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**UNIVERSITY OF JAMMU**  
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**STUDY MATERIAL FOR**  
**B.COM SEMESTER - I**

**COURSE NO. BCG-103**

**UNIT I-IV**

**Subject: Micro Economics**

**Lesson No. 1 to 20**

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# MICRO ECONOMICS

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**Dear Learners,**

Greetings and a warm welcome to the fascinating world of **Micro Economics!**

We are pleased to present this Self-Learning Material (SLM) specially designed for the B.Com. programme, keeping in mind your academic needs and the dynamic nature of the subject. This SLM aims to provide you with a strong foundation in the basic principles and concepts of microeconomics which form the bedrock of economic analysis.

Microeconomics helps us understand how individuals and businesses make decisions, how markets operate, and how scarce resources are allocated efficiently. Through real-life examples, clear explanations and concept-based learning, this material will guide you in developing a critical and analytical approach to economic problems.

Each unit in this SLM is structured to ensure clarity, promote self-paced learning and support your academic growth. We encourage you to go through the content carefully, reflect on the examples and attempt the self-assessment questions at the end of each unit. They are designed to reinforce your understanding and enhance your confidence.

As you begin this journey, remember that economics is not just about graphs and numbers—it is a powerful tool to understand the world around you. Stay curious, stay committed and let this SLM be your companion in exploring the fundamentals of microeconomic theory.

Wishing you a meaningful and enriching learning experience.

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## **MICRO ECONOMICS**

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## 1.0 LEARNING OBJECTIVES AND OUTCOMES

### Learning Objectives

- To explain the concept of micro economics.
- To know the importance of managerial economics in business decision making.

### Learning Outcomes

After completing this chapter, learners should be able to:

- define microeconomics and distinguish it from macroeconomics.
- apply microeconomic principles to real-world business scenarios.
- analyse how managerial economics supports strategic and operational decisions in a business environment.

## 1.1 INTRODUCTION

Economic analysis is of two types: micro and macro analysis. Like most other subjects economics is divided into branches and sub-branches. In recent years the subject-matter of economics has been made to fall into two major branches *(i) microeconomics*, which is the study of the economic actions of individuals and well-defined groups of individuals; and *(ii) macroeconomics*, which is the study of broad aggregates such as total employment and national income. The terms were coined by professor Ragnar Frisch of Oslo University in 1933 and have become current in modern economic terminology used in economic theory. The division is in a sense artificial, since aggregates are merely sums of individual figures. However, it is justified by the basic differences in the objectives and methods of the two branches.

The fundamental difference between microeconomic theory and macroeconomics is the microscopic versus the macroscopic view of the economy they take. However, this is not the only difference between the two branches of economics. Before the micro-macro distinction came into practice, the fundamental distinction was between price theory and income theory. This distinction was carried over into the micro and macro branches.

In microeconomics, prices play a major role. Here the goal is generally the analysis of price determination and the allocation of specific resources to particular uses. On the other hand, the main objects of macro economics generally are the determination of the levels of national income, total employment of resources and the general price level.

## **1.2 NATURE OF MICRO ECONOMICS**

According to *Boulding*, “Micro-economics is the study of particular firm, particular household, individual price, wage, income, industry, and particular commodity.”

In the words of *Leftwich*, “Micro-economics is concerned with the economic activities of such economic units as consumers, resource owners and business firms.”

### **1.2.1 Microeconomics as price Theory**

Microeconomics is the analysis of economy's constituent elements households, firms, industries and sectors. 'Micro' is a Greek word meaning 'small'. As the name suggests, it is not aggregative but selective; it seeks to explain the working of market for individual commodities and the behaviour of the individual buyer and seller in those markets. These markets are broadly classified into two types: commodity (product) markets and factor markets. These two markets are not, of course, independent of each other. Since the factors of production earn in the factor markets and spend in the product markets, changes in the former reflect themselves in changes in the latter. But there are essential differences in the character and working of the two markets. These differences justify the need for a separate theory of distribution. The basic, common feature of the two markets is that the pricing in both the markets is the result of the interplay of supply and demand and their elasticities. In the product markets (the product market has many sub-markets), the demand comes from the households and supply from the firms. A whole group of firms producing the same product constitutes an industry. Therefore, under product pricing, we study the forces behind individual demand and for that matter also market demand. An individual household is said to be in equilibrium if it gets the maximum satisfaction from the allocation of its expenditure on various goods and services. On the supply side, a firm is in equilibrium if it is getting maximum profits as determined by its marginal costs and marginal revenue. An industry is assumed to be in equilibrium if there is no tendency among its constituent firms to either leave the industry or for outside firms to enter it. In studying the processes

of equilibrium of these entities, we are studying by implication, the process of resource allocation. But we study the factor markets separately because of the different nature of supply of factors of production and resources and the derived nature of demand from the product markets. Thus, the subject of study under microeconomics is an individual consumer and a firm or an industry. Given the level of aggregate output and employment in the economy, its goal is to study how resources are allocated between different outputs for their production, how are product prices determined and how is the total production distributed among the co-operant producing factors. Microeconomics, in other words, involves the study of economic motives and behaviour of individual consumers and producers and the principles underlying the organisation and operation of firms and industries.

An important fact to be borne in mind about microeconomics is that here we assume the prevalence of full employment in the economy as a whole. Given this presumption, we proceed to know as to how a consumer is allocated. It studies relative prices of particular goods and services, how the various economic units act and react to changes in technology, the output and allocation of resources. Since prices of products and factor units occupy the central place, microeconomics is also called Price Theory. While the behaviour of a particular unit is under study, it has to be assumed that the environmental data are given. For example, in the analysis of price determination in a particular industry, it is assumed that the price and output in the industry under study are independent of those in other industries. On account of this *ceteris paribus* assumption of micro-economics, it is also called Partial Equilibrium analysis.

### **1.2.2 Microeconomics and Economic Efficiency**

An important extension of micro-economic theory consists of the determination of conditions for economic efficiency of firms and industries, and through them, the economy. Now we study the ideal organisation of production and exchange that would satisfy a community's broad economic motives. This type of analysis has been the basis of modern *welfare economics* that studies the *optimal* allocation of resources so as to achieve given non-contradictory but competing goals. Thus, we can say that the Robbinsian problems of 'scarcity' and 'allocation' of resources are at the heart of micro-economics.

#### **A. CHECK YOUR PROGRESS**

**Fill in the blanks**

1. Economics is the study of how people choose to use \_\_\_\_\_ resources.
2. The two main branches of economics are \_\_\_\_\_ and \_\_\_\_\_.
3. Economics deals with the production, \_\_\_\_\_, and consumption of goods and services.
4. The term "economics" is derived from the Greek word "\_\_\_\_\_", meaning household management.
5. \_\_\_\_\_ economics studies the behavior of individuals and firms in making decisions.
6. The study of national income, inflation, and unemployment falls under \_\_\_\_\_ economics.
7. Scarcity refers to the limited nature of society's \_\_\_\_\_.

**Answer**

1. Scarce      2. Allocation      3. Microeconomics      4. Macroeconomics  
5. distribution      6. Economics      7. opportunity

**1.3 SCOPE OF MICRO ECONOMICS**

Micro economics is concerned with the efficiency of allocation of resources for achieving the various objectives of the society. The scope of micro economics extends to the following fields.

**(1) *Theory of demand-*** All economic EXERCISE originates from a source of demand. Production of goods is done when there is demand for these. Micro economics studies the nature and extent of demand for different commodities and services and the way these

demands are interrelated. We study the behaviour of demand for a commodity, its elasticity, and variations in the same over a period of time. Sometimes economists try to forecast the demand for the product of a firm.

**(2) *Theory of production-*** When a commodity is demanded, it has to be produced by firms for a profit. Firms use the factors of production-land, labour, capital and

entrepreneurship-to produce the output which is most-profitable for them. In order to study the process of production, we study the laws of production- the behaviour of output in response to changes in inputs. We distinguish between the laws of production which operate in the short run and over the long period.

**(3) *Theory of price determination-*** Micro economics studies the way in which price determination of different commodities, the nature and structure of the markets where buyers and sellers interact and the changes in prices and outputs of the same over the short period and the long period. The earlier fields of knowledge-the theories of demand and supply-help us in knowing the process of commodity pricing in the perfect and imperfectly competitive markets.

**(4) *Theory of factor pricing-*** In this part of micro economics, we study the determination of the rates of return to the four factors of production-rent to land, wages to labour, interest to capital and profits to entrepreneurship. Rent, wages, interest and profits are the income shares of the four factors which are supplied by different people. In fact, the factor markets determine the pattern of income distribution in the economy. We are especially interested in the share of wages because a large part of the population earns its income from wages.

**(5) *Allocative efficiency-*** Micro economics is specifically being used to study the efficiency of allocation of the resources available to consumers, firms and industries. It is usually presumed that consumers try to maximise their satisfaction while firms try to maximise, therefore, profits by minimising their costs. This ensures allocative efficiency of the resources used by them. But this is not so in practice. There are inter-dependencies among consumers, firms and industries which micro units are not able to control. It is in this area of consumption and production that the market-mechanism is unable to ensure

allocative efficiency. Micro economics explores the scope for increasing output by re-organising the use of resources.

**(6) *Welfare Economics***-The last part of micro economics is what is called welfare Economics. Here we study the determinants of human welfare, the way the resources of the society ought to be used to promote the maximum benefit of the maximum number of people in the society. It studies the ideal ways of production, exchange and distribution.

## **B. CHECK YOUR PROGRESS**

### **Multiple Choice questions**

Which of the following is NOT a part of microeconomics?

- A. Consumer behaviour
- B. National income
- C. Price determination
- D. Theory of demand

**Answer: B. National income**

2. Microeconomics focuses on:

- A. The entire economy of a country
- B. Decision-making by individual economic agents
- C. Growth of gross domestic product
- D. International trade policies

**Answer: B. Decision-making by individual economic agents**

3. The theory of the firm in microeconomics is mainly concerned with:

- A. Profit maximization and cost minimization
- B. National income distribution
- C. Trade deficits
- D. Government budget

**Answer: A. Profit maximization and cost minimization**

4. The concept of 'utility' is associated with which microeconomic topic?

- A. Production function
- B. Consumer equilibrium
- C. National expenditure
- D. Foreign exchange rates

**Answer: B. Consumer equilibrium**

5. Price determination under different market structures is studied in:

- A. Public finance
- B. Macro policy
- C. Microeconomics
- D. Monetary economics

**Answer: C. Microeconomics**

## **1.4 IMPORTANCE AND USES OF MICRO ECONOMICS**

Microeconomic analysis is applied for solving different economic problems. In this regard Lord Keynes said, “Microeconomics is a necessary part of one’s apparatus of thought.” The importance of microeconomics is reflected in the following arguments:

### **1. Operation of an economy**

We get knowledge about the operation of any economy from the microeconomics. It tells us whether the units of the economy like a consumer or a firm are behaving optimally or not. According to Prof. Watson, “Micro-economics has many uses. The greatest of these is the understanding of the operation of the economy.”

### **2. Basis of the economy as a whole**

We know that micro-economics deals with individuals whereas macroeconomics deals with aggregates. Aggregates are merely the sums of individual figures. Therefore, microeconomics is the base for clear understanding of macro-economics. The problems of the economy are analysed on the basis of the analysis of the individual units of the economy. For example, if we want to study the expenditure habits of an economy, we will have, to study the family budgets of individuals of the economy. In this way, for detailed understanding of the working of the economy, the study of individuals is a must.

### **3. Predictions**

The principles of microeconomics are based on predictions. These predictions are made on some conditions. It explains that if something occurs then a set of results will



follow. For example, micro-economics states that with the fall of demand, prices will also fall.

#### **4. Economic policies**

Microeconomics is used while formulating economic policies. With the study of microeconomics, we can know the effects of Government policies on the allocation of factors or resources. In fact, microeconomics provides a basis for making economic policies. For example, when a Government wants to impose new taxes, it can make necessary changes in it by knowing the reactions of the people regarding the new taxes. This knowledge of individual reactions can be had from the microeconomics.

#### **5. It is helpful in removing difficulties of a particular firm**

There may be some difficulties or complications in the working of an individual firm or an industry. To remove these complications or difficulties, we need not study the working of the whole economy. The study of a working of a firm or an industry will suffice. Therefore, micro analysis is helpful in such situations:

#### **6. It is the basis of welfare economics**

The great importance given to microeconomics is due to the fact that it provides the base for welfare economics. The ultimate aim of all production is consumption. The main aim of the study of positive economics is the policy implications that can be built out of its prepositions. In so far as the main aim before us is the optimum allocation of our scarce resources, the primary purpose of economic theory is to build up hypothesis that define the 'optimum'. Price theory or microeconomics helps us exactly in doing this.

The whole structure of welfare economics available to us is built entirely on the price theory of perfect competition.

### **C. CHECK YOUR PROGRESS**

#### **Short Answer Type Questions:**

1. How does microeconomics help in the efficient allocation of resources?

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2. Explain the role of microeconomics in price determination.

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3. Mention any two uses of microeconomics in business decision-making.

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## **1.5 RELEVANCE OF MANAGERIAL ECONOMIC BUSINESS DECISIONS**

Business firms also use microeconomics while taking managerial decisions. In this context, the cost and demand analysis occupy great significance. From the arguments in favour of microeconomics we can say that it provides a base for analysing the problems of the economy as a whole.

A business manager is essentially involved in the processes of decision making as well as forward planning. Decision making is an integral part of management. Management and decision making are to be considered as inseparable. It is the intellectual process and a purposeful activity which at varied times takes in hands all the managerial activities, such as, planning, organising, staffing, directing and controlling. It is the process wherein an executive, by taking in to consideration several alternatives reaches at the conclusion about how it should be dealt successfully in a given situation. Thus, being a continuous activity, decision making is regarded to be the heart of management. Decision making is nothing but choice-making and the importance of choice-making emerges due to the fact that a business faces the changes in the conditions in which it operates and there arise unforeseen contingencies. The survival and the growth of a business in such situations is directly determined through decision making process. It can be defined clearly as selecting one of the best alternatives available - that entails being two or more alternatives. According to George Terry, "Decision making is the selection of a particular course of action, based on some criteria, from two or more possible alternatives." Decision making is thus choosing the best course of action out of the available options while aiming at the achievement of particular organisational objectives. Since a business organisation has the available resources, such as, capital, land and labour, a business manager needs to select the best

alternative among others and employ in the most efficient manner so as to attain the desired results. After a particular decision is made relating to resources, plans about production, pricing and materials are to be implemented. In this way, decision making and forward planning go conjointly. The fact that a business entity is influenced by the conditions of uncertainty about the future and due to the changes in the business environment resulting complexities in business decisions. Since no information or the knowledge about the future sales, profits or the costs is available for a business executive, the decisions are to be made on the basis of past data as well as the approximations being forecasted. In order that the decision making process is carried out in such conditions in an efficient way, economic theory is of great value and relevance as it deals with production, demand, cost, pricing etc. This gives rise to understand the concepts of managerial economics for business manager so that he may apply the economic principles to the business and appraise the relevance and impact of external factors in relation to the business.

Having been regarded as micro economic as well as the economics of the firm, managerial economics is related to the economic theory which is to be applied to the business with the objective of solving business problems and to analyse business situations and the factors constituting the environment in which a business is operated. Managerial economics has been defined by Spencer and Siegelman as, “The integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management.” Managerial economics is very much capable of serving various purposes and useful for managers in making decisions in relation to the internal environment. It aims at the development of economic theory of the firm while facilitating the decision making process with regard to sales and profits etc. Moreover, it enables to take decisions about appropriate production and inventory policies for the future. It is a branch of economics that is applied to analyse almost all business decisions. It is meant to undertake risk analysis, production analysis that is useful for production efficiency. Likewise, it is of great use for capital budgeting processes as well. In the most positive form, it seeks to make successful forecasts with the objective of minimising the risks involved. It deals with the aspects as how much cash should be available and how much of it should be invested in relation to a choice of processes and projects while making possible the economic feasibility of various production lines. A business produces goods which are in course of time to be sold in the market on the basis of demand of consumers. Demand can be defined in brief as the quantity of goods that the consumers are willing to buy at certain prices. In this pursuit, the decisions related to demand are of much significance for managers as the process entails making appropriate

estimates with successful forecasts on sales before the activity of production is to be carried out. It is therefore demand analysis is essential part of managerial economics since it enables to analyse the demand determinants and forecasting with a deep involvement of value judgments. Above and beyond, by considering whether the competitions are likely to increase or decrease, a business manager with the help of managerial economics applications is able to asses demand prospects as well as the social behaviour that can result in the expansion or the reduction of the sales of business products. Further, Managerial economics deals with the cost estimates that are helpful for management decisions. It is important for a manager to undertake production analysis and to determine economic cost with the objective of profit planning and cost control processes. Since the objective of a business entity in general is to generate profits.

profit is the chief measure of success in this way. In respect of this, managerial economics cover the aspects, such as, Profit policies and the techniques of profit planning-Break Even Analysis-also called as cost volume profit analysis - that assists significantly in profit planning and cost control methods with a view to maximise profits of the business. Managerial economics plays a significant role in the business organisations. It is very much effective to the management in decision making and forward planning in relation to the internal operations of a business as it gives clear understanding of market conditions as well as analytical tools through which the competitions prevailing in the markets can be studied, at the same time the market behaviour can be predicted. It enables to analyze the information about the business environment in which a business is managed. It is meant to undertake systematic course of business plans by making possible forecasts. Managerial economics contributes to the profitable growth of business and effective solutions of the business problems by changing the economic scenario in to the feasible business opportunities for business organisations while enabling managers to optimise business decisions as well as involving them in the activity of forward planning efficiently.

In a civilised society, we rely on others in the society to produce and distribute nearly all the goods and services we need. However, the sources of those goods and services are usually not other individuals but organisations created for the explicit purpose of producing and distributing goods and services. Nearly every organisation in our society-whether it is a business, non-profit entity, or governmental unit-can be viewed as providing a set of goods, services, or both. The responsibility for overseeing and making decisions for these organisations is the role of executives and managers.

Most readers will readily acknowledge that the subject matter of economics applies to their organisations and to their roles as managers. However, some readers may question whether their own understanding of economics is essential, just as they may recognise that physical sciences like chemistry and physics are at work in their lives but have determined they can function successfully without a deep understanding of those subjects.

Whether or not the readers are skeptical about the need to study and understand economics per se, most will recognise the value of studying applied business disciplines like marketing, production/operations management, finance, and business strategy. These

subjects form the core of the curriculum for most academic business and management programs, and most managers can readily describe their role in their organisation in terms of one or more of these applied subjects. A careful examination of the literature for any of these subjects will reveal that economics provides key terminology and a theoretical foundation. Although we can apply techniques from marketing, production/operations management, and finance without understanding the underlying economics, anyone who wants to understand the why and how behind the technique needs to appreciate the economic rationale for the technique. Since the purpose of managerial economics is to apply economics for the improvement of managerial decisions in an organisation, most of the subject material in managerial economics has a microeconomic focus. Therefore, Managerial economics may be viewed as economics applied to problem solving at the level of the firm. The problems relate to choices and allocation of resources is faced by managers all the time. Managerial economics is more concrete and situational and mainly concerned with purposefully managed process of allocation.

## **1.6 LET US SUM UP**

Microeconomics involves the study of economic motives and behaviour of individual consumers and producers and the principles underlying the organisation and operation of firms and industries. Where prices of the products and factor units occupy the central place, microeconomics is also called Price Theory. An important extension of micro-economic theory consists of the determination of conditions for economic efficiency of firms and industries.

Micro economics is concerned with the efficiency of allocation of resources for achieving the various objectives of the society. The scope of micro economics covers various fields like theory of demand, theory of production, theory of price determination,

theory of factor pricing, allocative efficiency, and welfare Economics.

Further, microeconomic analysis is applied for solving different economic problems. We get knowledge about the operation of any economy from the microeconomics. It tells us whether the units of the economy like a consumer or a firm are behaving optimally or not. The principles of microeconomics are based on predictions. It is used while formulating economic policies. With the study of microeconomics, we can know the effects of Government policies on the allocation of factors or resources. The great importance given to microeconomics is due to the fact that it provides the base for welfare economics.

Also, managerial economics is related to the economic theory which is to be applied to the business with the objective of solving business problems and to analyse business situations and the factors constituting the environment in which a business is operated. Managerial economics has been defined by Spencer and Siegelman as, “The integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management.” Managerial economics is very much capable of serving various purposes and useful for managers in making decisions in relation to the internal environment.

## 1.7 GLOSSARY

- **Microeconomics** – The branch of economics that studies the behavior of individuals and small groups in making decisions on resource allocation.
- **Resource Allocation** – The process of assigning and managing assets in a way that supports an organization's or individual's strategic goals.
- **Price Mechanism** – The way in which the forces of supply and demand interact to determine prices in a market economy.
- **Demand** – The quantity of a good or service that consumers are willing and able to buy at a given price.
- **Supply** – The quantity of a good or service that producers are willing and able to offer at a given price.
- **Market Equilibrium** – A situation in which quantity demanded equals quantity supplied.

## **1.8 SELF ASSESSMENT QUESTIONS**

1. How is micro economics different from macro-economic?

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2. Define micro economics. What is its importance?

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2. Critically evaluate micro economics. How micro economics is helpful in taking business decisions?

