entrusted with the 21-member-strong Central Board of Directors the Governor, four Deputy Governors, two Finance Ministry representatives, ten Government-nominated Directors to represent important elements from India's economy, and four Directors to represent Local Boards headquartered at Mumbai, Kolkata, Chennai and New Delhi. Each of these Local Boards consists of five members who represent regional interests, as well as the interests of co-operative and indigenous banks.

A repurchase agreement (repo) is a form of short-term borrowing for dealers in government securities. The dealer sells the government securities to investors, usually on an overnight basis, and buys them back the following day.

For the party selling the security, and agreeing to repurchase it in the future, it is a repo; for the party on the other end of the transaction, buying the security and agreeing to sell in the future, it is a reverse repurchase agreement.

Reverse repo is the exact opposite of repo. In a reverse repo transaction, banks purchase government securities form RBI and lend money to the banking regulator,

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thus earning interest. Reverse repo rate is the rate at which RBI borrows money from banks.

CRR - Cash Reserve Ratio - Banks in India are required to hold a certain proportion of their deposits in the form of cash. However Banks don't hold these as cash with themselves, they deposit such cash (aka currency chests) with Reserve Bank of India , which is considered as equivalent to holding cash with themselves. This minimum ratio (that is the part of the total deposits to be held as cash) is stipulated by the RBI and is known as the CRR or Cash Reserve Ratio.

24.19 GLOSSARY

(a) Money: Money is any item or verifiable record that is generally accepted as payment for goods and services and repayment of debts in a particular country or socio-economic context, or is easily converted to such a form. The main functions of money are distinguished as: a medium of exchange; a unit of account; a store of value; and, sometimes, a standard of deferred payment. Any item or verifiable record that fulfils these functions can be considered as money.

(b) Standard Money: Standard Money is that form of money in terms of which all other forms of money in the country are measured.

(c) Token money: Token money is made of cheaper metal; it is limited legal tender; it is not subject to free coinage and its face value is greater than its intrinsic or metallic value. Token money consists of small coins.

(d) Money of account: Money of account is the monetary unit in terms of which the accounts of a country are kept and transactions made, i.e., in which general purchasing power, debts are prices are expressed. The rupee, for instance is our money of account. Sterling, dollar, frank and mark are the moneys of account respectively of Great Britain, the United States, France and West Germany.

(e) High Powered Money: High Powered Money (HPM) is the net or total liability of the monetary authority of any nation, in India it is the liability of RBI. It is simply the sum of all currency in circulation with the people of country; cash kept in the commercial bank vaults along with the deposits of govt. of the country and commercial banks.

(f) Bank: Bank is an institution which deals with money & credit. It accepts from the public, makes the funds available to those who need them, & helps in the remittance of money from one place to another.

(g) CRR: Cash Reserve Ratio - Banks in India are required to hold a certain proportion of their deposits in the form of cash. However Banks don't

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hold these as cash with themselves, they deposit such cash (aka currency chests) with Reserve Bank of India , which is considered as equivalent to holding cash with themselves. This minimum ratio (that is the part of the total deposits to be held as cash) is stipulated by the RBI and is known as the CRR or Cash Reserve Ratio.

24.20 CHECK YOUR PROGRESS (MULTIPLE CHOICE/OBJECTIVE TYPE QUESTIONS)

(A) Short Answer Questions

1. What is Money?
2. What are M1, M2, M3 and M4?
3. What is high power money?
4. What is Bank?
5. What are Repo, Reverse Repo, CRR, SLR and MSF?
6. What is credit creation?

(B) Extended Answer Questions

1. Discuss features of Money.
2. Discuss functions of Money.
3. Discuss various types of Money?
4. Explain various types of Money Supply .
5. Discuss about Banking in India.
6. Explain about Reserve Bank of India.
7. Discuss functions of Reserve Bank of India.

(C) True or false

1. Money is any item or verifiable record that is accepted as payment for goods and services.
2. Standard Money is that form of money in terms of which all other forms of money in the country are measured.
3. Account money is made of cheaper metal; it is limited legal tender; it is not subject to free coinage and its face value is greater than its intrinsic or metallic value.

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4. Money of account is the monetary unit in terms of which the accounts of a country are kept and transactions made, i.e., in which general purchasing power, debts are prices are expressed.
5. The Reserve Bank of India (RBI) is India's central banking institution, which controls the monetary policy of the Indian rupee.

(D) Multiple Choice Questions

1. What is any item or verifiable record that is accepted as payment for goods and services?
   (a) Money (b) Cost
   (c) Investment (d) All the above
2. What is that form of money in terms of which all other forms of money in the country are measured?
   (a) Standard Money (b) Cost
   (c) Investment (d) All the above
3. What is India's central banking institution, which controls the monetary policy of the Indian rupee?
   (a) The Reserve Bank of India (RBI)
   (b) SBI
   (c) UBI
   (d) All the above

(E) Fill in the Blanks

1. Money is any item or verifiable record that is accepted as payment for……..
2. ……is that form of money in terms of which all other forms of money in the country are measured.
3. ……..is made of cheaper metal; it is limited legal tender; it is not subject to free coinage and its face value is greater than its intrinsic or metallic value.
4. The Reserve Bank of India (RBI) is India's central banking institution, which controls the monetary policy of the……...

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24.21 KEY TO CHECK YOUR ANSWER

(C) 1. True, 2. True, 3. False, 4. True, 5. True

(D) 1. (a), 2. (a), 3. (a)

(E) 1. Goods and services, 2. Standard Money, 3. Token money, 4. Indian rupee

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24.23 SUGGESTED READINGS

It is a reading list of additional material available on the topic which may be of use for learners who want to expand their knowledge beyond the details provided in the SLM. Though the learning material should be generally self-sufficient, for an above-average learner who seeks to know more about the topic, these aids can come handy. The list may include the following and the items should be presented in the same style as References:

1. Managerial Economics, Christopher R Thomas.
2. Managerial Economics, Paul Keat, Philip Young.
3. Managerial Economics, Howard Davies, Pun-Lee Lam.
4. Keith Weigelt, Managerial Economics.

24.24 TERMINAL QUESTIONS

1. "Money plays a dynamic role in determining the economic trends". Discuss.

2. Explain various types of Money Supply .

3. Explain about Reserve Bank of India. Discuss functions of Reserve Bank of India

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