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## **1.9 LESSON END EXERCISE**

1. Define microeconomics. Discuss in detail its meaning and how it differs from macroeconomics. Illustrate your answer with suitable examples.
2. Explain the scope of microeconomics.
3. Discuss the importance and relevance of microeconomics in modern economic life.

### **1.10 SUGGESTED READINGS**

- Business Economics, Chopra P.N., Kalyani Publishers, New Delhi.
- Managerial Economics, Mehta, P.L., S. Chand, Delhi.
- Micro Economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

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## **FUNDAMENTAL ECONOMIC CONCEPTS**

### **STRUCTURE**

- 2.0 Learning Objectives and Outcomes
- 2.1 Introduction
- 2.2 Scarcity of Resources
  - 2.2.1 Robbins'
  - 2.2.2 Scarcity-Of-Resources Definition
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- 2.3 Opportunity Cost
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- 2.4 Production Possibility Curve
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- 2.5 Let Us Sum UP
- 2.6 Glossary
- 2.7 Self-Assessment Questions
- 2.8 Lesson End Exercise
- 2.9 Suggested Reading

## **2.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

The objectives of this chapter are:

- To provide the idea of economic problem.
- To explain the concept of scarcity of resources and opportunity costs.
- To define production possibility curve and its related concepts.
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### **Learning Outcomes**

After completing this chapter, learners should be able to:

- Identify and describe the fundamental economic problem of limited resources and unlimited wants.
- Analyze real-life situations using the concepts of scarcity and opportunity cost.

- Illustrate and explain the Production Possibility Curve and use it to demonstrate concepts such as efficiency, underutilization, and opportunity cost.

## 2.1 INTRODUCTION

Economic theory deals with the problems of economic systems. To understand the economic problem means to know the purpose and functions of economic system. Economic problem arises mainly due to two reasons: (i) human wants are unlimited, (ii) resources to satisfy human wants are scarce.

The problem of scarcity is faced by an individual and a nation. We know from our daily experience that man has to do many types of work to satisfy his wants. The nature of human wants is such that they never come to an end. As long as man is alive, his wants go on increasing. In his life time, a man cannot satisfy or fulfill all his wants. The reason is that resources required to fulfil these wants are limited i.e., they cannot be increased according to needs. This is also true for a nation. Productive resources are scarce in relation to human wants. *Thus, unlimited wants and scarce resources lead to the origin of the basic economic problem in all types of economies, whether they are rich or poor.* Besides the fact of scarcity of productive resources, you also find that resources have alternative uses. It means that one resource can be put to several uses. For example, coal is used in factories, in running railway engines, in ovens, etc. So those resources which are scarce in relation to human wants become more scarce. This character of human resources gives rise to another problem. This is the problem of choice. The economic problem is to utilise these scarce resources that it satisfies the human wants in the best possible way. In other words, the problem of choice deals with the utilization or allocation of scarce resources in such a way as achieves the greatest possible satisfaction of human wants.

Prof. Lewis has rightly said, “We have economic systems or economies because we are confronted by the economic problem; all economies irrespective of characteristics or qualities are fashioned, moulded and maintained solely because this problem exists. To

understand the economic problem is to know the purpose and functions of economic system.”

The economic problem is pointed out in Robbins’ definition of economics clearly. He observed, “Economics is the science, which studies human behaviour as a relationship between ends and scarce means which have alternative uses”.

Because resources are scarce, choices have to be made. There are three main types of choice which must be made in any society and these are:

- What goods and services are going to be produced and in what quantities, given that there are not enough resources to produce all things people desire?
- How are things going to be produced, given that there is normally more than one way of producing things?
- For whom are things going to be produced?

All societies have to make these choices, whether they be made by individuals, by groups or by the government. These choices can be seen as micro economic choices, since they are concerned not with the total amount of national output, but with the individual goods and services which make it up: what they are, how they are made, and who gets the income to buy them.

## **2.2 SCARCITY OF RESOURCES**

### **2.1.1 Robbins’ Scarcity-of-Resources Definition**

Robbins criticised Marshall for his normative view of economics. In his own words, “Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses.” The definition is based on a number of facts of life: (i) wants are unlimited but, (ii) the means to satisfy the human wants are limited or scarce, (iii) the means or resources can be put to different uses, (iv) we are faced with the choice of using the limited means to satisfy this want or that. Much of man’s economic activity is moving around the problem of scarcity or choice. This is the central idea in Robbins’ definition.

### **2.1.2 Main Features of Robbins’ Definition**

The definition given by Robbins has the following five main features:

- I. *Unlimited wants or ends-*** Robbins calls wants as the ends. Ends are of the economic or non-economic type. Those concerned with the consumption of goods and services may be called economic ends. Economic ends are unlimited; as one want is satisfied, many, others crop up. It is impossible to satisfy all of man's wants. Each one of them, of course, may be satisfied separately.
- II. *Limited or scarce means-*** Most of the means or resources which can be used to satisfy wants are limited in supply. Here the word 'limited' is used in a relative sense. We call such a resource as limited whose supply is less than its demand. Man's wants are unlimited and the resources available to satisfy them are scarce. Therefore, we are forced to postpone the satisfaction of many of our wants while we try to find out more and more resources by working harder and harder.
- III. *Means have alternative uses-*** According to Lord Robbins, another important reason for the existence of the economic problem is the alternative uses of resources. Some resources have a large number of uses, for example, sugar. Others have a few uses, for example, wasteland. Man is always faced with the problem of allocation of limited resources.
- IV. *Wants are of different intensity-*** All the wants are not equally urgent. Some wants are more intense than others. Some need immediate satisfaction, others can wait. For example, if a man needs medicine as also fruit for his ailing child, he will try to obtain the medicine first. Thus, a man is forced to choose between wants due to their different intensity.
- V. *Problem of choice-*** According to Robbins, choice making is really an economic activity. Every man is faced with the scarcity of means and as such is forced to make a choice in his present and future satisfaction of wants and in his allocation of resources. The choice problem is the central problem of economics. It forces us to evaluate different commodities for their satisfaction of man's wants. If resources were in plenty and goods free, there would be no such problem. But facts are always pointing to the scarcity of means.

Robbins' definition has been approved by a good number of economists like Macfie, Oscar Lange. Scitovsky has remarked, "Economics is a social science concerned with the

administration of scarce resources.”

### **2.1.3 Merits of Robbins' Definition**

Robbins has found many admirers. For example, Macfie has showered praise on his definition in the following words “Whatever he (Robbins) has said cannot be resaid. To me it appears final within its chosen scope.” We can list the major merits of Robbins' definition as under:

- a) *Status of a positive science*- Robbins tried to make economics a more exact science. He defined economics in a way as clearly laid down the central problem of the science of economics. Therefore, he wanted the subject to be a positive science, that is, a science which has nothing to do with the goodness or bad nature of the ends. He wanted to study all economic activities without bringing in welfare. He succeeded in this to some extent.
- b) *An analytical definition*- Robbins' definition has made the study of economics analytical. He provided the reasons for the study of the economic problem which is the problem of scarcity. Thereby he not only gave a separate identity to the subject, he pointed to the nature of analysis in it also.
- c) *Clear conception of human behaviour for economics*- Robbins also gave a clearer view of what human behaviour economists are interested in. He told us that it is human behaviour for choice between ends and means.
- d) *Clear on the scope of Economics*- This definition has delimited the scope of economics very well. Wherever a choice problem arises due to the resources being scarce and the wants being much more, an economic study is called for. This is the subject matter of economics.
- e) *A universal definition*- Robbins' definition is applicable everywhere. It is concerned with unlimited wants and limited resources which is the problem facing every country. Whether it is rich America or poor Asia, whether an economy is capitalist or socialist, the problem everywhere is the same.
- f) *Points out the central problem of Economics*- Marshall's definition, was defective due to the failure of the definition in identifying the central problem. Robbins can be credited with removing this defect.

### 2.1.4 Criticism of Robbins' Definition

The definition given by Robbins is logical and scientific. But it has been criticised by some economists on different grounds.

1. *Self-contradictory.* Robbins has contradicted himself by his two views about choice between ends. In the first place, he contended that economics is neutral as regards ends. *Secondly*, he considers economics as the science of choice. These two contentions are mutually contradictory because choice between ends and the allocation of resources is simply not possible without a knowledge of the relative importance of different ends.
2. *Concealed concept of welfare.* Robbins rejects Marshall's definition for its welfare content. According to critics, even Robbins' definition has a concealed concept of welfare. According to Robbins, economics is concerned with the choice between ends and allocation of resources. It is understood that there is something to guide the solution of this problem. It is nothing else than maximization of satisfaction. Prof. Pigou considered satisfaction as a sign of welfare. Thus, the idea of welfare has entered Robbins' definition through the backdoor.
3. *Hazy view of the scope of Economics.* Robbins laid down in general terms the subject matter of economics. It is difficult to decide in particular cases whether it is in the scope of economics or not. For example, time and space available to us are limited. The choice here is so wide that economics alone cannot solve the problem. To what extent is economics concerned is just not clear in Robbins' definition.
4. *Ineffective attempt to make Economics a positive science.* Critics have also charged Robbins with trying in vain to make economics a positive science. Fraser observed, "Economics is something more than a value theory or equilibrium analysis." If economics is not concerned with material welfare, then what is it concerned with? Again, a Ruskin can attack economics. It becomes a dry and dull science. Prof. Pigou also observed that economics must be a problem-solving science. It is as much an art as it is science.
5. *Artificial separation of Economist's personality.* Prof. Eric Roll has criticised Robbins for dividing the personality of an economist artificially. As an economist, Robbins wants the analyst to refrain from commenting on ends and means. In the practical life, the economist is supposed to give his verdict on economic matters. An economist's personality

cannot be split like this. He is not mechanical-minded as Robbins seems to believe.

6. *Impractical definition.* If we follow Robbins then economics is merely an intellectual exercise. It is a study for study's sake. But all practical men of affairs are interested in a science only if it can help to solve humanity's problems. This is particularly true of economics. Robbins' definition is removed away from reality.

From the study of Robbins' definition of economics we can say that it is a scientific definition. The main shortcoming of this definition is that it considers economics only as theoretical science. It ignores the realistic side of economics because it ignores the welfare of human

beings. The fact is that we cannot separate welfare from economics. Welfare economics is developing these days. The reason is that the role of state has increased in the economics activities of nations. Every state aims at providing maximum benefits to its citizens. Thus, economists cannot remain silent about the well-being of human beings. Thus, the fundamental economic problem of every economy is of relative scarcity. It is so in all types of economic systems whether it is a capitalistic economy, a socialistic one or a mixed economy. Thereby the principle of economising is given much importance. Further, modern economists have analysed the nature of fundamental economic problems with help of the production possibility curve.

## **A. CHECK YOUR PROGRESS**

### **Case Study**

**Background:** Rivertown is a rapidly growing urban area located in a semi-arid region. Over the last decade, the city's population has doubled, increasing the demand for water dramatically. At the same time, climate change has reduced rainfall levels, leaving the local reservoir at historically low levels. City officials must now decide how to allocate the limited water supply. Should priority go to residential use, industrial operations that fuel the economy, or to agriculture that supports surrounding rural communities? Every choice means giving up something else, and public debate is intense.

This dilemma perfectly illustrates Lionel Robbins' definition of economics: "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses." Based on the above case study answer the following questions:



**Questions:**

- Q1. Which allocation choice (residential, industrial, or agricultural) best reflects efficient resource use according to Robbins' view, and why?
- Q2. What role can incentives play in encouraging more efficient water use among households, businesses, and farmers?
- Q3. In Robbins' framework, why can't economics determine the "right" decision, only the most efficient allocation?

## 2.3 OPPORTUNITY COST

Work to an ordinary man is uncomfortable or even painful if done overtime. In the same way, responsibility and risk-bearing in business means worry and nervous wear for the common businessman. Similarly, accumulation of capital whose services are so important for production is the result of a process of abstinence and waiting. From the social point of view no real cost may be attributed to the services of natural resources, yet from the point of view of an individual, land (or other resource) owner, the sacrifice of an opportunity of using it for some purpose other than the one to which it is being put, constitutes a cost. The forgone opportunity also taken as cost and is termed opportunity cost.

According to *Leftwich*, "Opportunity cost of a particular product is the value of the forgone alternative product that resources used in its production could have produced."

It is instructive and analytically helpful to think of production costs as opportunity costs or alternative costs. The resources (or inputs) used in production generally have many alternative uses, that is, they are non-specialised. A driver can be used to drive a taxi, a personal car, a highway truck, a tractor or a road-building bulldozer. He cannot be put to all these employments at the same time. His employment as a taxi driver means the loss of an opportunity of employing him as a truck driver. The sacrifice of an alternative opportunity from the viewpoint of the transport firm is an opportunity cost.

A more interesting example of opportunity cost is the dislocation of family life a person has to suffer in agreeing to his wife getting employed. Similarly, a businessman is generally capable of working in a few industries. A machine can be put to a variety of uses. Its employment in one of these uses must pay it at least that much which it can get in the next best employment; it must be priced at least equal to its transfer earnings, which is its opportunity cost.

### 2.3.1 Relative Nature of Opportunity Cost

Opportunity cost assumes different magnitudes when looked from different angles:

- i. From an individual producer's viewpoint opportunity cost of a worker is the wage he can secure by working in another firm within the same industry,
- ii. From the industry's viewpoint, his opportunity cost is the wages he will be paid in another industry, where he can get the next highest wages. The alternative cost looked at from the point of industry will be less than that viewed from the individual firm's viewpoint. This is because the worker will choose the firm in that industry where he gets the highest wage. However, the alternative cost of labour of the worker is entirely different when looked at from the social point of view. Socially, a worker can be put to an innumerable number of tasks. In this case the alternative or opportunity cost will be the wage he needs in his lowest paid employment.

We can therefore said that ultimately the real costs of production of a commodity boil down to the costs that are paid socially, the costs which the society has to pay. A private entrepreneur reckons his costs of production from his point of view; a society must, in planning resource allocation, look at costs from its own point of view. This difference in the viewpoints has also given rise to another cost concept, the social as against private cost.

According to Ferguson, "The alternative or opportunity cost of producing one unit of commodity X is the amount of commodity Y that must be sacrificed in order to use resources to produce X rather than Y." Opportunity cost has to be stated in relative terms.

### 2.3.2 Outlay Costs and Opportunity Costs

Outlay costs involve actual outlay of funds on, say, wages, material, rent, interest

etc. Opportunity cost, on the other hand, is concerned with the cost of foregone

opportunity;

it involves a comparison between the policy that was chosen and the policy that was rejected. For example, the cost of lending or using capital is the interest that it may earn in the next best use of equal risk.

A distinction between outlay costs and opportunity costs can be drawn on the.

basis of the nature of the sacrifice. Outlay costs involve financial expenditure at some time and thus are recorded in the books of account. Opportunity costs relate to sacrificed alternatives; they are not recorded in the books of account in general.

The opportunity cost concept is very useful, *e.g.*, in a cloth mill which spins its own yarn, the opportunity cost of yarn to the weaving department is the price at which the yarn could be sold, for measuring profitability of the weaving operations. Similarly, during a boom period a decision of the use of scarce capacity for a given product would involve the use on the opportunity cost of not using it or to make some other product that can yield profit.

In long-term cost calculation also it is useful *e.g.*; in calculating the cost of higher education, it is not only the student's tuition fee and books but also the earning foregone by him that should be taken into account.

### 2.3.3 Choice and opportunity cost

Choice involves sacrifice. The more food you choose to buy, the less money you will have to spend on other goods. The more food a nation produces the fewer resources will there be for producing other goods. In other words, the production or consumption of one thing involves the sacrifice of alternatives. This sacrifice of alternatives in the production (or consumption) of a good is known as its opportunity cost. The opportunity cost of buying a text book is the new pair of jeans you also wanted to buy which you have had to go without. The opportunity cost of working overtime is the leisure you have sacrificed.

## B. CHECK YOUR PROGRESS

### Match the columns

#### Column A

1. Opportunity Cost
2. Outlay Cost
3. Choice Cost
4. Alternative Cost
5. Implicit Cost

#### Column B

- A. The actual money spent or financial expenditure incurred
- B. The cost of the next best alternative foregone.
- C. The broader idea that every choice involves a cost.
- D. Another term for opportunity cost, often used interchangeably.
- E. The cost not directly paid in cash but represented by lost opportunities

6. Explicit Cost	F. Actual out-of-pocket expenses recorded in books of accounts.		
7. Real Cost	G. The effort, sacrifice, or pain involved in producing a good or service.		
8. Economic Cost	H. The sum of both explicit and implicit costs.		
<b>Answers:</b>			
1 → B	2 → A	3 → C	4 → D
5 → E	6 → F	7 → G	8 → H

## 2.4 PRODUCTION POSSIBILITY CURVE

The relative scarcity of productive resources in relation to needs has caused the economic problem. Every economy has to decide about what to produce, how to produce, and for whom to produce. These are the sub-problems. We know the problems which an economy has to solve from time to time. Prof. Samuelson has analysed these problems with the help of production possibility curve.

Whatever the nature and type of an economy, it faces the problem of scarcity of resources in relation to human wants. In other words, in socialistic as well as capitalistic economies, in rich as well as in poor countries, the basic or fundamental cause of all economic problems is the scarcity of resources in relation to human wants. Owing to scarcity of resources, the need of economising is felt. An economy cannot produce unlimited amounts of goods. Though we use all factors of production for the production of a good, yet its production cannot go beyond a limit. So by using different-combinations of factors of production for the production of different goods, we can know the possibilities of production of the desired goods. This tells us the maximum production that can be possible with the help of available combinations of factors of production. *The curve showing the possibilities of production of the desired goods in an economy is known as production possibilities curve. In other words, production possibilities curve depicts the maximum possible production of different combinations of different goods that can be produced with the given technology and resources.*

According to Samuelson, “Substitution is the law of life in a full-employment economy. The production possibility curve or frontier depicts society’s menu of choices.”

### 2.4.1 Assumptions

- a) *Fixed Factors of Production*- It is assumed that the factors of production are given and they do not change.
- b) *Full Employment*- Factors of production are supposed to be fully employed.

- c) *No change in technology*- Methods of production and technology are assumed to be constant.
- d) *Based on short run*- Production possibility curve is a short period phenomenon. The reason is that techniques of production and size of factors of production can change in the long run. So it is a short period concept.
- e) *Production of two goods*- Further it is assumed that the economy is producing only two goods, rice and butter. So all factors of production are engaged in the production of these two goods.
- f) *Substitution of Factors of Production*- Another bold assumption taken here is that factors of production are substitutable. It means that one factor can be frequently used in place of another. The assumption implies that factors of production can be reallocated among different uses.

We know that resources at our disposal are scarce. Further all factors of production are taken to be fully employed. So if we increase the production of one commodity, it can be only at the cost of another commodity. The reason is that to increase the production of one good, we have to put more factors of production to work. This is possible only when some factors of production are taken away from the other use. Therefore, from the production possibility curve, we come to know how factors of production are transferred from one use to another. This curve is also known as “Transformation Curve.”

#### **2.4.2 Production Possibility Schedule**

Production possibility schedule shows the various combinations of different goods which can be produced with the existing resources with the given technology. We have assumed that the economy is producing only two goods: rice and butter. Various combinations of the two goods which can possibly be produced using the given factors of production in different proportions can be listed in a schedule given below:

**Table 3.1: Production Possibility Schedule**

<b>Production Possibilities</b>	<b>Rice (in tons)</b>	<b>Butter (in tons)</b>
<b>A</b>	<b>0</b>	<b>15</b>
<b>B</b>	<b>1</b>	<b>14</b>
<b>C</b>	<b>2</b>	<b>12</b>
<b>D</b>	<b>3</b>	<b>9</b>
<b>E</b>	<b>4</b>	<b>5</b>
<b>F</b>	<b>5</b>	<b>0</b>

The production possibility schedule given above shows that if all the factors of production are engaged in the production of butter alone, the economy is capable of producing fifteen tons of butter. On the contrary, when all factor inputs are used for the production of rice, five tons of rice is produced. These are the two extremes of possibilities of production of the two goods.

In between these two combinations, there are other combinations of the two goods showing the different possibilities of production of rice and butter. Production possibility on combination *B* is such that 1 ton of rice and 14 tons of butter are produced. Similarly combination *C* gives 2 tons of rice + 12 tons butter ; Combination *D* offers 3 tons rice + 9 tons butter and combination *E* shows that 4 tons rice + 5 tons butter can be produced with the given resources and technology.

One thing more is clear from the schedule. That is, as we go on having more and more quantities of rice or lesser quantities of butter, we are ready to forgo more quantities of butter to get the same additional units of rice. In other words, the marginal rate of transformation between rice and butter is increasing. The schedule also shows that more of rice can be produced only when less butter is produced. In other words, increase in the production of rice takes place only at the cost of butter.

### 2.4.3 Production Possibility Curve

Production possibility curve is the graphical representation of the production possibility schedule. In other words, production possibility curve graphically shows the alternative production possibilities with given resources and technology. It can be explained as under.

Figure 2.1 shows the graphical representation of the production possibilities schedule. The curve AF is obtained when the different combinations of the production of rice and butter as shown in the schedule are plotted on a graph. This curve is called the production possibility curve. It shows the various combinations of rice and butter which the economy can produce with given amount of resources. This production possibility curve like the schedule shows that in an economy where there is full employment, an increase in the amount of one good is possible only by decreasing the amount of another good.

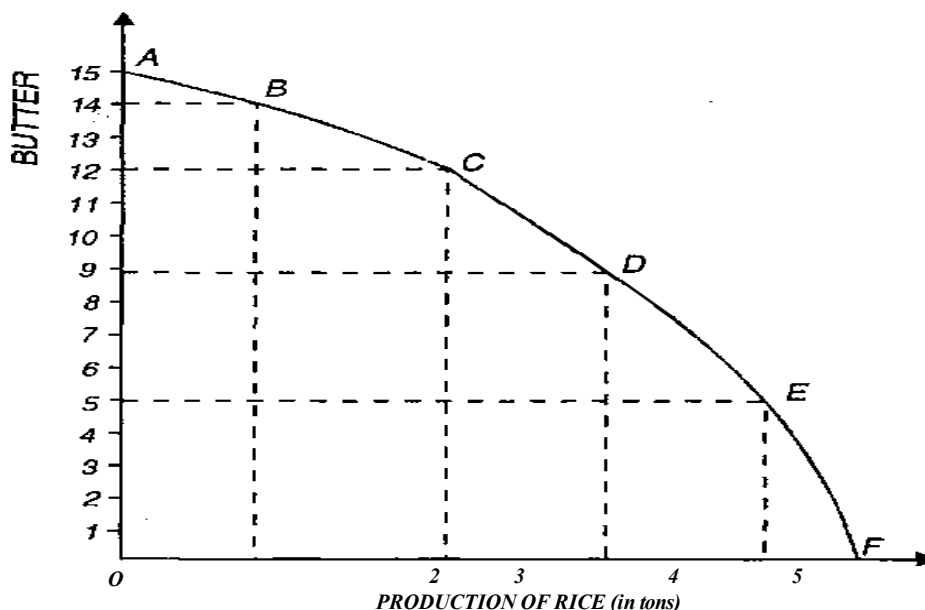


Fig. 2.1 The Production Possibility Curve with a Given Technology



In figure 2.1, combination A shows 15 tons of butter alone because all factors are used in the production of butter. Similarly point F on the AF curve shows that only 5 tons of rice is produced when all resources are devoted for its use. In between these two combinations, there are various points B, C, D and E showing the different combinations of rice and butter that can be produced with the given technology and factors of production available to the economy.

#### 2.4.4 Production Possibility Curve as the Transformation Curve

We have already said that production possibility curve is also called transformation curve. The reason is that when we move from one point to another on the production possibility curve, one good is transformed into another by transferring resources from one use to another. Another implication of the curve is that, with the given resources and technology, the combination of the two goods produced can lie anywhere on the production possibility curve but not inside or outside it.

As shown in the figure 2.2 the combined output of rice and butter can neither lie at S nor at P. This is so because at S the economy would not be utilising its resources fully while the output of the two goods shown by point P is beyond the reach of the economy under the given technology. In other words, the economy is not having enough resources to produce the output as shown by the point P. Further, a movement from S to any point B, C, D is welcome.

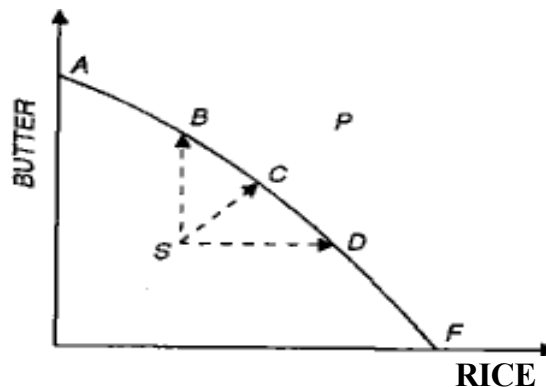


Fig. 2.2 The Transformation curve

### 2.4.5 Increasing Opportunity Costs

The production possibility curve also illustrates the phenomenon of increasing opportunity costs. But this we mean that when a country produces more of one good, it has to sacrifice ever increasing amounts of the other, the reason for this is that different factors of production have different properties. Workers differ in efficiency and lands differ in productivity. Thus, as a nation wants to produce more and more of one good, it has to start using resources which are less and less suitable. In one example given in table 3.1, production of an additional ton of rice involves sacrifice of one, two, three and four tons of butter for every additional ton of rice produced. This is called the law of increasing opportunity costs. It is because of the operation of this law that a normal production possibility curve slopes from left to the right and is concave to the origin.

### 2.4.6 Uses of Production Possibility Curve

Production possibility curve helps us to make correct decisions regarding the analysis and solution of economic problems. It tells what goods ought to be produced. With the given technology and factors of production, production possibility curve shows the maximum amount of product that can be produced if the economy is working efficiently.

1. *Knowledge of economic efficiency*- The answer to the first problem (*i.e.* whether there is the full and efficient utilisation of economic resources or not) can be sought from the transformation curve as shown in figure 3.2. If the real production of the economy lies on the production possibility or transformation curve, it is said to be fully utilizing its resources: On the contrary, if the actual production level of the economy lies below the transformation curve as shown by point 5 in the figure, it means that it is not fully utilizing its resources. Thereby there is the scope of increasing production by putting idle resources to work or by removing inefficiencies of production.
2. *Distribution of the national product*- Production possibility curve also solves another economic problem. It shows the distribution of the national income between the two sections of the society known as capitalists and workers. We can know from it as to how much of the national income is enjoyed by the capitalists and how much goes to workers. For example, if the economy is producing more televisions than cloth, then

we can say that there is the inequality of the distribution of wealth.

3. *Choice of the techniques of production-* Another problem concerning the choice of techniques of production is also illustrated with the help of the production possibility curve. There are two techniques of production: (i) labour intensive, (ii) capital-intensive. The choice of techniques depends upon the economic conditions of the country—availability of capital, size of the population, technological development and training facilities, etc. Actual choice of techniques can be made only by keeping in mind the production possibilities. If the needs of the people are more in consumer goods, then labour-intensive techniques are profitable and suitable. On the contrary, if people demand more machinery and other capital equipment, then capital-intensive techniques are advocated.
4. *Nature and extent of economic growth-* The answer to the problem of economic growth can also be sought from the production possibility curve. The curve shows the different combinations of production of two goods with the given technology and factors of production. The production possibility curve is based on the assumption of the short period. The reason is that technological developments take place with the passage of time. When technological improvements occur, it is possible to increase production even with the old size of factors of production or resources. With the improvement in technology, the production possibility curve shifts. Therefore, we can say that if there is a rightward shift in the production possibility curve of an economy, it shows to that extent, the economic growth of the economy.

## C. CHECK YOUR PROGRESS

### Case study

**Background:** Energio is a developing nation rich in coal reserves but aiming for a greener future. Its economy primarily produces two goods: electricity from coal and electricity from renewable sources (solar and wind). The government must decide how to allocate its limited resources—land, labor, and capital—between these two sectors.

Currently, Energio operates along its PPC. If it invests more in renewable energy, coal-

based electricity production must be reduced, and vice versa. As demand for clean energy rises globally, Energio faces pressure to transition, but doing so could slow economic growth in the short term, as renewables are more expensive and require new infrastructure.

**Scenario-Based Questions:**

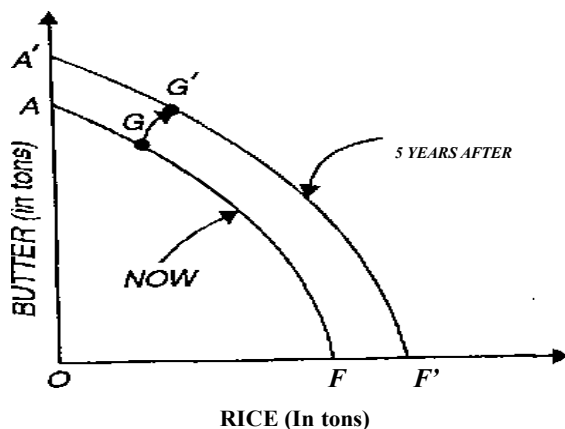
1. What does the PPC represent in the context of Energio's energy production?
2. How would technological advancements in solar energy affect Energio's PPC and opportunity costs?
3. Draw a hypothetical PPC for Energio. Mark points showing different combinations of coal and renewable energy and explain what each point represents (on the curve, inside the curve, outside the curve).

#### **2.4.7 Shifting of Production Possibility Curve**

Figure 2.3 shows the production of rice in tons on OX axis and that of butter on OY axis. With the given technology and resources, the economy is producing on the production possibility curve  $AF$ . In other words  $AF$  shows the maximum limit of the output that can be produced with the given resources and technology.

Now we suppose that due to technological improvements which result from technical growth production possibility of both rice and butter increases in the economy. The possible rise in the production of the two goods is shown by a shift of the  $AF$  curve to a higher

position  $A'B'$ . When there is such shift of the production possibility curve, we can say that economic growth has taken place. More of both butter and rice can be produced.



**Fig. 2.3 The rightward shift in the Production Possibility Curve with improvement in technology.**

## 2.5 LET US SUM UP

We live in a world with scarce resources, which is why economics is a practical science. We cannot have everything we want. Further, others want the same scarce resources which we want. Organisations that provide goods and services will survive and thrive only if they meet the needs for which they were created and do so effectively. Since the organisation's customers also have limited resources, they will not allocate their scarce resources to acquire something of little or no value. And even if the goods or services are of value, when another organisation can meet the same need with a more favourable exchange for the customer, the customer will shift to the other supplier. Put another way, the organisation must create value for their customers, which is the difference between what they acquire and what they produce.

Robbins Defines Economics as the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses. The main features of Robbins' definition are unlimited wants or ends, limited or scarce means, means have alternative uses, wants are of different intensity, and problem of choice.

This definition by Robbins is logical and scientific. But it has been criticised by some economists on different grounds, as it is self contradictory, concealed concept of

welfare, hazy view of the scope of economics, ineffective attempt to make economics a positive science, artificial separation of economist's personality. The main shortcoming of this definition is that it considers economics only as theoretical science. It ignores the realistic side of economics because it ignores the welfare of human beings.

Opportunity cost of a particular product is the value of the forgone alternative product that resources used in its production could have produced. It is concerned with the cost of foregone opportunity; it involves a comparison between the policy that was chosen and the policy that was rejected. For example, the cost of lending or using capital is the interest that it may earn in the next best use of equal risk. The opportunity cost concept is very useful, e.g., in a cloth mill which spins its own yarn, the opportunity cost of yarn to the weaving department is the price at which the yarn could be sold, for measuring profitability of the weaving operations.

Thus, every economy has to decide about what to produce, how to produce, and for whom to produce. These are the sub-problems which an economy has to solve from time to time. Prof. Samuelson has analysed these problems with the help of production possibility curve, which explained that by using different combinations of factors of production for producing different goods, we know the possibilities of production of the desired goods. This tells us the maximum production that can be possible with the help of available combinations of factors of production. The curve showing the possibilities of production of the desired goods in an economy is known as production possibilities curve. In other words, production possibilities curve depicts the maximum possible production of different combinations of different goods that can be produced with the given technology and resources. This curve is also known as "Transformation Curve." Therefore, Production possibility curve is the graphical representation of the production possibility schedule. In other words, production possibility curve graphically shows the alternative production possibilities with given resources and technology.

## 2.6 GLOSSARY

- **Production Possibility Curve (PPC)** – A graphical representation showing all possible combinations of two goods that an economy can produce using all resources

efficiently.

- **Relative Scarcity** – The idea that scarcity is not absolute but depends on demand and supply conditions at a given time.
- **Trade-offs** – The necessity to give up one good to produce more of another due to resource limitations.
- **Marginal Rate of Transformation (MRT)** – The rate at which one good must be sacrificed to produce an additional unit of another good.
- **Scarcity** – A fundamental economic problem where unlimited wants exceed limited resources, forcing choices to be made.

## 2.7 SELFASSESSMENT QUESTIONS

1. What is an economic problem? Why does it arise?

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2. What is meant by production possibility curve? Illustrate it?

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3. Discuss the concept of opportunity costs with an example.

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4. Critically evaluate Robbin's Definition of economics.

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## **2.8 LESSON END EXERCISES**

1. Explain the concept of scarcity of resources. Why does scarcity lead to the problem of choice in economics? Illustrate your answer with suitable examples.
2. What is a Production Possibility Curve (PPC)? Draw a PPC and explain its main features. How does the PPC illustrate the concepts of opportunity cost and economic efficiency?

## **2.9 SUGGESTED READINGS**

- Advanced Economic Theory. Micro Economic Analysis, Ahuja, H.L., 2012, S. Chand and Company Ltd, New Delhi.
- Principles of Economics, Mishra and Puri, 2007, Himalaya Publishing House, New Delhi.
- Economic Theory, Chopra, P.N., 2005, Kalyani Publishers New Delhi.

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## **DEMAND FUNCTION**

### **STRUCTURE**

- 3.0 Learning Objectives and Outcomes
- 3.1 Introduction
- 3.2 Demand
  - 3.2.1 Definition
  - 3.2.2 Features
- 3.3 Determinants Of Demand
  - 3.3.1 Demand Function
  - 3.3.2 Types of Demand Function
- 3.4 Law of Demand
  - 3.4.1 Assumptions
  - 3.4.2 Explanation of The Law of Demand
  - 3.5.3. Demand Curve
  - 3.5.4 Why is The Demand Curve Negatively-Sloped?
  - 3.5.5 Exceptions

- 3.5.6 Importance
- 3.6 Let Us Sum Up
- 3.7 Glossary
- 3.5 Self-Assessment Questions
- 3.6 Lesson End Exercise
- 3.7 Suggested Readings

### **3.0 LEARNING OBJECTIVES AND OUTCOMES**

#### **Learning Objectives**

The objective of this lesson is to provide information about:

- Demand and its determinants.
- Demand function and Law of Demand

#### **Learning Outcomes**

After completing this lesson, learners should be able to:

- Define demand and list the major factors that influence it.
- Distinguish between a change in quantity demanded and a change in demand.
- Represent and interpret the demand function in mathematical form.
- Explain the Law of Demand and illustrate it with the help of a demand schedule and curve.

### 3.1 INTRODUCTION

In Economics, we use of the word 'demand' is made to show the relationship between the prices of a commodity and the amounts of the commodity which consumers want to purchase at those prices. Demand is one of the forces determining price. The theory of demand is related to the economic activities of a consumer, called consumption. The process through which a consumer obtains the goods and services he wants to consume is known as demand.

- Analyze real-life examples where demand changes due to variations in price and other determinants.

### 3.2 DEMAND

#### 3.2.1 Definition

According to Prof. Hibdon, "Demand means the various quantities of goods that would be purchased per time period at different prices in a given market." Thus, three things are necessary for demand to exist; (1) the price of a commodity (2) the amount of the commodity the consumer or consumers are prepared to buy per unit of time; (3) a given time. Similarly, Benham wrote down, "The demand for anything at a given price is the amount of it which will be bought per unit of time at that price."

#### 3.2.2 Features

The definitions given above contain the following characteristics of demand:

- Difference between desire and demand.*** Demand is the amount of a commodity for which a consumer has the willingness and the ability to buy. There is difference between need and demand. Demand is not only the need, it also implies that the consumer has the money to purchase it.
- Relationship between demand and price.*** Demand is always at a price. Unless price is stated, the amount demanded has no meaning. The consumer must know

both the price and the commodity and he will tell his amount demanded.

- c) ***Demand at a point of time.*** The amount demanded must refer to some period of time such as 10 quintals of wheat per year or six shirts per year or five kilos of sugar per month. Not only this, the amount demanded and the price must refer to a particular date.

### **A. CHECK YOUR PROGRESS**

**Read each statement carefully and indicate whether it is True or False.**

1. Demand refers to the desire to buy a product, regardless of purchasing ability.
2. Demand is always measured with reference to a specific price and time period.
3. The law of demand states that demand increases as price increases, assuming other factors remain constant.
4. Demand includes both willingness and ability to purchase a product.
5. Demand for a commodity is not influenced by consumer income.
6. The demand curve typically slopes downward from left to right.
7. Future price expectations can influence current demand.
8. Demand for essential goods never changes, regardless of price.

### **Answer Key**

- |          |         |          |          |
|----------|---------|----------|----------|
| 1. False | 2. True | 3. False | 4. True  |
| 5. False | 6. True | 7. True  | 8. False |

### 3.3 DETERMINANTS OF DEMAND

The demand for a product is determined by a large number of factors. It would be impossible to include all possible determinants of demand in any study. Therefore, a few factors which underlie the demand for most of the products can be easily spotted. These factors are price of the commodity, incomes of the buyers' of the commodity, prices of related goods, advertising and sales promotion. These factors are found to have a substantial influence on the sales of a commodity. These are expressed and measured in various ways. In demand studies, these constitute the controlling variables. The importance of each determinant varies from product to product. As such the demand for a particular product has to be analysed only after the importance of each determinant is specified. Some of these factors are within a firm's control, others may not be so. For example, a firm can change the price of the commodity, its promotional expenditure, quality of the product and sales conditions. Let us discuss all these determinants in brief:

- i. Price of the Commodity-* The most important factor affecting amount demanded is the price of the commodity. The amount of a commodity demanded at a particular price is more properly called price demand. The relation between price and demand is called the Law of Demand. It is not only the existing price but also the expected changes in price which affect demand.
- ii. Income of the Consumer-* The second most important factor influencing demand is consumer income. In fact, we can establish a relation between the consumer income and the demand at different levels of income, price and other things remaining the same. The demand for a normal commodity goes up when income rises and falls down when income falls. But in case of Giffen goods the relationship is the opposite.
- iii. Prices of related goods.* The demand for a commodity is also affected by the changes in prices of the related goods also. Related goods can be of two types: (1) Substitutes which can replace each other in use; for example, tea and coffee are substitutes. The change in price of a substitute has effect on a commodity's demand in the same direction in which price changes. The rise in price of coffee shall raise the demand for tea; (2) Complementary goods are those which are

jointly demanded, such as pen and ink. In such cases complementary goods have opposite relationship between price of one commodity and the amount demanded for the other. If the price of pens goes up, their demand is less as a result of which the demand for ink is also less. The price and the demand go in opposite direction. The effect of changes in price of a commodity on amounts demanded of related commodities is called Cross Demand.

- iv. Tastes of the Consumers-* The amount demanded also depends on consumer's taste. Tastes include fashion, habit, customs, etc. A consumer's taste is also affected by advertisement. If the taste for a commodity goes up its amount demanded is more even at the same price. This is called increase in demand. The opposite is called decrease in demand.
- v. Wealth-* The amount demanded of a commodity is also affected by the amount of wealth as well as its distribution. The wealthier are the people higher is the demand for normal commodities. If wealth is more equally distributed, the demand for necessities and comforts is more. On the other hand, if some people are rich, while the majorities are poor, the demand for luxuries is generally higher.
- vi. Population-* Increase in population increases demand for necessities of life. The composition of population also affects demand. Composition of population means the proportion of young and old and children as well as the ratio of men to women. A change in composition of population has an effect on the nature of demand for different commodities.
- vii. Government Policy-* Government policy affects the demands for commodities through taxation. Taxing a commodity increases its price and the demand goes down. Similarly, financial help from the government increases the demand for a commodity while lowering its price.

### 3.3.1 Demand function

The demand function for a commodity describes the relationship between quantities of the commodity which consumers demand during a specific period and the factors which influence its demand. In mathematical symbols the demand function for a good can be expressed as follows:

Where

$$D_x = f(Y, P_x, P_s, P_c, T; E_p; N, D, u)$$

Subject to the condition that

$$f_3, f_6, f_7, f_8 > 0 > f_2 > f_4 \text{ and } f_3, f_5, f_9 > 0$$

**D<sub>x</sub>** = demand for good x    **Y** =

Consumers' income    **P<sub>x</sub>** = Price of

good x

**P<sub>s</sub>** = Prices of substitutes of x

**P<sub>c</sub>** = Prices of complements of x

**T** = measure of consumer's tastes and preferences

**E<sub>p</sub>** = consumers' expectations about future prices

**E<sub>y</sub>** = consumers' expected future incomes

**N** = number of consumers

**D** = distribution of consumers

**u** = 'other' determinants of the demand for x

**f** = unspecified function, to be read as "function of"

**f<sub>i</sub>** = derivative of f with respect to the i<sup>th</sup> variable

The demand function given above can be easily rationalised and explained and we can draw the following observations:

- a.  $f_x$  is positive if x happens to be a superior good or and negative if it were an inferior good. This is because superior goods have a positive income effect while inferior goods have a negative income effect.
- b.  $f_5$  is positive if consumers develop taste and preferences in favour of x and  $f_5$  is



negative if the consumers have preferences against it.

- c. The sign of  $f_y$  depends upon the way distribution of consumers undergoes a change. If the consumers move to the cities, the demand for consumers durable is found to be favourably affected.
- d. The first five determinants affect the demand for all goods. These are  $y, P_x, P_x, P_5, P_c$  and  $T$ .
- e.  $E_p$  and  $E_y$  exert an influence mainly on the demand for durable and expensive goods.
- f.  $N$  and  $D$  are arguments only in the demand function for a group of consumers. For example, religious books are demanded only by a small group of persons having a religious bent of mind. Hot fiction books are demanded by young readers who might be town dwellers.

Thus, the demand function for commodities is not generally under the control of producer firm. But under imperfect competition, firms can change the number of customers by changing their prices, product quality and service etc. Firms can also try to tilt the demand in favour of their own brands through well-designed advertising.

### **3.3.2 Types of Demand function**

In the context of the discussion of the demand function, it is important to know about the distinction between firm demand and industry demand. Although the two demand functions have similar arguments, the direction and magnitudes of their effects would presumably be different. Let us take the case of a car producing firm, say Maruti Udyog. The demand function facing this firm would have rival firm's product prices as the prices of substitutes and then 'other firms' price would be expected to exert a positive influence on the demand for a firm's product. In contrast, for the industry demand function, all firm's prices are the argument for the demand function for cars. Therefore, these prices would exert a negative influence on the demand for the industry product *i.e.* cars. Likewise, the advertisement budgets of the 'other' car producing firms promoting their brands of cars would adversely affect the demand for the Maruti cars. But the advertisement budgets of all the firms taken together would favourably affect the demand for cars.

Another difference between company demand function and industry demand function is about the effect of consumers' income. Consumers' income in the company demand function would have a smaller co-efficient than that in the industry demand function.

## **B. CHECK YOUR PROGRESS**

### **Multiple Choice Questions**

**1. Which of the following is not a determinant of demand?**

- A. Price of the commodity
- B. Weather conditions
- C. Consumer's income
- D. Tastes and preferences

**2. A fall in the price of substitute goods will generally cause the demand for a product to:**

- A. Increase
- B. Decrease
- C. Remain constant
- D. Become perfectly elastic

**3. When consumer income increases, the demand for normal goods:**

- A. Increases
- B. Decreases
- C. Remains unchanged
- D. Falls to zero

**4. If consumers expect the price of a good to rise in the future, the current demand will likely:**

- A. Decrease
- B. Stay the same
- C. Increase
- D. Be unaffected by expectations

**5. Which of the following can cause a shift in the demand curve?**

- A. Change in the good's own price
- B. Change in consumer preferences
- C. Change in quantity supplied
- D. Change in production technology

**Answers:** 1. B          2. B          3. A          4. C          5. B

### **3.4 LAW OF DEMAND**

Experience tells us that ordinarily if the price of a commodity falls, the amount demanded goes up and vice-versa. There is an inverse relationship between the price of a commodity and the amount demanded. In Economics, this relationship is known as the Law of Demand.

#### **Statement of the Law**

Some popular statements of the Law of Demand are as follows:

According to *Bilas*, “The Law of Demand states that other things being equal, the quantity demanded per unit of time will be greater, the lower the price and smaller, higher the price.”

*Prof. Samuelson* writes, “Law of Demand states that people will buy more at lower prices and buy less at higher prices, other things remaining the same.”

In *Ferguson’s* words, “According to the Law of Demand, the quantity demanded varies inversely with price.”

### **3.4.1 Assumptions of the Law of Demand**

According to *Prof. Stigler* and *Boulding*, the main assumptions of the law are:

- i. No change in tastes and preferences of consumers.
- ii. Consumer’s income must remain the same. Marshall assumed that money income should not change. Milton Friedman thinks that real income should remain constant.
- iii. The prices of the commodities related to the commodity in demand should not change.
- iv. There should be no change in the wealth of the consumers.

### **3.4.2 Explanation of the Law of Demand**

The relationship between the price of a commodity and the amount demanded is dependent on a large number of factors, the most important being the nature of a commodity. The response of amount demanded to changes in price of a commodity is known as the demand schedule. It summarises the information on prices and quantities demanded. The table 3.1 showing the prices per unit of the commodity and the amount demanded per period of time.

The Demand Schedule may be the Individual Demand Schedule which refers to the prices and amount demanded of the commodity by an individual.

In Price Theory we are mainly interested in the Market Demand Schedule. A market consists of all those individuals who want to purchase a given commodity. Therefore, “Market Demand Schedule is defined as the quantities of a given commodity which all

consumers will buy at all possible prices at a given moment of time.” It should be clear that the Individual Demand Schedules when added give us the Market Demand Schedule.

The following table shows the Individual Demand Schedules of buyers A and B and the Market Demand Schedule where there are only two buyers.

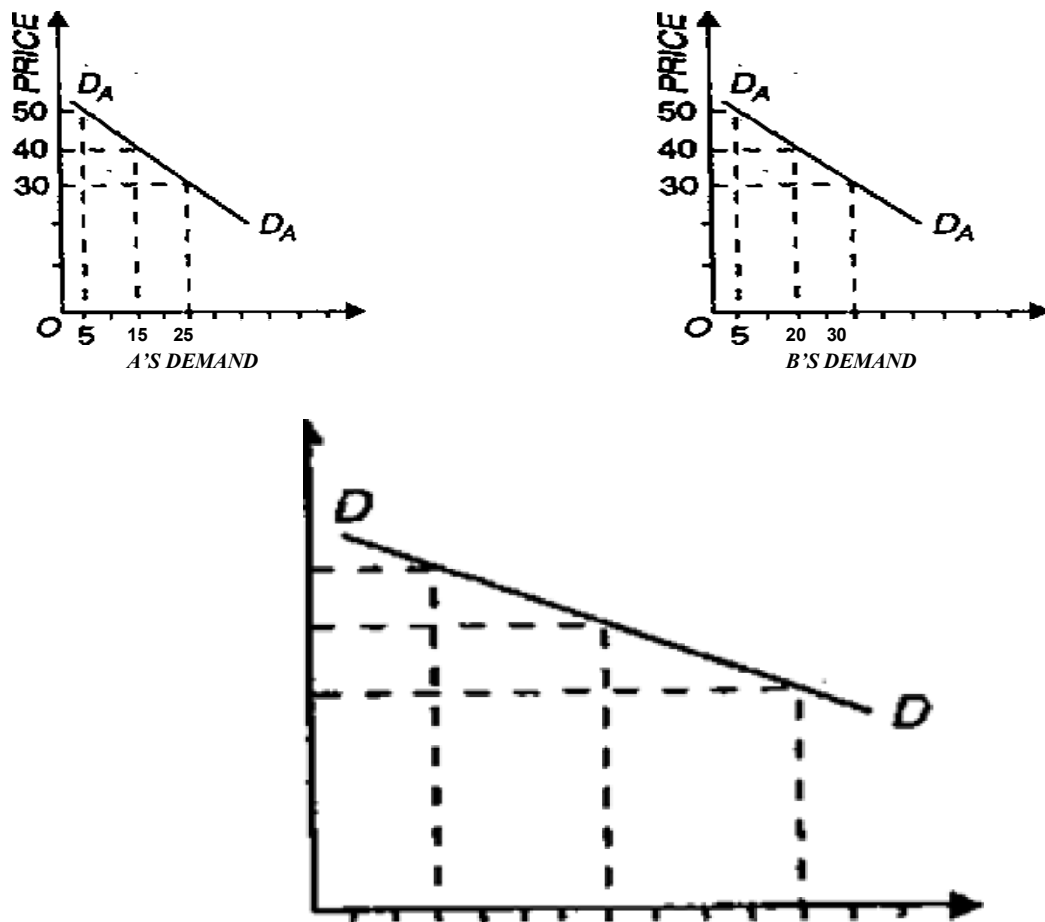
**Table 3.1**

Price per Quintal (Rs.)	Amount Demanded by buyer A	Amount Demand by buyer B	Total Market Demand
50	5	10	15
40	15	20	35
30	25	30	55

### **3.4.3 Demand Curve**

If we show the demand schedule graphically, we get a Demand Curve. The demand curve shows the maximum quantities per unit of time that consumers will take at various prices. According to R.G. Lipsey, “This curve, which shows the relation between the price of a commodity and the amount of that commodity the consumer wishes to purchase, is called Demand Curve.”

Like the demand schedules, there can be an Individual Demand Curve and Market Demand Curve. (1) Individual Demand Curve is the graphical representation of Individual Demand Schedule and Market Demand Curve is the horizontal summation of the Individual Demand Curves in the Market. The following diagram shows the Individual Demand Curves for consumers.



**Figure 3.1 Individual and Market Demand Curves**

A and B are the Market Demand Curve. It is assumed here that there are only two

MARKET DEMAND

consumers in the market. They face the same price of the commodity but purchase according to their needs. The Market Demand Curve sums up the amounts demanded by the two consumers at different prices. The Individual Demand Curves show the prices and quantities of the Demand Schedules given in the Table 5.1. The Individual Demand Curves-slope

from left down to the right. That is, they have a negative slope. As a result, the Market Demand Curve DD is also negatively sloped.

#### 3.4.4 Why is the Demand Curve Negatively-Sloped?

There are some reasons given for the inverse relationship between price and amount demanded in case of ordinary commodities. These reasons are as follows:

- 1) ***Law of Diminishing Marginal Utility.*** Writers who believe in cardinal utility approach to consumer's demand believe that diminishing marginal utility for the consumer in case of the commodity is the fundamental cause of the Law of Demand. As the price of the commodity falls, consumer purchases more of the commodity so that his marginal utility from the commodity also falls to equal the reduced price. If the price rises, the opposite happens.
- 2) ***Substitution Effect.*** Another group of writers who believe in ordinal utility (Indifference curves) consider the substitution effect of the change in price as the major cause for the application of the Law of Demand. When the price of commodity falls, it becomes cheaper as compared to the other commodities which the consumer is purchasing. As a result the consumer would like to substitute this cheaper commodity for other commodities whose prices remain the same. For example, -with the fall in price of tea, coffee's price remaining the same, tea will be substituted for coffee. In other words, the demand for tea would go up. This is nothing but the application of the Law of Demand.
- 3) ***Income Effect.*** Another cause behind the Law of Demand is known as Income Effect. As the price of a commodity is reduced, the consumer has to spend less amount of money income for the same amount of the commodity. This may be taken to be a rise in his real income. It is the Income Effect of a fall in price. Part of the increase in his real income can be used to purchase more of the cheaper commodity while the other part may be spent on other goods. Thus, when the price falls, amount demanded rises and ***vice-versa***.
- 4) ***New Consumers.*** When the price of a commodity is reduced then many other

consumers who were not consuming the commodity earlier will start purchasing it now because it is within their reach now. For example, radio sets have become cheaper and even poor people can easily buy a set. The amount demanded of the radio-sets has gone up with a fall in their price. The opposite would happen with a rise in prices.

- 5) ***Different uses of the commodity.*** Commodities have many uses. If their price rises, they are used only for the more important purposes. As a result, their demand will go down. On the contrary, when the price is reduced, the commodity will be put to many other uses where it was not being used earlier. Its demand will go up.

### 3.4.5 Exception

Many times people behave contrary to what we expect according to law of demand. In these exceptional cases, the demand curve is positively sloped. These are as under:

- (1) ***Special Type of Inferior Goods or Giffen goods-*** There are some commodities of consumption which are inferior from the consumer's viewpoint. There are others which are superior. Sir Giffen pointed out to the economist, Marshall, that in the case of English workers the Law of Demand does not apply to bread. He could practically show that with a fall in the price of bread its amount demanded was reduced rather than being more than before. Marshall admitted that this was an exceptional case to the Law of Demand. It is now clear as to why the English workers behaved contrary to the Law of Demand. They had two main items of consumption: (1) Bread, (2) Meat. As the price of bread fell in the market, they could purchase the same amount of bread with less money. The money income saved thereby was not spent on purchasing more bread. Rather it was spent on purchasing more of meat, a superior commodity for the English workers. In short, there was no Substitution Effect in favour of bread. The Income Effect of the fall in price of bread was also in favour of meat. This reduced the demand for bread as its price went down. Therefore, bread was a special type of inferior good whose amount demanded changed directly with change in its price and not inversely as expected from the Law of Demand.



In India, such food grains as Jowar and Bajra are Giffen goods, wheat and rice being the superior goods.

- (2) **Articles of Distinction-** This exception was first explained by the American economist, Veblen. According to him, the demand for articles of distinction like diamonds and jewellery is more when their price is high. This is because a rich man's desire for distinction is satisfied better when the articles of distinction are highly-priced and the poorer man cannot buy them. On the other hand, the demand for articles of distinction falls with a fall in their price.
- (3) **Expectation of Rise and Fall in Price in Future-** There are many commodities whose prices are expected to go down or rise in future. In such cases consumers may behave opposite to the law of demand. If people expect a rise in price in future, they will rush to purchase more of the commodity at the present price. If they expect the price to fall, they will purchase less of the commodity to derive benefit from the fall in price later on.
- (4) **Ignorance on the Part of Consumers about Quality-** It happens many times that consumer's judge the quality of a commodity from its price. In such cases, a lower-price commodity may be considered inferior and purchasers buy lesser amount of it. But when its price is more they consider it to be superior and may purchase more of the commodity than before.

## C. CHECK YOUR PROGRESS

### Case Study

**Background:** In 2023, a popular smartphone brand—NovaTech—launched a new mid-range model priced at ₹30,000. Despite initial excitement, the company observed sluggish sales within the first three months. In response, they decided to reduce the price to ₹25,000 through a limited-time promotional offer.

**Observation:** Following the price drop, demand surged significantly. Retailers reported a 40% increase in sales within the first month of the price reduction. Online pre-orders also rose sharply.

**Analysis Using the Law of Demand:** The Law of Demand states that, *ceteris paribus*

(all other factors being equal), when the price of a good falls, the quantity demanded increases. NovaTech's case clearly illustrates this principle: as the price decreased, more consumers found the smartphone affordable and desirable, leading to increased demand.

Supporting Determinants:

- Price was the main factor influencing the increase in demand.
- The consumer perception of value improved due to the price cut.
- The income levels and preferences of the target market (young professionals and students) also played a role in responsiveness to the price change. On the basis of above case answers the following:

**Questions:**

1. What does this case illustrate about the relationship between price and quantity demanded?
2. Could any non-price factors have influenced demand in this situation?
3. Do you think the increase in demand would have happened if the price had remained the same? Why or why not?
4. What other products might show similar demand behavior when prices are reduced?

### **3.4.6 Importance of Law of Demand**

The law has some theoretical as well as practical advantages. These are as follows:

- i. Price determination.* A monopolist gets the help of the Law of Demand in fixing his price. He is able to know how much amount demanded for his commodity shall go up or down with change in prices. The Demand Schedule tells him the demand at different prices in the whole market. He is able to decide the most profitable amount of output for himself.
- ii. To the Finance Minister.* The Finance Minister also takes the help of the Law of Demand. The Finance Minister can know the effect of his taxes on the amount

demand for different commodities. If increasing the rate of taxation of a commodity reduces its sale to a large extent, it is not good policy to tax this commodity. Only such commodities should be taxed as have relatively inelastic demand.

*iii. To farmers.* How far a good shall or bad crop affect the economic condition of the farmer can be known from the Law of Demand. If there is a good crop and demand for it remains the same, price will definitely go down. The farmer will not have much benefit from a good crop, but the rest of the society will be benefited from it.

*iv. In the field of planning.* Demand Schedule has great importance in planning for individual commodities and industries. In such cases it is necessary to know whether a given change in the price of the commodity will have the desired effect on the demand for commodity within the country or abroad. This can be known from a study of the nature of demand schedules for the commodity.

### 3.5 LET US SUM UP

Demand is one of the forces determining price. The theory of demand is related to the economic activities of a consumer, called consumption. The process through which a consumer obtains the goods and services he wants to consume is known as demand. In Economics, use of the word 'demand' is made to show the relationship between the prices of a commodity and the amounts of the commodity which consumers want to purchase at those prices.

The demand for a product is determined by a large number of factors, viz., price, income, prices of related goods, tastes, preferences, population etc. There is an inverse relationship between the price of a commodity and the amount demanded.

In Economics, this relationship is known as the Law of Demand. The demand curve is negatively sloped just because of law of diminishing marginal utility, substitution effect, different uses of the commodity, and because of income effect.

As we know that the demand curve is negatively sloped from left to right, but in some cases it is positively sloped like in case of inferior or Giffen goods, expecting rise or

fall in the prices of goods in future, due to ignorance of consumers etc.

Law of demand is important to determine price of a product, budget fixing by finance minister, How far a good shall or bad crop affect the economic condition of the farmer can be known from the Law of Demand and also in planning for individual commodities and industries.

### 3.7 GLOSSARY

- **Demand:** The quantity of a good or service that consumers are willing and able to buy at various prices during a given period.
- **Law of Demand:** States that, all else being equal, as the price of a good falls, the quantity demanded rises, and vice versa.
- **Demand Schedule:** A table that shows the relationship between different prices and the corresponding quantities demanded.
- **Demand Curve:** A graphical representation of the demand schedule, typically downward sloping from left to right.
- **Determinants of Demand:** Factors other than price that influence demand, such as income, tastes, prices of related goods, and expectations.
- **Change in Quantity Demanded:** A movement along the demand curve due to a change in the good's own price.

### 3.8 SELF ASSESSMENT QUESTIONS

1. Define Demand. State the factors affecting demand for a commodity by a consumer?

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2. What is demand curve? Why does demand curve slope downwards? Are there exceptions to it?

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3. State the law of demand and explain its assumptions?

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### **3.9 LESSON END EXERCISE**

1. What is the Law of Demand? State its assumptions and explain why the demand curve slopes downward. Illustrate your answer with a demand schedule and diagram.
2. Demand is influenced by multiple factors, not just price. Discuss the importance of non-price factors in determining demand with practical examples.

### **3.10 SUGGESTED READINGS**

- Advanced Economic Theory. Micro Economic Analysis, Ahuja, H.L., 2012, S. Chand and Company Ltd, New Delhi.
- Principles of Economics, Mishra and Puri, 2007, Himalaya Publishing House, New Delhi.
- Economic Theory, Chopra, P.N., 2005, Kalyani Publishers New Delhi.

## **ELASTICITY OF DEMAND**

### **STRUCTURE**

- 4.0 Learning Objectives and Outcomes
- 4.1 Introduction
- 4.2 Meaning And Types of Elasticity of Demand
- 4.3 Price Elasticity of Demand
  - 4.3.1 Degrees
  - 4.3.2 Factors Affecting
  - 4.3.3 Importance
- 4.4 Income Elasticity of Demand
  - 4.4.1 Types
  - 4.4.2 Importance
- 4.5 Cross Elasticity of Demand
  - 4.5.1 Classification of Commodities
- 4.6 Measurement
  - 4.6.1 Total Expenditure Method
  - 4.6.2 Mathematical Method
  - 4.6.3 Graphic Method
- 4.7 Let Us Sum Up
- 4.8 Glossary
- 4.9 Self-Assessment Questions
- 4.10 Lesson End Exercise
- 4.11 Suggested Readings

## **4.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

After reading this chapter, you will be able:

- To understand the concept of elasticity of demand.
- To define different types of elasticity of demand.
- To explain how elasticity of demand is measured.

### **Learning Outcomes**

Upon completion of this chapter, learners should be able to:

- Accurately define elasticity of demand and explain its role in business decision-making.
- Identify and describe the different types of elasticity and the factors affecting each.
- Use appropriate formulas and methods to measure elasticity of demand in practical scenarios.
- Interpret the degree of elasticity and relate it to consumer behavior and revenue implications.

## **4.1 INTRODUCTION**

We have studied in the previous chapter that when price of a good falls, its quantity demanded rises and when price of it rises, its quantity demanded falls. This is generally known as law of demand. This law of demand indicates only the direction of change in quantity demanded of a commodity in response to a change in its price. This does not tell us how much or to what extent the quantity demanded of a good will change in response to a change in its price. This information as to how much or to what extent the quantity demanded of a good will change as a result of a change in its price is provided by the concept of price elasticity of demand. Quantity demanded of a good will change as a result of change in any of these determinants (price, income, price of related goods etc.) of

demand. The concept of elasticity of demand therefore refers to the degree of responsiveness of quantity demanded of a good to a change in its price, consumers' income and prices of related goods.

## 4.2 MEANING AND TYPES OF ELASTICITY OF DEMAND

Elasticity of demand is the measure of the degree of change in the amount demanded of the commodity in response to a given change in price of the commodity, prices of some related goods or changes in consumers' income. This is the general definition of the term "Elasticity of Demand".

It should be clear from the above definition that elasticity of demand can be mainly of three types:

- (1) Price elasticity is responsiveness of demand to changes in prices.
- (2) Income elasticity is the responsiveness of demand to changes in consumers income.
- (3) Cross elasticity is the responsiveness of demand for a commodity A to changes in the price of a related commodity B.

## 4.3 PRICE ELASTICITY OF DEMAND

Price elasticity of demand is commonly called the elasticity of demand. This is because price is the most changeable factor influencing demand. Some popular definitions of the price elasticity of demand are:

In the words of *Kenneth Boulding* "Elasticity of demand measures the responsiveness of demand to changes in price".

*Alfred Marshall* define elasticity as, "The Elasticity (or responsiveness) of demand in a market is great or small according as the amount demanded increases much or little for a given rise in price.

$$\text{Elasticity of Demand} = \frac{\text{Proportionate change in Demand}}{\text{Proportionate change in Price}}$$

Suppose, sugar is Rs. 5 per kg and its demand is 15 quintals in a small market. If the price falls to Rs 4 per kg the amount demanded goes up to 30 quintals. Here change in



demand is 15 quintals, the original demand was also 15 quintals. So the proportionate change in demand is  $15/15 = 1$ . Now let us find out the proportionate change in price. The absolute change in price is from Rs. 5 to Rs. 4; this means '-1'. The original price Rs 5. So the proportionate change in price is  $-1/5$ . Now, we can calculate the price elasticity of demand.

$$\begin{aligned}\text{Elasticity of Demand} &= \frac{\text{Proportionate change in Demand}}{\text{Proportionate change in Price}} \\ &= 1 / (-1/5) = 1 * \frac{-5}{-5} = -5\end{aligned}$$

Thus, the demand for sugar is highly elastic. With 1 percent change in its price there is a 5 per cent change in its demand. The elasticity of demand with regard to price of the commodity is always having a minus sign. This shows that price and demand are inversely related. The

negative sign is not ordinarily used in writing the price elasticity of demand. The sign is understood.

### 4.3.1 Degrees of price Elasticity of Demand

Elasticity of Demand for different commodities is different. Some commodities have more elastic demand while others have relatively inelastic demand. Elasticity of demand may have a value from zero to infinity. Some particular values of elasticity of demand show graphically as under:

*4.3.1.1 Completely inelastic demand* is shown by a straight line demand curve which is parallel to vertical axis showing price. This means that whatever the changes in price may be, the amount demanded remains the same. In the case, price elasticity of demand is equal to zero.

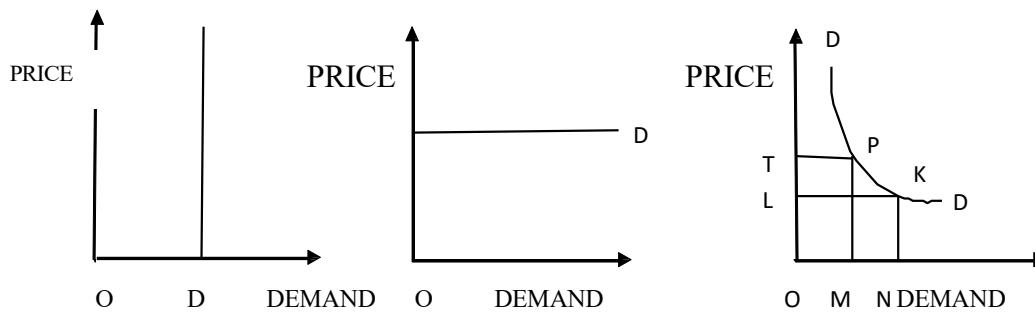
*4.3.1.2 Perfectly elastic demand* is one in which a small change in price will cause an infinitely large change in amount demanded. A small rise in price on the part of the seller reduces the demand to zero. A small reduction in price leads to such a big expansion in demand that no seller is able to satisfy this demand at the reduced price. This case of infinite elasticity of demand is shown by a straight line demand curve parallel to the horizontal axis.

*4.3.1.3 Unitary elasticity of demand.* This is a particular case of elasticity of demand in which a given percentage change in price leads to exactly the same percentage change in amount demanded. According to Marshall, a commodity has elasticity equal to one if the total expenditure of the consumers on the commodity remains the same even when the price changes.

A demand curve that subtends equal-area rectangles over the X and Y axis has unitary elasticity of demand. Such a demand curve is known in mathematics as a rectangular hyperbola. This curve is shown in panel C of the diagram 4.1. The two sides of the curve are such that they approach the two axes but never meet them. We can call this curve as a constant-total-outlay curve. In the diagram (Figure 4.1 panel C) when the price is OT and the amount demanded OM, the total expenditure is OT X OM which is the area of the rectangle OMPT. At price OL, total expenditure is the area of the rectangle ONKL. According to Marshall when total

expenditure remains the same with changes in price, elasticity of demand is equal to one.

**4.3.1.4 Relatively elastic and inelastic demand.** Those demand curves which have elasticity between zero and infinity are closely classified as relatively inelastic and relatively elastic. We may say that demand elasticity between zero and one may be termed relatively inelastic. A higher value of elasticity than one may be called relatively elastic. On the basis of the sign and value of the price-elasticity of demand for a commodity, it is usually classified as a necessity, a comfort and a luxury. Necessities of life like wheat, or rice have price elasticities less than one. Comforts have slightly higher values of price elasticity. Luxuries have the highest values of price-elasticity. In all these cases the sign of price elasticity is minus. All these commodities obey the Law of Demand.



**Figure 4.1 Demand Curves with different Elasticities**

## 4.3.2 Factors Affecting price Elasticity of Demand

Price elasticity of demand depends upon a number of factors. The main factors are as follows:

**4.3.2.1 Availability of Substitutes-** If a commodity has close substitutes available at reasonable prices, then the demand for the commodity will be quite price elastic. The demand for Campa-Cola is elastic because a substitute, Thumbs-up is easily available at a competitive price.

- 4.3.2.2 ***Nature of the Commodity-*** Price elasticity for necessities of life is low while that for luxuries is quite high. The amount of demand in case of food grains does not change much because it is a necessity. The demand for butter and eggs is quite price-elastic because these are luxuries for the poor common man.
- 4.3.2.3 ***Number of uses of a Commodity-*** The greater the number of uses to which a commodity is put, the higher is the elasticity of demand. For example, coal is used for many purposes. If its price rises, the less important users will not purchase coal and the amount demanded will fall appreciably. Contrary to this, ordinary women's Jewellery has no other use and, therefore, its demand is relatively inelastic.
- 4.3.2.4 ***Possibility of Postponing the Purchase of a Commodity-*** Price elasticity is also affected by the possibility or otherwise of the postponement of the purchase of a commodity; for example, if woollen clothes become costlier, the middle class people try to get their old suits repaired and postpone the purchase of new woollen clothes. As a result, elasticity will be high in this case.
- 4.3.2.5 ***Level of Income of the Consumers of the Commodity-*** Price elasticity of demand for a commodity also depends upon the income of the consumers of the commodity. Price elasticity of demand from the high income class for high quality mangoes is low because the expenditure on mangoes for this class forms only a minor part of the total expenditure. On the other hand, price elasticity for high quality mangoes from the poorer classes is very high.
- 4.3.2.6 ***Habitual Necessities-*** Those commodities whose consumption is a habit with consumers have low price elasticity. For example, the prices of cigarettes and liquor are rising but their demand has not diminished. It is price-inelastic.
- 4.3.2.7 ***Place of the Commodity in the Consumer's budget-*** The demand for a commodity is less elastic, lesser is the proportion of expenditure on the commodity by the consumer: such items as shoe-polish, newspaper, tooth paste and tooth powder have inelastic demand. If their prices rise, the consumer is not worried about his budget and, therefore, does not seek substitutes. On the other hand, demand for durable commodities claiming a good deal of income of the consumer

is quite elastic. Examples are television, steel-almirahs etc.

4.3.2.8 ***Prevailing Price level of the Commodity-*** Price elasticity of demand also depends upon whether the price prevailing in the market is relatively high or low from the viewpoint of common consumers. Highly priced commodities such as diamonds and low-priced commodities such as salt have low price elasticity because a change in their price has very little effect on their consumers. But commodities having price in the middle range are quite price-elastic because their consumers are quite conscious of their price; examples are radios, transistors, etc.

4.3.2.9 ***Time Period Under Consideration-*** Price elasticity in the short period is low while in the long period it will be relatively higher. This is because it is possible for consumers to change their consumption habits in favour of cheaper substitutes and against the expensive commodities. Therefore, in the long period, elasticity is generally higher for all the commodities.

4.3.2.10 ***Joint Demand-*** Price elasticity for a commodity is also dependent upon the nature of price elasticity of jointly-demanded commodities. If the demand for cars is inelastic the demand for petrol will also be inelastic. The elasticity of demand for ink depends directly on the nature of elasticity of demand for pens.

### 4.3.3 Importance of Price Elasticity of Demand

Price elasticity of demand is a very useful concept for producers, farmers, workers and the Government. Lord Keynes considered price elasticity to be the most important contribution of Marshall. The practical importance of this concept should be clear from the following applications.

- 1) ***Determination of price and output:*** Every producer has to decide his volume of output and the price at which he has to sell it. In these decisions, elasticity of demand is one of the very relevant informations. If the demand is less elastic price will be higher. If the demand is elastic, a lower price is fixed.
- 2) ***Price discrimination:*** A monopolist adopts a price discriminatory policy only

when the elasticity of demand from different consumers or sub-markets is different.

Those consumers whose demand is inelastic can be charged a higher price than those with more elastic demand.

- 3) ***Price determination in cases of joint supply:*** Jointly supplied goods are those which are the products of the same production process; for example, wool and mutton. The price determination of these joint products becomes a little difficult due to joint costs of production. In such cases, the concept of price elasticity of demand comes to our help. If the demand for wool is inelastic as compared to the demand for mutton, a higher price for wool is charged and a lower price for mutton.
- 4) ***Determination of sale policy for super markets:*** Super markets are a combined set of shops run by a single organisation. These markets are supposed to sell commodities at lower prices than are charged by shopkeepers in the bazaar. The costs of marketing have also to be covered. Therefore, the policy adopted in the super bazaar is to charge a slightly lower price for goods whose demand is quite elastic. As a result of the greater sales, the costs are easily covered.
- 5) ***Use of the concept in factor pricing:*** The idea of price elasticity is helpful in explaining the relative share of factors of production in the production process. The factors having price-inelastic demand for the goods they produce can obtain a higher price than those with elastic demand. For example, workers producing petro-products having inelastic demand can easily get their wages raised.
- 6) ***Importance in taxation policy:*** The finance minister often taxes those commodities whose demand is price-inelastic. This increases total expenditure on the commodity and taxation revenue. Similarly in levying indirect taxes, the finance minister taxes those commodities which are having inelastic demand from the rich class. That way, the burden of taxation falls on the richer class.
- 7) ***Pricing policy for public utilities:*** Such enterprises as provide services of mass consumption like water, electricity, postal services, railways and communication are known as public utilities. A suitable price policy for these enterprises is to charge 2 consumers according to their elasticity of demand for

the public utility. Household consumers are charged a higher rate of electricity than industrial consumers because the demand for electricity from households is less elastic compared to that from industrial consumers.

### **A. CHECK YOUR PROGRESS**

#### **Calculate the problem**

Data of Price & Quantity Demanded

<b>Scenario</b>	<b>Price (₹)</b>	<b>Quantity Demanded (units)</b>
A	100	500
B	120	400
C	80	650
D	90	580

**Calculate:**

- 1. Price elasticity of demand**
- 2. Interpret results and**
- 3. Recommend some price strategies based on the above data**



#### 4.4 INCOME ELASTICITY OF DEMAND

The percentage change in amount demanded as a result of a given percentage change in income of a consumer is called Income Elasticity of demand.

According to Watson, “Income elasticity of demand means the ratio of the percentage change in the quantity demanded to the percentage change in income. Income elasticity measures the responsiveness of demand to change in income. It gives us an idea of the sensitivity of demand for a commodity as consumer’s income changes.

$$E_y = \frac{\text{Proportionate change in demand}}{\text{Proportionate change in income}}$$

$$\frac{\frac{\Delta q}{q} \times 100}{\frac{\Delta y}{y} \times 100}$$

$$\frac{y}{q} \times \frac{\Delta q}{\Delta y}$$

Where  $E_y$  is income elasticity of demand,  $\Delta q$  is the change in demand,  $q$  is original demand,  $y$  original income and  $\Delta y$  change in income.

Suppose a consumer’s income is Rs.100, and he purchases 10 kilos of sugar. If his income goes up to Rs. 110, he is prepared to purchase 12 kilos of sugar. We can find the income elasticity of demand here as,

$$= \frac{12 - 10}{10} \times \frac{100}{110 - 100} = 2$$

Since,  $Y = \text{Rs.100}$

$q = 10$  kilos

$$\begin{aligned} @y &= \text{Rs. } 110-100 \\ &= \text{Rs. } 10 \end{aligned} \qquad \frac{100}{10} \times \frac{2}{10}$$

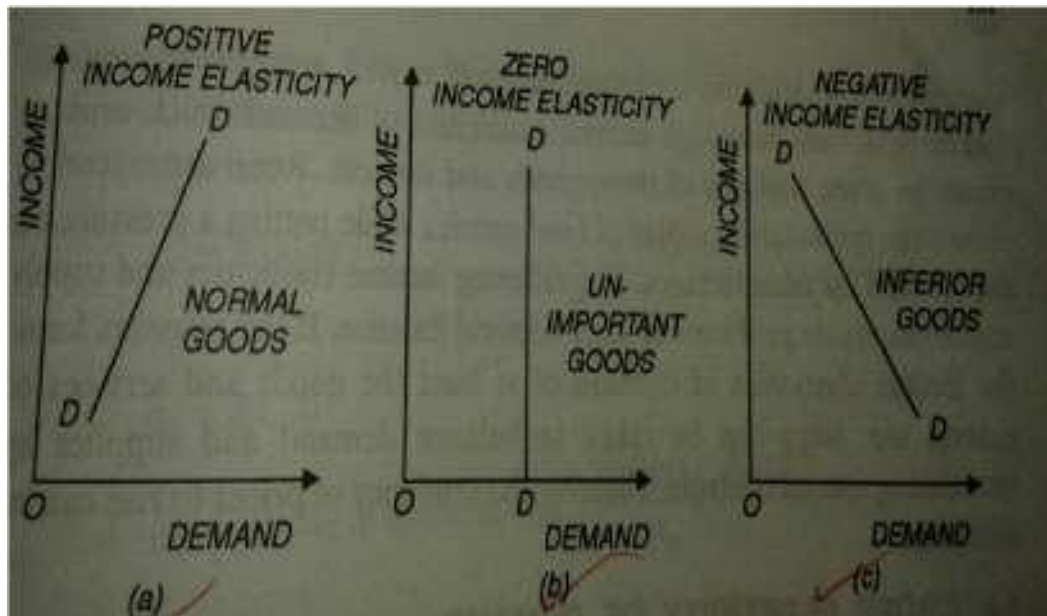
$$@q = 12-10 = 2 \text{ kilos.}$$

Thus, the demand for sugar is 2 which is quite income-elastic.

#### 4.4.1 Types of Income Elasticity

An income demand curve shows the changes in amount demanded in response to changes in income. The response of demand to income changes is classified into three categories:

- I. *Positive income elasticity of demand.* When the amount demanded of a commodity increases with increase in income and vice-versa, the income demand curve will be shown as positively-sloping from left upwards to the right. In this case the commodity is shown on the horizontal axis and income on vertical axis. The commodity is normal. It has a positive income-elasticity as shown in part (a) of the figure 4.2 given below.
- II. *Zero income elasticity.* When the demand for a commodity does not respond to changes in income, it is said to be completely income inelastic. Examples are salt, kerosene oil and post cards. In these cases, the income demand curve is shown as a straight line parallel to the vertical axis, as shown in part (b) of the figure 4.2.
- III. *Negative income elasticity.* When the amount demanded of a commodity diminishes with an increase in income of the consumer, the commodity is said to be an inferior one. In this case, the income demand curve will be shown as sloping from left downwards to the right as shown in part (c) of the 4.2 figure. The food grains such as Jowar and Bajra are inferior goods.



**Fig. 4.2** *Types of Income-demand curves and Income elasticity*

#### 4.4.4 Importance of Income Elasticity

The concept of income elasticity of demand is of theoretical and practical importance.

- 1) ***Use in Capitalist Economies.*** Income elasticity concept occupies an important place among the analytical tools applied for business research. In the U.S.A. the department of commerce has evolved another concept intimately related to income elasticity. This concept is of income sensitivity of consumption expenditure. The main point of difference between the two concepts is that while income elasticity concerns physical units of the commodity purchased, income sensitivity tells us about changes in dollar expenditures. Income sensitivity has a coefficient which measures the percentage increase in dollar expenditure associated with a one percentage change in disposable income in the same period. The income sensitivity estimates are of great use in business forecasting. It has been found that telephone service, automobiles, air-transportation, television repair and foreign travel have

high income sensitivities (co-efficients equal to 1.5 or more) while shoes, clothing, local bus-transportation and dental care have a low income sensitivity (co-efficient less than 0.5).

- 2) ***Importance in planned developing economies.*** In less developed countries like India as level of living rises, demand for some commodities is expected to go up much faster than the demand for others. In the earlier stages income elasticity of demand for food tends to be high. Generally as income rises there is a shortage of food, which when not satisfied leads to inflation. Similarly, in urban areas the demand for comforts like superior foot-wears, auto-cycles and scooters, movies, readymade garments and medical care have high income elasticities of demand which work to create an acute shortage of these goods and services. Rural areas tend to reduce the marketable surplus of food articles while putting a pressure on the demand for manufactures. The differing income elasticities and supply elasticities create problems of inter-sectoral balance. If the planners know the income elasticities of demand of at least the goods and services of general use, steps can be taken to balance demand and supplies by introducing special controls. Thereby, the tendency of prices to rise can be contained.

## **B. CHECK YOUR PROGRESS**

### **Case Study**

**Background:** A premium coffee brand, Caffè Luxe, has been expanding in urban markets. The company observed that as average household income in Metro City rose by 15% over the last year, its monthly sales increased from 10,000 to 12,500 units. However, in smaller towns where income levels remained stagnant, sales growth was negligible. By using the above information answer the following:

**Questions: 1.** Calculate the Income Elasticity of Demand (YED) for Caffè Luxe in Metro City using the percentage method.

$$\text{YED} = \% \text{ change in income} / \% \text{ change in quantity demanded}$$

2. What does this tell you about the nature of the product (necessity, luxury, or inferior)?
3. Is Caffè Luxe income elastic or inelastic?
4. Based on your YED calculation, what pricing or marketing strategies would you recommend as Caffè Luxe plans to expand further? Consider different cities with varying income levels.

#### 4.5 CROSS ELASTICITY OF DEMAND

When the demand for a commodity changes with a change in the price of another related commodity, the case is of Cross Demand. Cross Elasticity of demand measures the responsiveness of demand for a commodity, say tea, when the price of another related commodity, say coffee, changes by a small amount.

In the words of *Liebhafsky*, “The cross elasticity of demand is a measure of the responsiveness of purchases of Y to change in the price of X.” Speaking out more exactly, Prof. Ferguson observes, “The cross elasticity of demand is the proportional change in the quantity of X demanded resulting from a given relative change in the price of the relative good Y.”

Measurement of Cross Elasticity of Demand

$$E_{xy} = \frac{\text{Proportionate change in demand of X}}{\text{Proportionate change in the price of Y}}$$

Writing in symbols:

$$\begin{aligned} E_{xy} &= \frac{\Delta qx}{qx} \div \frac{\Delta py}{py} \\ &= \frac{\Delta qx}{qx} \times \frac{py}{\Delta py} \\ &= \frac{\Delta qx}{\Delta py} \times \frac{py}{qx} \end{aligned}$$

Where p and q have their usual meanings of price and quantity and  $\Delta$  is the small change in it.

Anumerical example will explain the concept further. Suppose the price of coffee rises from Rs.10 per tin of 250 gms to Rs.12 per tin. As a result, consumers' demand for tea, an immediate substitute, rises from 70 kilos to 100 kilos. Then, the cross elasticity of demand of tea for coffee can be calculated as follows:

$$\Delta q_x = 100 - 70 = 30 \text{ kilos.}$$

$$q_y = 70 \text{ kilos.}$$

$$\Delta y_x = \text{Rs. } 12 - \text{Rs. } 10 = \text{Rs. } 2$$

$$p_y = \text{Rs. } 10$$

Therefore, the Cross elasticity of demand in this case = 2.14

#### **4.6.1 Classification of Commodities through Cross Elasticity**

Cross elasticity of demand can be used to classify goods into three types:

1. *Substitute goods.* Examples of substitute goods are tea and coffee. The cross elasticity of demand for these goods is positive, because a rise in the price of tea will raise the demand for coffee. The rise in demand for coffee as a result of the rise in the price of tea will give a positive coefficient of cross elasticity.

2. *Independent goods.* Such goods as eggs and diesel engines have no price relationship with one another. If eggs go cheaper; the demand for diesel engines remains unaffected. The value of cross elasticity in such cases is zero; these are, therefore, called ‘independent goods’.
3. *Complementary goods.* Milk and sugar are examples of complementary goods. When the price of milk rises, its demand falls. Since sugar is used along with milk, demand for sugar will also fall. The value of cross elasticity in this case will be negative because the price of milk and the demand for sugar move in opposite directions.

#### 4.7 METHODS OF MEASURING ELASTICITY OF DEMAND

Elasticity of demand can be measured through three popular methods. These are:

- Total Expenditure Method
- Graphical Method
- Mathematical Method

##### 4.7.1 Total Expenditure Method

Elasticity of demand can be measured from the changes in the expenditure of the consumers on the commodity as its price changes also known as the outlay method, given by Marshall. He distinguished between three separate cases of changes in total outlay resulting from a change in the price of the commodity. These three cases can be shown with the help of a table 4.1.

In Table 4.1, the price of the commodity goes down from rupees ten to rupee one. Suppose the amount demanded increases from one kilogram to ten kilograms. We can easily calculate the resulting changes in total outlay. These changes can be easily classified into three parts as shown in the table given below:

In table 4.1, three separate cases of price elasticity of demand are easily traced out.

- (i) If with a (small) change in price of the commodity total expenditure by consumers on its purchase remains the same, then the elasticity of demand within that range of price change is equal to one.

- (ii) If with a 'small' fall in the price of the commodity total expenditure on it also falls, the elasticity of demand in that range of price change is said to be less than one. That is, if total outlay and price move in the same direction elasticity of demand is taken to be less than one. For example, in the lowest part of the given table, this is the case.

**Table 4.1**

Price	Amount demanded	Total expenditure	Elasticity of demand	Direction of Price	Direction of total expenditure
Rs.	Kilos	Rs.			
10	1	10	Greater than Unity	Down	Increasing
9	2	18			
8	3	24			
7	4	28			
6	5	30	Equal to Unity	Down	Constant
5	6	30			
4	7	28	Less than Unity	Down	Decreasing
3	8	24			
2	9	18			
1	10	10			

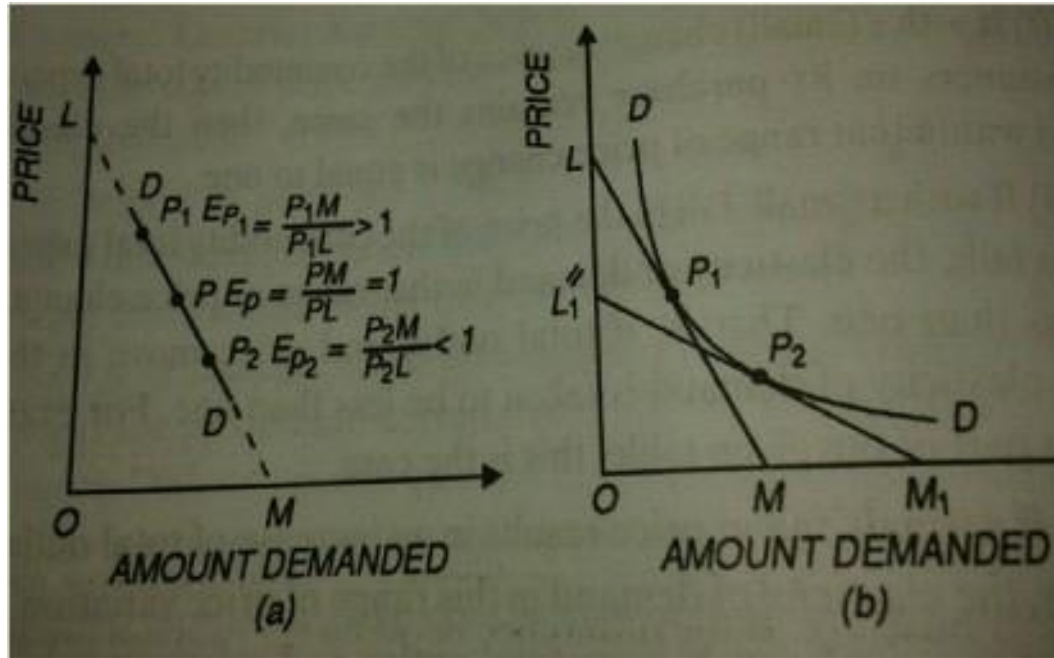
- (iii) If a 'small' fall in the price results in an increase of total outlay on the commodity, the elasticity of demand in this range of price variation is said to be greater than one. In such cases total outlay and price move in opposite directions. This is the case in our table in the first part.

#### 4.7.2 Graphic Method

The second popular method for measuring elasticity of demand was also given by Marshall. In this method we make use of a demand curve drawn on a graph. Therefore, it is called the graphic method or the Geometrical method. The method can be illustrated with the help of a Figure 4.3.



In the figure 4.3, we have a straight line demand curve in the (a) portion of the diagram and a curve convex to the origin in part (b). We can illustrate the method of finding out the price elasticity at any point of the demand curve.



**Figure 4.3: Measuring Price Elasticity of Demand Geometrically.**

Let us take the straight line demand curve  $DD$  in part (a). We join both sides of the straight line demand curve with the two axes at points  $L$  and  $M$ . Elasticity at any point  $P$  is equal to the ratio of the distance from the point  $P$  to the X-axis and the distance to the Y-axis. In the diagram the point  $P$  is half way between  $M$  and  $L$ .

$$\text{Elasticity of Demand} = E_p = \frac{PM}{PL} \text{ (because } PM \text{ is equal to } PL \text{)} = 1.$$

Similarly, at the point  $P_1$ , elasticity of demand is equal to  $P_1M/P_1L$ . Here elasticity is greater than one because the point  $P_1$  is higher than the mid-point  $P$ . Elasticity at the point  $P_2$  is given as  $P_2M_1/P_2L_1$ , which is less than one.

In the part (b) of the figure we have the convex demand curve  $DD$ . Suppose we

want to find out price elasticity at the point  $P_1$ . For this we draw a tangent  $LM$  at the point  $P_1$ . The elasticity is found easily as  $P_1M/P_1L$ . Similarly, for finding out elasticity at the point  $P_2$  we draw a tangent at this point to the demand curve. The elasticity at this point is given by the ratio of the distance along the tangent to the X-axis divided by the distance to the Y-axis.

It should be remembered that the method of measuring price elasticity given above is designed to measure it around a point for small changes in price. Therefore, this measure is also called the point elasticity measure.

### C. CHECK YOUR PROGRESS

#### Short Answer Type Questions

Q1. What is the formula for calculating Cross Elasticity of Demand

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 .....  
 .....

Q2. Give one example of two goods that have negative cross elasticity of demand.

.....  
 .....  
 .....

Q3. Differentiate between substitute and complementary goods using cross elasticity.

.....  
 .....  
 .....

### 4.7.3 Mathematical Method

In this method, price elasticity is estimated by dividing the percentage change in amount demanded by the percentage change in price of the commodity. If the proportionate (percentage) change in amount demanded is higher than the percentage change in price, elasticity will be greater than one. In a mathematical form we can write:

$E_p$  = Price elasticity of Demand

= Proportionate change in Demand / Proportionate change in Price

= Change in Demand / Change in Price  $\times$  Original Demand / Original Price

The formula for price elasticity of demand given above suggests three different ways of finding out the proportionate change in demand and the proportionate change in price.

The first commonly adopted procedure is what Marshall called the point elasticity measure. If the difference between the original price and the new price is very small, then we get point elasticity measure through the above formula.

As Leftwich has also remarked, "Elasticity computed at a single point on the curve for an infinitely small change in price is point elasticity."

The formula given above tells us that price elasticity of demand is not simply a coefficient or the slope of a curve of demand for the commodity. It is a ratio of the proportionate change in demand divided by the proportionate change in price. If we write  $q$  for the

original demand and  $p$  for the original price, then  $\Delta p$  and  $\Delta q$  denote the absolute changes in demand and price respectively.

$$E_p = \frac{\Delta q}{q} \div \frac{\Delta p}{p}$$

$$= \frac{\Delta q}{q} \times \frac{p}{\Delta p}$$

$$\frac{\text{Original Price}}{\text{Original Demand}} \times \frac{\text{Change in Demand}}{\text{Change in Price}}$$

Learning objectives and inputd

This shows that

$\frac{\partial Q}{\partial P}$  represents the slope of \_\_\_\_\_  
 $\frac{\partial Q}{\partial P}$  the demand curve which has  
to be

multiplied with the ratio of price to quantity so as to get the estimate of price elasticity. Thus, it should be clear that we cannot judge elasticity from the slope of a demand curve alone.

Some writers such as Schnider and Bilas have suggested that we must not just take the original price or original demand in finding out price elasticity. It will be better if we take the lower value of the price elasticity of the original price and the lower value of demand instead of the original demand. Taking lower values of  $Q$  and  $P$  will ensure a lower value of the price elasticity. It will avoid unnecessary, over-estimation of price elasticity.

#### **4.8 LET US SUM UP**

Elasticity of demand is the measure of the degree of change in the amount demanded of the commodity in response to a given change in price of the commodity, prices of some related goods or changes in consumers' income.

Elasticity of demand can be mainly of three types viz., price, income and cross elasticity of demand.

Price elasticity of demand is commonly called the elasticity of demand. This is because price is the most changeable factor influencing demand. Elasticity of Demand for different commodities is different. Some commodities have more elastic demand while others have relatively inelastic demand. Elasticity of demand may have a value from zero to infinity.

Price elasticity of demand depends upon a number of factors such as availability of substitutes, nature of the commodity, number of uses of the commodity, level of income of the consumers of the commodity, time period, Joint demand etc.

Price elasticity of demand is a very useful concept for producers, farmers, workers and the Government.

The percentage change in amount demanded as a result of a given percentage change in income of a consumer is called Income Elasticity of demand.

The response of demand to income changes is classified into three categories, as positive income elasticity of demand, zero income elasticity of demand, and negative income elasticity of demand.

When the demand for a commodity changes with a change in the price

of another related commodity, the case is of Cross Demand. Cross Elasticity of demand measures the responsiveness of demand for a commodity, say tea, when the price of another related commodity, say coffee, changes by a small amount.

Elasticity of demand can be measured through three popular methods like Total Expenditure Method, Graphical Method, and Mathematical Method. Elasticity of demand can be measured from the changes in the expenditure of the consumers on the commodity as its price changes also known as the outlay method, given by Marshall.

The second popular method for measuring elasticity of demand was also given by Marshall. In this method we make use of a demand curve drawn on a graph. Therefore, it is called the graphic method or the Geometrical method.

In mathematical method, price elasticity is estimated by dividing the percentage change in amount demanded by the percentage change in price of the commodity. If the

proportionate (percentage) change in amount demanded is higher than the percentage change in price, elasticity will be greater than one.

#### 4.9 GLOSSARY

- **Price Elasticity of Demand (PED):** Measures the responsiveness of quantity demanded to a change in the product's own price.
- **Elastic Demand:** Demand that changes more than proportionately with a change in price ( $PED > 1$ ).
- **Inelastic Demand:** Demand that changes less than proportionately with a change in price ( $PED < 1$ ).
- **Income Elasticity of Demand (YED):** Measures the responsiveness of demand to changes in consumer income.
- **Cross Elasticity of Demand (XED):** Measures the responsiveness of demand for one good to a change in the price of another good.
- **Substitute Goods:** Goods that can replace each other; an increase in the price of one leads to increased demand for the other.

#### 4.10 SELF ASSESSMENT QUESTIONS

1. Explain any five factors determining price elasticity of demand?

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2. What do you understand by price elasticity of demand? How is it measured?

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3. Show the different degrees of elasticity of demand with the help of a Diagram?

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#### **4.11 LESSON END EXERCISE**

1. Explain the concept of Price Elasticity of Demand. What are its different degrees, and how do they affect total revenue?
2. Define and distinguish between income elasticity and cross elasticity of demand. Give suitable examples to illustrate your answer.
3. What are the main factors that influence the price elasticity of demand for a product? How can businesses use this knowledge in decision-making?

#### **4.12 SUGGESTED READINGS**

- Advanced Economic Theory. Micro Economic Analysis, Ahuja, H.L., 2012, S. Chand and Company Ltd, New Delhi.
- Principles of Economics, Mishra and Puri, 2007, Himalaya Publishing House, New Delhi.
- Economic Theory, Chopra, P.N., 2005, Kalyani Publishers New Delhi.

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## **SUPPLY FUNCTION**

### **STRUCTURE**

- 5.0 Learning Objectives and Learning Outcomes
- 5.1 Introduction
- 5.2 Supply
  - 5.2.1 Concept of Supply
- 5.3 Law of Supply
  - 5.3.1 Changes in Supply
  - 5.3.2 Elasticity of Supply
  - 5.3.3 Degrees of Elasticity
- 5.4 Determinants of Supply
- 5.5 Let Us Sum Up
- 5.6 Glossary
- 5.7 Self-Assessment Questions
- 5.8 Lesson End EXERCISE
- 5.9 Suggested Reading

## **5.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

The specific objectives of this chapter are:

- To define the concept of supply.
- To explain law of supply and elasticity of supply.
- To express factors affecting supply.

### **Learning Outcomes**

After studying this chapter, learners will be able to:

- Define the concept of supply with clarity and examples.
- Explain the law of supply and identify the nature of the supply curve.
- Understand and calculate elasticity of supply.
- Analyze the key factors that influence market supply.
- Apply the concepts of supply to real-world business and economic situations.

## **5.1 INTRODUCTION**

As demand is defined as a schedule of the quantities of good that will be purchased at various prices, similarly the supply refers to the schedule of the quantities of a good that the firms are able and willing to offer for sale at various prices. How much of a commodity the firms are able to produce depends on the resources available to them and the technology they employ for producing a commodity. How much of a commodity the firms will be willing to offer for sale depends on the profits they expect to make on producing and selling the commodity. Thus, the supply refers to the entire relationship between the price of a commodity and the quantity supplied at various possible prices.

## **5.2 SUPPLY**

The concept of supply occupies an important place in economic theory. Supply of a commodity influences price as does the demand. Economists use the word 'supply' with different connotations. It may mean 'total supply' in the market, *i.e.*, the sum total of supply available with the retailers and wholesalers or it may mean supply held by the wholesalers or may refer to the total amount of the commodity produced during a season. It is necessary to clarify the meaning of the word 'supply' as it is used in economics.

Supply should be carefully distinguished from stock. The amount of a commodity that a seller is willing to supply at a given price is known as supply. As against this, a quantity which a seller can place on the market for sale when demanded is termed as stock. Thus, supply constitutes a part of the stock of the commodity which is offered for sale in the market. Supply need not be equal to stock. A producer may keep back a part of total output produced by him during a given period of time. Besides, the supply in the

market may exceed current production if past stocks are unloaded along with the present production. On the other hand, supply may fall short of current production to the extent to which a part of the current production is held back for building up stock.

### 5.2.1 Concept of Supply

Supply means the various amounts of the commodity, other things remaining constant, the sellers are willing and able to sell at different prices at any moment of time or during any one period of time. In the words of Prof. Bach, "Supply is a schedule of amounts that will be offered for sale at different prices during any given time period, other factors remaining unchanged." The phrase "other factors remaining unchanged" is a very important qualification to be taken note of. In fact the amount of a commodity which sellers are willing to sell depends upon a number of factors like price of that commodity, prices of factors of production, state of technology, supply of co-operant factors etc. But for our purpose, supply is taken as function of price alone, all other factors remaining the same.

## 5.3 LAW OF SUPPLY

Supply is said to be functionally related to price. According to the law of supply, other things remaining the same, as the price of a commodity rises, its supply is extended and as the price falls its supply is contracted. In the words of Prof. Lipsey, "*Ceteris paribus*, the quantity of a commodity produced and offered for sale will increase as the price of the commodity rises and decreases as the price falls".

The law of supply establishes a direct relationship between price and quantity supplied, *i.e.*, the higher the price, the larger is the supply; the lower the price, the smaller is the supply.

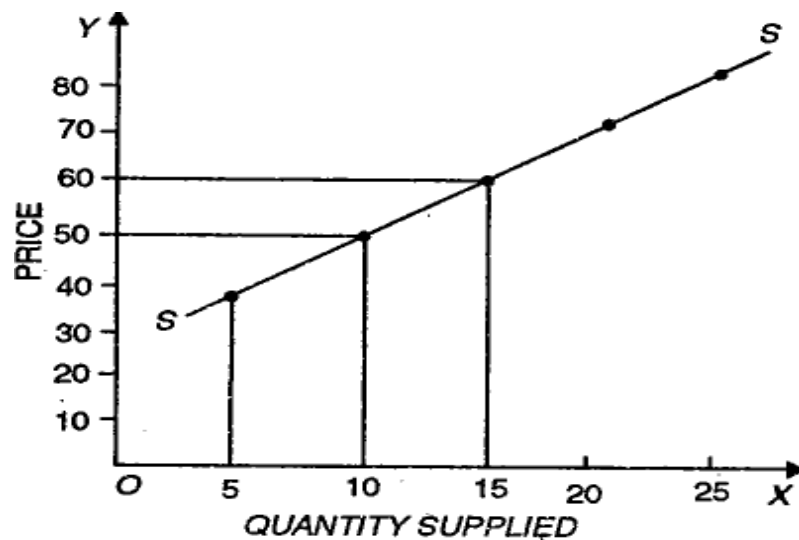
The following is the market supply schedule (Fig. 5.1) of commodity *X*. It is the sum total of individual supply schedules. It shows the various quantities of the commodity *X* that are offered for sale in the market at alternative prices.

It is evident from the study of market supply schedule and the supply curve that higher the price more quantity will be supplied and vice versa. The supply curve slopes upwards from left to right showing that price and quantity supplied move in the same direction.

A supply curve can be a straight line or a curve. For simplicity in the figure given below we have dealt with a straight line curve. The things that are kept constant in defining supply schedule and in drawing a supply curve are: the technology in the production of the commodity, the supplies of inputs, climate and weather conditions, wages, interest, prices, of machinery, prices of raw materials etc.

**Table 5.1: MARKET SUPPLY SCHEDULE FOR COMMODITY X**

Price per Quintal Rs.	Number of Quintals Supplies
40	5
50	10
60	15
70	20
80	25



*Figure 5.1 The Market Supply Curve*

There are of course, exceptions to the law of supply. It is just possible that in the case of some commodities supply may not change in response to a change in price. For example, the supply of paintings by Raphael is fixed for all times. The law of supply does not apply here. It may also happen that in some cases, as the price rises, sellers may choose to sell smaller quantity than before. The backward sloping supply curve of labour illustrates the above mentioned case. The workers have a low standard of living and have fixed needs. When wages rise, they are able to satisfy their meagre wants by working less hours or days in a month. So higher wages induce increased absenteeism on the part of workers. This means that as wages rise, supply of labour falls off.

### **A. CHECK YOUR PROGRESS**

#### **Multiple Choice**

**1. Which of the following best defines supply?**

- A. The desire to buy goods at any price
- B. The ability to sell goods regardless of market demand
- C. The quantity of a good sellers is willing and able to offer for sale at various prices
- D. The consumption of goods and services by consumers

**2. The Law of Supply states that:**

- A. As the price increases, supply decreases
- B. As the price increases, supply increases
- C. Supply remains constant at all prices
- D. Price and supply are unrelated

**3. Which of the following is NOT a determinant of supply?**

- A. Cost of production
- B. Price of related goods
- C. Consumer income
- D. Government policies

**4. An upward sloping supply curve indicates:**

- A. A decrease in demand
- B. A decrease in cost
- C. A direct relationship between price and quantity supplied
- D. That supply is not affected by price

**5. What happens to the quantity supplied when the price falls, according to the law of supply?**

- A. It increases
- B. It remains the same
- C. It decreases
- D. It doubles

**Answers:**

1. C                      2. B                      3. C                      4. C                      5. C

## 5.4 Changes in Supply

While defining the law of supply, we assume “other things remain unchanged”. This phrase implies that there is no change in the methods of production, availability of other inputs, climate and weather conditions, cost of production and all other variables which exert their influence on supply. Thus, we normally maintain that other things remaining the same, the law of supply holds good. But other things seldom remain the same. A change in ‘other things’ will be attended by either an increase in supply or decrease in supply.

### I. Increase in Supply

Increase in supply is there when (a) at the same price more is offered for sale; and (b) the same quantity is offered at a lower price. We will illustrate increase in supply in the following figures. In both these figures,  $SS$  is the original supply curve and  $S_1S_1$  is the new supply curve. In Figure 5.2 (a), at price  $OP$  supply equals  $OR$ . It is just possible that with a change in real conditions supply increases to  $OT$ . This increase in supply from  $OR$  to  $OT$  at the same price is not due to a rise in price but due to change in other variables, such as reduction in the cost of production, adoption of better techniques etc. In Fig. 5.2 (b) where the producer supplies the same amount at lower price, supply, curve shifts from  $SS$  to  $S_1S_1$ . In both these figures supply curve shifts to the right showing that more is supplied at the same price or same is supplied at a reduced price.

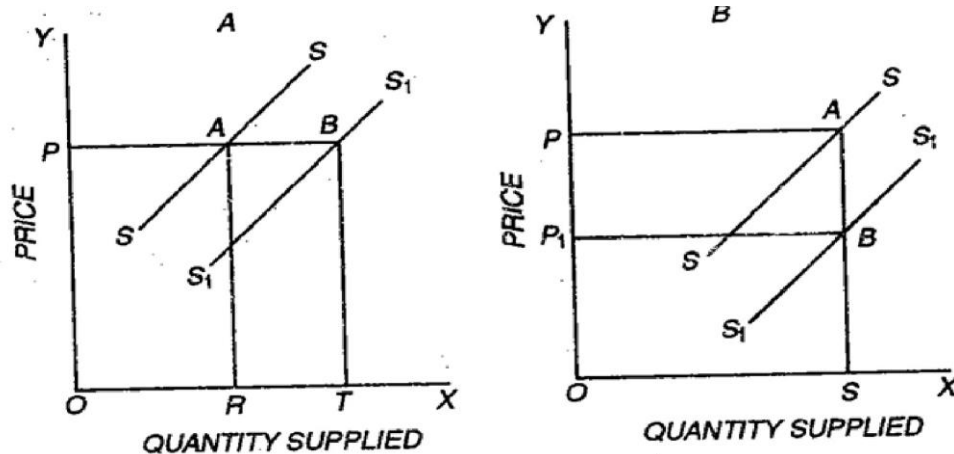


Fig. 2. Increase in Supply

## II. Decrease in Supply

In the case of decrease in supply, either less is supplied at the same price or same amount is supplied at a higher price. In both these cases, supply curve shifts to the left as is shown in Figures 5.3.

In both of these figures,  $SS$  is the original supply curve whereas  $S_2S_2$  is the supply curve after the change in supply. In Fig. 5.3 (a) initially the producers supplied  $ON$  amount at  $OP$  price. But now they supply less *i.e.*,  $OM$  at the same price, because supply curve shifts from  $SS$  to  $S_2S_2$ . In Fig. 5.3(b), the producers supply the same amount *i.e.*,  $OM$  despite a rise in price from  $OP_1$  to  $OP$ . It is decrease in supply because supply curve also shifts upwards and to the left.

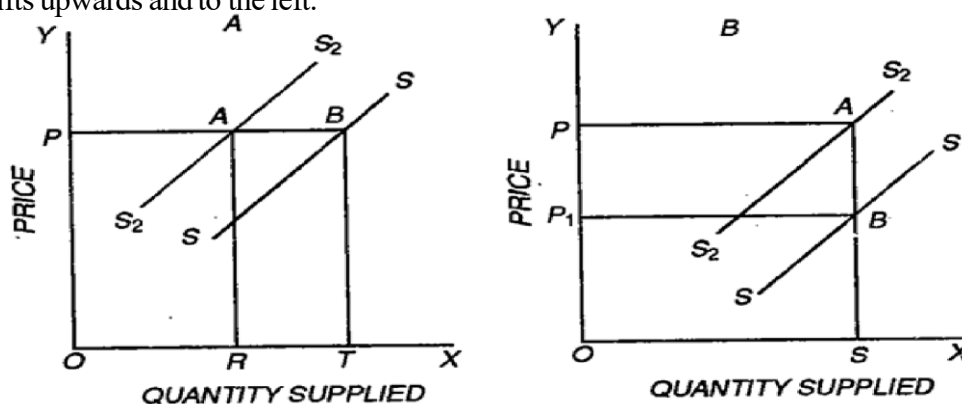


Figure 5.3. Decrease in Supply



We must carefully understand the distinction between an increase in supply and extension of supply and also between decrease in supply and contraction of supply. Extension of supply means that more is being offered for sale at a high price and contraction of supply means that less is supplied at reduced price. These are shown on the same supply curve whereas increase or decrease in supply is shown by shifts in the supply curve either downwards or upwards.

### **B. CHECK YOUR PROGRSS**

#### **Fill in the Blanks**

1. An increase in supply is represented by a shift of the supply curve to the \_\_\_\_\_.
2. A decrease in supply means that producers are willing to supply \_\_\_\_\_ quantity at each price level.
3. Changes in supply occur due to \_\_\_\_\_ factors like technology, input prices, and government policies.
4. A rightward shift of the supply curve indicates a(n) \_\_\_\_\_ in supply.
5. When supply decreases, the supply curve shifts to the \_\_\_\_\_.

#### **Answers:**

- |          |         |              |             |
|----------|---------|--------------|-------------|
| 1. Right | 2. Less | 3. Non-price | 4. Increase |
| 5. Left  |         |              |             |

### **5.1.1 Elasticity of Supply**

Elasticity of supply of a commodity measures the responsiveness of the quantity supplied to changes in price. It measures the degree to which price is effective in calling forth or holding back the quantity. In the words of Boulding. “The relationship between price and quantity supplied is rather like the relation between a whistle and a dog, the louder the whistle, the faster comes the dog; raise the price and the quantity supplied increases. If the dog is responsive, in economic terminology elastic, quite a small upsurge in the whistle will send him bounding along. If the dog is unresponsive or inelastic, we may have to whistle very loudly before he comes along at all. We need, therefore, a quantitative

measure of this responsiveness of quantity to changes in price. One such measure is elasticity”. In technical terms, the coefficient of price elasticity of supply measures the percentage change in the quantity supplied of a commodity per unit of time resulting from a given percentage change in the price of the commodity.

$$\begin{aligned}\text{Elasticity of supply} &= \frac{\text{percentage change in supply (Qx)}}{\text{percentage change in price (Px)}} = \frac{\Delta Qx}{Qx} \div \frac{\Delta Px}{Px} \\ &= \frac{\Delta Qx}{\Delta Px} \times \frac{Px}{Qx}\end{aligned}$$

### 5.1.2 Degrees of Elasticity

There are five types of elasticity of supply. They are as follows:

1. **Perfectly Elastic Supply.** Perfectly elastic supply is one in the case of which a slight change in price is attended by an infinite change in supply. Such a supply curve runs parallel to the X-axis as is shown in figure given below Fig. 5.4 (a) the supply curve *SS* runs parallel to X-axis showing that an infinite small change in price causes an infinitely large change in the quantity supplied.

2. **Perfectly Inelastic Supply.** A perfectly inelastic supply is one in the case of which supply is completely non responsive to changes in price. Such a supply curve runs parallel to y-axis. For example refer to Fig. 5.4(b). In this figure, supply curve *SS* runs parallel to Y-axis showing that quantity-supplied does not change at all in response to a change in price.

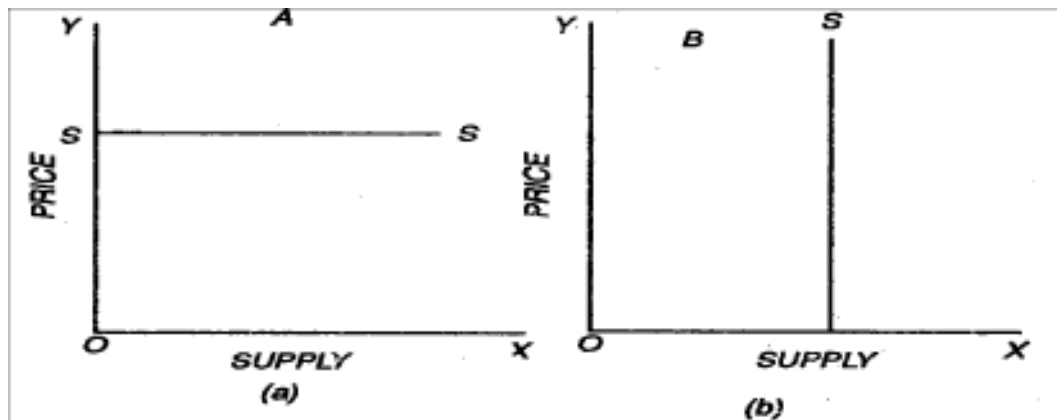


Figure 5.4 (a) Perfectly elastic supply, (b) Perfectly Inelastic Supply

3. **Relatively Elastic Supply.** A relatively elastic supply is one in the case of which a

given change in price produces more than proportionate change in quantity supplied. For example, a supply is relatively elastic if a doubling of price will result in more than double the quantity supplied. In Fig. 5.5(a), a given change in price from  $OP$  to  $OP_1$  is attended by a much more change in supply, that is from  $OS$  to  $OS_1$ . Hence supply curve  $SS$  is relatively elastic.

4. **Relatively Inelastic Supply.** A relatively inelastic supply curve is one in which a given change in price is attended by a less than proportionate change in quantity supplied. In this case, two per cent rise in price will produce less than two per cent rise in quantity supplied. Refer to Figure 5.5(b). According to this figure, a rise in price from  $OP_1$  to  $OP$  brings about less than proportionate change in supply from  $OS_1$  to  $OS$ . Hence supply curve  $SS$  is relatively inelastic.

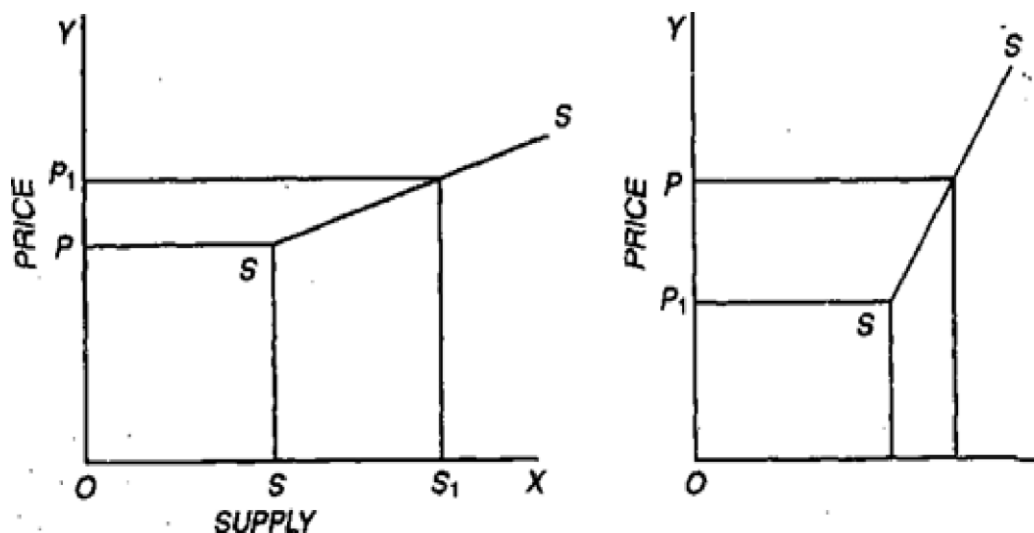


Figure 5.5 (a) Relatively elastic Supply; 5.5 (b) Relatively Inelastic Supply

5. **Unitary Elastic Supply.** If a proportionate change in supply equals the proportionate change in price, then, elasticity of supply equals unity. In Fig. 5.6,  $SS$  is the unitary elastic supply curve. Increase in price from  $OP$  to  $OP_1$  is attended by a proportionate change in supply from  $OS$  to  $OS_1$ .

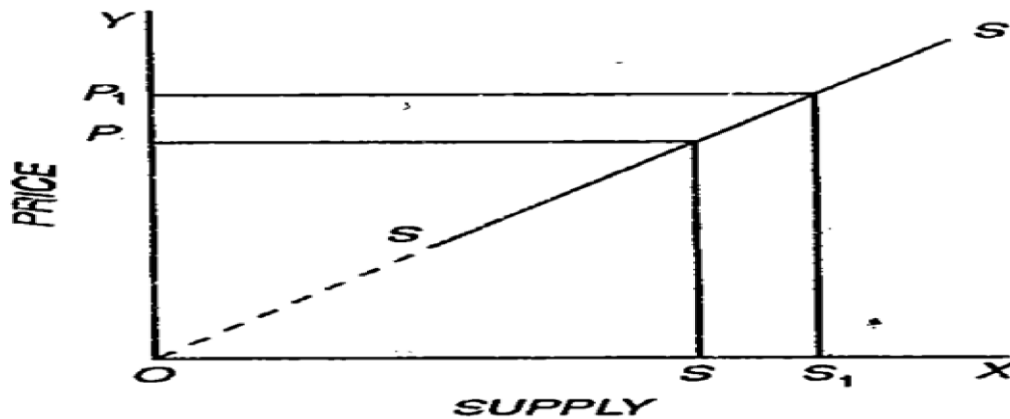


Figure 5.6. Unitary Elastic Supply

### C. CHECK YOUR PROGRESS

#### Case Study

**Background:** In the southern region of Country X, tomato farming is a key agricultural activity. After an unexpected dry spell, tomato production drops significantly. Prices in the market suddenly double due to the shortage. However, only a small increase in the quantity supplied is observed over the next month.

**Scenario:** Farmers explain that increasing supply quickly is not possible because growing tomatoes takes time, and the land and labor resources are already fully utilized. Some farmers try to shift resources to grow more tomatoes, but most cannot adjust production until the next season.

#### Questions:

1. Based on the case, is the supply of tomatoes elastic or inelastic in the short run? Why?
2. Explain how time affects the elasticity of supply in agricultural markets like this one.
3. What could be done in the long term to make the supply of tomatoes more elastic?

## 5.2 DETERMINANTS OF SUPPLY

Increase or decrease in supply may be brought about by a number of factors.

- 1) ***Change in the Cost of Production*** : A in the cost of production may affect the position of supply curve. An increase in costs will shift the supply curve upwards indicating a decrease in supply. Conversely, a fall in the cost of production may enable the producer to supply more at the same price. In that case supply curve shifts downwards.
- 2) ***Technological Progress***. Technological progress by lowering the cost of production may enable the producer to supply more at the same price. In this case the supply curve will shift downwards and to the right.
- 3) ***Discovery of new sources of raw material***. Discovery of new sources of raw material and exploitation of new mines may enable the producers to supply more at the same price. As against this, with the progressive depletion of existing sources of basic materials, supply of the commodity may decrease.
- 4) ***Complementary Relationship***. It is just possible that production of one commodity may result in the production of another commodity as in the case of wool and beef. This happens in the case of joint goods. If the production of one is increased, the supply curve of other commodity will shift downwards and to the right.
- 5) ***Natural Factors***. The supply of agricultural commodities depends upon a number of natural factors. The supply of agricultural products may change because of a change in rainfall, weather conditions, Supply of other inputs etc. Adequate and timely rainfall, improvement in irrigation facilities, adequate supply of manures, better seeds and fertilisers may enable the agriculturists to increase the supply. On the contrary, failure of rains, floods, pests and deterioration in the technology will decrease the supply.
- 6) ***Intensity of desire for self- Consumption***. A change in the intensity of desire of producers for their own product will bring about a change in the supply. For example, if milk producers decide to drink less milk themselves the supply of milk will increase.

- 7) ***Change in the price of Substitutes.*** A fall in the price of a substitute commodity and its fall in production may also cause the supply of the commodity to increase, for the production of the substitute will be less profitable and resources previously used in making the substitute will turn to the now relatively higher priced commodity.
- 8) ***Means of Transport.*** Changes in the costs of transport and communications also bring about changes in the supply. Improvement in means of transport results in the extension of market for the commodity. This affects the supply of the commodity under consideration.
- 9) ***Political and Social Factors.*** Changes in political and social factors also bring about changes in the supply of the commodities. Deterioration in law and order situation and political uncertainty adversely affect the supply.

## 5.5 LET US SUM UP

The concept of supply occupies an important place in economic theory. Supply of a commodity influences price as does the demand. Economists use the word 'supply' with different connotations. . It is necessary to clarify the meaning of the word 'supply' as it is used in economics.

Supply means the various amounts of the commodity, other things remaining constant, the sellers are willing and able to sell at different prices at any moment of time or during any one period of time.

According to the law of supply, other things remaining the same, as the price of a commodity rises, its supply is extended and as the price falls its supply is contracted. In the words of Prof. Lipsey, "*Ceteris paribus*, the quantity of a commodity produced and offered for sale will increase as the price of the commodity rises and decreases as the price falls".

The supply curve slopes upwards from left to right showing that price and quantity supplied move in the same direction.

While defining the law of supply, we assume "other things remain unchanged". We normally maintain that other things remaining the same, the law of supply holds good. But other things seldom remain the same. A change in 'other things' will be attended by either

an increase in supply or decrease in supply.

Elasticity of supply of a commodity measures the responsiveness of the quantity supplied to changes in price. It measures the degree to which price is effective in calling forth or holding back the quantity. In technical terms, the coefficient of price elasticity of supply measures the percentage change in the quantity supplied of a commodity per unit of time resulting from a given percentage change in the price of the commodity.

Further, increase or decrease in supply may be brought about by a number of factors, and these are; Change in the Cost of Production, Technological Progress, Discovery of new sources of raw material, Complementary Relationship, Natural Factors, Change in the price of Substitutes etc.

## 5.6 Glossary

- **Supply:** The quantity of goods a producer is willing and able to offer for sale at different prices.
- **Law of Supply:** States that quantity supplied increases with price, all else being equal.
- **Elasticity of Supply:** Measures how much the quantity supplied responds to a change in price.
- **Change in Supply:** Refers to a shift of the entire supply curve due to non-price factors.
- **Supply Curve:** A graphical representation showing the relationship between price and quantity supplied.
- **Determinants of Supply:** Factors such as input costs, technology, and government policy that influence supply.

## 5.7 SELF ASSESSMENT QUESTIONS

1. Explain the law of supply with the help of a supply schedule and supply curve?

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2. Explain determinants of the market supply of a commodity?

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3. What are the exceptions to the law of supply?

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## **5.8 LESSON END EXERCISE**

1. Explain the Law of Supply with the help of a supply schedule and diagram. Also discuss its assumptions and exceptions.
2. Define elasticity of supply. Describe the factors that affect elasticity of supply and explain its importance in managerial decision-making.

## **5.9 SUGGESTED READINGS**

- Advanced Economic Theory. Micro Economic Analysis, Ahuja, H.L., 2012, S. Chand and Company Ltd, New Delhi.



- Business Economics, Chopra P.N., Kalyani Publishers, New Delhi.
- Micro Economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

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# CONSUMER BEHAVIOUR

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**B.Com. Semester-I**

**Unit-II**

**C. No. BCG-103**

**LESSON No. 6**

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## UTILITY ANALYSIS

### STRUCTURE

6.0 Learning Objectives and Outcomes

6.1 Introduction

6.2 Cardinal Utility analysis

6.2.1 Assumptions

6.3 Law of Diminishing Marginal Utility

6.3.1 Explanation

6.3.2 Assumptions

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6.3.4 Limitations

6.4 Let us Sum up

6.5 Glossary

6.6 Self-Assessment Questions

6.7 Lesson End Exercise

6.8 Suggested Reading

## **6.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

After reading this chapter, you will be able:

- To define utility analysis and cardinal utility analysis.
- To explain the concept of diminishing marginal utility.

### **Learning Outcomes**

After completing this chapter, learners will be able to:

- Accurately define utility, total utility, and marginal utility using the cardinal utility approach.
- Illustrate and explain the Law of Diminishing Marginal Utility with the help of examples and schedules.
- Differentiate between total utility and marginal utility in decision-making contexts.
- Apply the concept of marginal utility to understand consumer behavior and rational consumption choices.
- Analyze how diminishing marginal utility forms the basis for demand theory and the downward-sloping demand curve.

## **6.1 INTRODUCTION**

We have already studied the concepts of individual and market demand. But why does the consumer behave as he does? What **is it** that governs his decisions to increase or decrease the demand for various goods and services? Why is it that a consumer would

like ordinarily to purchase more of a commodity when its price falls and less when its price rises? The answers to these questions are not easy to formulate scientifically; these comprise what is popularly called the Theory of demand, or the Theory of Consumer's Demand or also the Theory of Consumer Choice. The main aim, therefore, of the theory of demand is to explain consumer's demand to establish the Law of Demand. Since the law of demand is nothing but a statement of the tendency on the part of an individual consumer to adjust his purchases when price changes (or income changes). From time to time, different theories have been advanced to explain consumers' demand for a product and derive the law of demand which establishes an inverse relationship between price and quantity demanded for product and derive a valid demand theorem. Cardinal utility analysis is the oldest theory of demand which provides an explanation of consumers' demand for a product. Though cardinal utility analysis approach is very old, its final shape emerge in the hands of Alfred Marshall.

## **6.2 CARDINAL UTILITY ANALYSIS**

This approach to the theory of demand was started by the classical economists of the late eighteenth and nineteenth centuries but matured at the hands of the twentieth century economists, the neo-classical like Marshall and Pigou. The basic idea of this approach is that a consumer buys a certain commodity or service because of its utility i.e. the power that it possesses to satisfy his want. Every economic good is supposed to have the property of satisfying a particular want of a consumer, whatever the nature of want.

Liquor and cigarettes satisfy drunkards and smokers and, thus, possess utility although they may be harmful for them.

Utility is an economic concept that differs from the pleasure and usefulness a commodity may give to an individual. It was assumed by the neo-classical that utility which a consumer derives out from a commodity is identical with the satisfaction he expects to get out of its consumption. It can be measured cardinally; it is possible to know exactly the number of units of utility that a commodity or service contains for the consumer.

The cardinal utility analysis of demand made many bold assumptions besides the one that utility is cardinally measurable. (1) The consumer is thought to be rational in that he is deemed to make deliberate calculations and consistent choices: that if he prefers A

to *B*, and *B* to *C*, then he does not prefer *C* to *A*. (2) He is also assumed to maximise utility under given circumstances. Further, it is assumed that his wants and subjective utilities of commodities are not influenced by prices. The consumer does not buy a commodity simply because its price is very high or very low. (3) The biggest assumption of the cardinal utility approach is the ‘law of diminishing marginal utility’, which is the generally felt and observed fact that the marginal utility of a commodity falls, other things remaining the same as consumer buys more and more of it. (4) This law itself is further based on many assumptions; the units of commodity must be appropriate, that the tastes of the consumer do not change, that it is possible to know somehow the marginal utility of a commodity and that utilities of different commodities are independent of each other, *i.e.*, the commodities are neither substitutes nor complements.

### **6.2.1 Basic Assumptions of Cardinal Utility Analysis**

The cardinal utility analysis of demand was based on some explicit assumptions.

1. **The Cardinal Measurability of Utility-** The exponents of the analysis believed that every economic good gives utility to the consumer when he consumes it. And this utility is cardinally measurable; that is utility derived by the consumer can be stated in quantitatively terms. It was also held that the consumer can tell how much more or less utility he gets from one amount of one commodity over some amount of another commodity. The assumption was that utility is quantitatively measurable and comparable.
2. **Independence of Utilities of Different Goods-** Another assumption of marginal utility analysis is that the utilities of different commodities are independent. The utility obtained from the consumption of a good is a function of the quantity of that good alone. This assumption amounts to taking absence of any ‘external effects’ of consumption that goods entering the budget of the consumer are neither substitutes nor complements. It is on the basis of this assumption that the utility functions were considered to be additive. Marginal utility is the addition made of the total utility derived from the consumption of a commodity by the purchase of an additional unit of it.
3. **Constancy of the Marginal Utility of Money-** The Marshallian marginal utility

analysis of demand assumes that the marginal utility of money to the consumer remains constant to him as he spends more' and more on a commodity. So the consumer's diminishing marginal utility from the successive units is measured by the lower and lower price the consumer is willing to pay for them. However, the validity of this assumption of constancy of the marginal utility of money has been contested.

- 4. The Law of Diminishing Marginal Utility-** The marginal utility analysis of demand was built on a fundamental premise about marginal utility behaviour called the Law of Diminishing Marginal Utility. Dr. Marshall stated the law as: "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." In other words, the law states that the marginal utility derived by a consumer from the consumption of a commodity goes on diminishing as he consumes more and more of it, other things remaining the same.

## **A. CHECK YOUR PROGRESS**

### **True and False**

Utility can be measured in exact units called utils.

Total utility decreases as more units of a good are consumed.

Marginal utility remains constant with each additional unit consumed.

Cardinal utility approach is based on the assumption that utility is subjective and cannot be measured.

Law of Diminishing Marginal Utility is a key principle in cardinal utility analysis.

Cardinal utility theory assumes consumers are rational.

Marginal utility becomes negative when total utility starts decreasing.

### **Answers:**

1. True

2. False

3. False

4. False

5. True

6. True

7. True

### 6.3 LAW OF DIMINISHING MARGINAL UTILITY

One of the most important propositions of the marginal utility approach to demand was the Law of Diminishing Marginal Utility. German economist Gossen, was the first to explain it. Therefore, it is also called Gossen's First Law.

#### *Definition*

This law has been stated differently by different economists, According to Marshall, "The additional benefit which a person derives from a given increase of a stock of a thing diminishes, other things being equal, with every increase in the stock that he already has."

*Chapman* stated the law as, "The more we have of a thing the less we want additional increments of it or the more we want not to have additional increments of it."

This law simply tells us that we obtain less and less utility from the successive units of a commodity as we consume more and more of it.

#### 6.3.1 Explanation

The basis of this law is a fundamental feature of wants which is that every want needs to be satisfied only upto a limit. After this, limit is reached the intensity of our want becomes zero. It is called complete satisfaction of the want. Therefore, as we consume more and more units of a commodity to satisfy our needs, the intensity of our want for it becomes less and less. Therefore, the utility obtained from the consumption of every unit of the commodity is less than that of the units consumed earlier. We can better explain this law with the help of a table and a diagram.

Suppose a man wants to consume apples and is hungry. In this condition, if he gets one apple, he has very high utility for it. Let us say that the measure of this utility is equal to 30 units (also called utils). Having eaten the first apple he will not remain so hungry as before. Therefore, if he consumes the second apple he will have a lesser amount of utility from the second apple even if it was exactly like the first one. Suppose the utility he got from the second apple equals 20 units. The third, fourth, fifth and sixth apples give him utility equal to 15,10,5 and 2 units respectively. If, now, he is given the seventh apple, he has no use for it. In other words, the utility of the seventh apple to the consumer is zero. It

is just possible that if he is given the eighth apple for consumption, it may harm him. In this case, the utility obtained will be negative. We are, therefore, clearly led to believe that the additional utility of the successive apples to the consumer goes on diminishing as he consumes more and more of it.

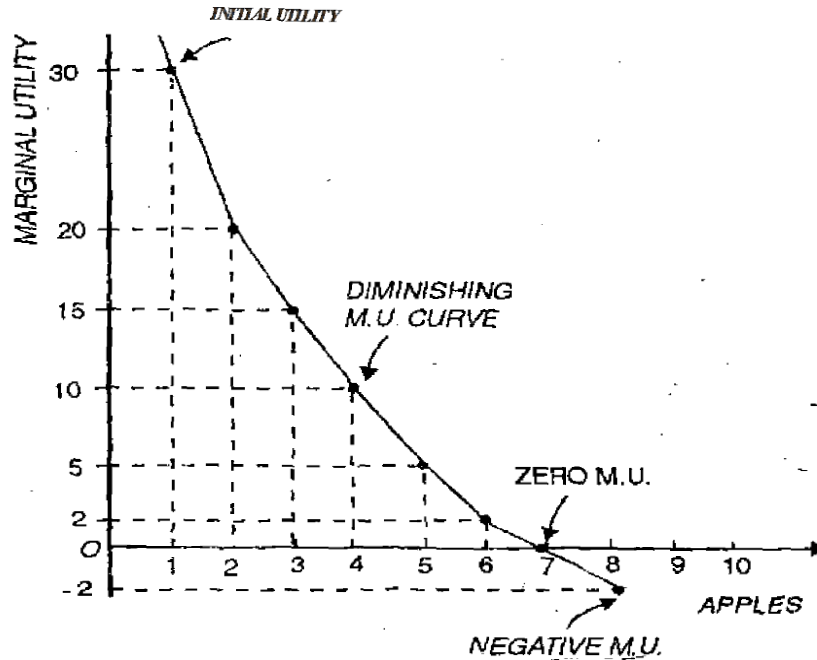
The Law of Diminishing Marginal Utility is clear from the following table showing the total and marginal utilities in the example given above. The law can be explained with the help of a diagram given in figure 6.1 where the horizontal axis shows the units of apples and the vertical axis measures the marginal utility obtained from the apple units. The utility curve shows the utility obtained from the successive apples. The curve shown thickly and falling from left down to the right clearly enlighten us that the marginal utility of the successive apples is falling.

**Table: 6.1**

Units of Apples	Total Utility	Marginal Utility
1	30	30
2	50	20
3	65	15
4	75	10
5	80	5
6	82	2
7	82	0
8	80	-2

The marginal utility of the first apple is known as initial utility. It is 30 units. The marginal utility of the seventh apple is zero. Therefore, this point is called the satiety point. The marginal utility of the eighth apple is -2. Therefore, the *MU* curve lies below the x – axis (Figure 6.1).





**Fig. 6.1: The Law of Diminishing Marginal Utility**

### 6.3.2 Assumptions

The law is based on some assumptions and applies only when these assumptions are satisfied.

1. *Uniform quality and size of the commodity-* The successive units of the commodity should not differ in any way either in quality or size.
2. *Consumption within the same time-* Consumption may be in one continuous shying. There should not be so much difference in time between the consumption of successive units.
3. *No change in the mental condition of the consumer during consumption-* The consumer should not feel any change in his mental condition due to the consumption of the commodity. This condition is not satisfied in the case of liquor.
4. *No change in fashion or taste-* The law applies only when consumer's taste for it remains the same.

5. *No change in the price of the commodity or its substitutes*- The law is based on the assumption that the commodity's price is not changed with successive units. The price of the substitutes is also kept at the same level.
6. *Applicable to a pleasure economy*- According to Patten, consumer's economy may be that of pleasure or pain. When the commodity is directly needed by the consumer, then a less unit of the commodity is likely to pain him. In such commodities as food grains during famine conditions -the law does not apply. It is only when the consumer has the pleasure of obtaining or forgoing a unit of the commodities. That this law is applicable.

## **B. CHECK YOUR PROGRESS**

### **Case Study**

**Background:** Anita enjoys drinking mango juice. The first glass she drinks gives her great pleasure and refreshment. The second glass still tastes good but not as enjoyable as the first one. By the third glass, she feels less satisfaction, and after the fourth glass, she feels very little joy. If she drinks more than four glasses, she might start feeling uneasy or bored of the juice. This shows that the satisfaction she gets from each additional glass decreases with consumption. Based on the above case, answer the following questions:

### **Questions:**

1. What is the total utility Anita gains from drinking multiple glasses of mango juice?
2. Define marginal utility and explain how it changes for Anita with each additional glass.
3. Why does the satisfaction (utility) from each extra glass decrease according to the law of diminishing marginal utility?
4. How can understanding this concept help Anita decide how many glasses of juice to drink?

### 6.3.3 Importance

The law has theoretical and practical advantages. This is why it is one of the most important laws of economics. The theoretical and practical advantages are:

- 1) *Basis of the Law of Demand.* The Law of Demand is based on this law. The Law of Demand tells us that as the price of a commodity falls, its demand goes up. This is due to diminishing utility of the commodity to the consumer as he purchases more of it. If we want a consumer to purchase more units of a commodity; we have to reduce its price so that a consumer is able to equate the reduced price with reduced marginal utility.
- 2) *Theory of Value.* The law tells us the difference between value-in-use and value-in-exchange. The Law also helps in knowing the difference between value-in-use and value-in-exchange. Water has no value in exchange because the marginal utility of another litre of water is zero. On the other hand, the marginal utility of a commodity like gold is very high because its marginal utility is quite high. In the former case, the marginal utility is already zero. In the latter case, it is still very high.
- 3) *Consumer's Surplus Concept.* The idea of consumer's surplus is also based on this law. A consumer purchases as many units of a commodity the marginal utility of which equals the average unit price. In this Way, the consumer obtains some surplus utility from the earlier units. This is called Consumer's Surplus.
- 4) *Importance to Finance Minister.* A Finance Minister keeps this law in mind when he taxes the commodities purchased by the rich at a high rate and those purchased by the poor people at a lower rate. Sometimes, the rate of taxation of income also goes on rising. This is called progressive taxation. The main reason behind this is the belief that the marginal utility of money to the poor is much higher than the marginal utility of the money to the rich.
- 5) *Socialism.* Socialists want equitable distribution of wealth. They would like to transfer some part of wealth with the rich to the poor people through taxation and grants. They argue that the measure of sacrifice by the rich in terms of utility is

much less as compared to the utility obtained by the poor people. There is a net gain to society through this income transfer.

- 6) *Variety in Consumption and Production.* This Law strongly supports the provision of variety for consumers. A consumer purchasing the same variety of a product may find his marginal utility going down very fast. But if he is given another variety of the commodity, his marginal utility may fall but at a lesser speed. Variety adds to the consumer's satisfaction.
- 7) *Importance to the Consumer.* A consumer also benefits from this law. He is advised to spend his income over the purchase of a number of commodities rather than on one commodity. It is in this way that he can get the maximum utility out of his expenditure. This law, therefore, induces the consumer to maximise his utility.

### **C. CHECK YOUR PROGRESS**

#### **Short Answer Questions:**

1. Why is the Law of Diminishing Marginal Utility important in understanding consumer behavior?

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2. How does the concept of diminishing marginal utility help in explaining the downward-sloping demand curve?

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3. In what way does diminishing marginal utility influence a consumer's decision on how much to consume?

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### 6.3.4 Limitations

There are some instances when this law does not apply. These are some common examples of the exceptions to this law.

- i. *Rare and curious things*. This law does not apply to rare and curious things-like old coins, rare paintings, etc.
- ii. *Goods of display*. Things which satisfy consumer's taste for display of wealth or fashion, as is the case with jewellery.
- iii. *Consumption of public goods*. The law does not apply to such public goods as telephones because the greater the number of telephones in a town, the greater is utility obtained from the use of a telephone.
- iv. *Intoxicants*. There are many commodities which change the mental condition of the consumer as they are consumed more and more. This is the case with drinking.
- v. *Good books or poetry*. According to Taussig, good books, music, or poetry may give the interested persons more and more utility.
- vi. *First time consumption of a commodity*. When a consumer consumes a commodity for the first time, then he may get increasing marginal utility for some time. This may be the case with a man who has seen the television for the first time in his life.

## 6.4 LET US SUM UP

Utility is an economic concept that differs from the pleasure and usefulness a commodity may give to an individual. It was assumed by the economists that utility which a consumer derives out from a commodity is identical with the satisfaction he expects to get out of its consumption. It can be measured cardinally; it is possible to know exactly the number of units of utility that a commodity or service contains for the consumer.

The cardinal utility analysis of demand was based on some conditions that utility is cardinally

measurable, utilities of different commodities are independent, the marginal utility of money to the consumer remains constant, and finally the law of diminishing marginal utility.

The basis of this law is a fundamental feature that every want needs to be satisfied only up to a limit. After this, limit is reached the intensity of our want becomes zero. It is called complete satisfaction of the want. Therefore, as we consume more and more units of a commodity to satisfy our needs, the intensity of our want for it becomes less and less. Therefore, the utility obtained from the consumption of every unit of the commodity is less than that of the units consumed earlier.

This law of diminishing marginal utility is based on certain assumptions, such as Uniform quality and size of the commodity, Consumption within the same time, No change in the mental condition of the consumer during consumption, No change in fashion or taste, No change in the price of the commodity or its substitutes, and Applicable to a pleasure economy. This is one of the most important laws of the economy.

## 6.6 Glossary

- **Diminishing Marginal Utility:** The principle stating that as consumption increases, the additional satisfaction from each extra unit decreases.
- **Consumer Behaviour:** It explains how consumers allocate their limited resources based on falling utility from additional consumption.
- **Demand Curve:** The law supports the downward-sloping nature of the demand curve in economics.
- **Rational Consumption:** Helps consumers decide the optimal quantity of goods to consume for maximum satisfaction.
- **Pricing Strategy:** Businesses use this principle to set prices by recognizing the decreasing value of extra units to customers.

### **6.7 SELFASSESSMENT QUESTIONS**

1. Explain the law of diminishing marginal utility with an illustration?

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2. What is utility? How is total utility derived from marginal utility?

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3. Make a critical evaluation of the Marshallian cardinal Utility analysis.

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### **6.8 LESSON END EXERCISE**

1. Explain the concept of cardinal utility analysis. What are its main assumptions and limitations?
2. Define the Law of Diminishing Marginal Utility. Explain the law with the help of a schedule and diagram.
3. Discuss the importance and applications of the Law of Diminishing Marginal Utility in economics.

## **6.5 SUGGESTED READINGS**

- Economic Theory, Chopra P.N., Kalyani Publishers, New Delhi.
- Micro Economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

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## **INDIFFERENCE CURVE ANALYSIS**

### **STRUCTURE**

7.0 Learning Objectives and Learning Outcomes

7.1 Introduction

7.2 Important Concepts

7.2.1 Definition

7.2.2 Indifference Schedule

7.2.3 Indifference curve

7.2.4 Indifference Map

7.2.5 Marginal Rate of Substitution (MRS)

7.3 Assumptions of Indifference Curve Analysis

7.4 Properties of Indifference Curves

7.5 Let Us Sum Up

7.6 Glossary

7.7 Self-Assessment Questions

7.8 Lesson End Exercise

7.8 Suggested Reading

## **7.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

The objectives of this chapter are:

- To explain indifference curve and its related concepts.
- To provide assumptions about indifference curve.

### **Learning Outcomes:**

After studying this chapter, students will be able to:

- Define an indifference curve and explain its significance in consumer behavior analysis.
- Identify and interpret key concepts related to indifference curves such as marginal rate of substitution (MRS), indifference map, and consumer equilibrium.
- Understand and describe the assumptions underlying the indifference curve approach.
- Differentiate between indifference curve analysis and utility analysis.
- Analyze consumer choices using the indifference curve framework.

## **7.1 INTRODUCTION**

The classical economists including Marshall had adopted the cardinal utility approach to the theory of demand. Its main merit was its simplicity but it was widely criticised because of the defective assumptions on which it was based. Taking these criticisms seriously some economists wanted to search for an alternative approach which could be free from criticisms. The most defective assumption and the most unrealistic assumption was that utility can be cardinally measured. Edgeworth, Fisher and Pareto had given some ideas

about the possibility of building demand analysis on what was ordinal utility, that is, a measure of utility in which commodities or their combinations are ordered according to the preference of the consumer. In cardinal utility, the amount of utility in a commodity is measured absolutely and is given as so many units. In ordinal utility, commodities are ranked as first, second, third and so on according to the preference of the consumer.

Russian economist Slutsky is credited with the first statement of the law of demand with the help of ordinal utility in the year 1915. But a detailed study of the indifference curve analysis was given by Prof. Hicks and Allen in the year 1928 in a paper: "A Reconsideration of the Theory of Value". In this paper they strongly criticised cardinal utility theory and gave their own approach to consumer's demand, which they called 'Indifference Curve Approach'. J.R. Hicks wrote down the indifference curve theory in a much more detailed form in his book 'Value and Capital' published in 1939.

This analysis starts by rejecting the idea that utility can be cardinally measured. This is because utility is something subjective. According to Hicks and Allen cardinal utility measurement is not necessary for building a theory of demand. According to them, a consumer makes comparisons of the satisfaction obtainable from combinations of different commodities. Given two combinations of commodities, a consumer can easily tell us which of the two he prefers. But he cannot tell us how much he prefers one over the other. The consumer is able to put the various combinations in order as first, second, third, as he views these combinations from the point of view of his satisfaction. Thus, Hicks and Allen claimed that their indifference curve analysis was merited on two grounds: (1) It had fewer assumptions and yet could establish the law of demand. (2) It was more realistic because it could take into consideration combinations of commodities which were related with one

another. The cardinal utility analysis was unrealistic because it assumed the commodities to be independent and being bought one at a time.

## **7.2 BASIC CONCEPTS OF THE INDIFFERENCE CURVE ANALYSIS**

The indifference curve analysis is in many ways similar to the cardinal utility analysis but it has important differences with that analysis also. It has its own concepts. Before we take up the analysis of indifference curves, these concepts must be made very clear.

### **7.2.1 Definition**

According to Hicks, a consumer can tell whether the various combination of any two commodities which he wants to purchase give him equal satisfaction so that he is indifferent between them. If we show these combinations on a graph showing one commodity on the horizontal axis and the other on the vertical axis, then the combinations bearing consumer's indifference can be shown as points on the graph. If we join these points to form a curve, it will be known as an indifference curve. An indifference curve is the locus of all those points representing various combinations of two commodities giving the same satisfaction to the consumer. In the words of A. L. Meyers, "An indifference schedule (curve) may be defined as a schedule of various combinations of goods which will be equally satisfactory to the consumer concerned. According to Prof. Leftwitch, "A single indifference curve shows the different combinations of  $x$  and  $y$  that yield equal satisfaction to the consumer."

### **7.2.2 Indifference Schedule**

An indifference schedule is a table representing the various combinations of goods which give equal satisfaction to the consumer. According to A.L.Meyers, "An indifference schedule may be defined as a schedule of various combinations of goods that will be equally satisfactory to the individual concerned." The following table shows the indifference schedule of combinations of biscuits and cups of tea for a consumer.

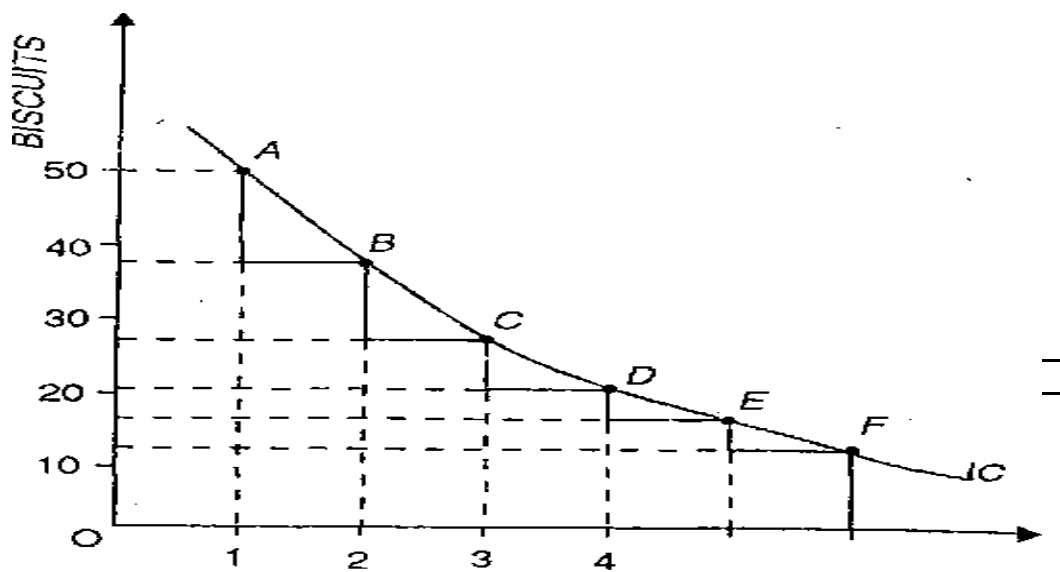
**Table 7.1**  
**Indifference Schedule**

		Cups of Tea	+	Biscuits
A		1	+	50
B		2	+	38
C		3	+	28
D		4	+	21
E		5	+	17
F		6	+	15

In Table 7.1 the consumer is assumed to be purchasing combinations of cups of tea and biscuits. He tells us that he is indifferent between the six combinations given above. Combination A shows that the consumer has one cup of tea and 50 biscuits. While combination B shows that the consumer gets two cups of tea and 38 biscuits. The consumer is indifferent between these combinations since they give him the same level of satisfaction. Similar is the case with the other combinations i.e. C, D, E and F. The consumer is indifferent among these combinations. In other words, he prefers none of these combinations.

### 7.2.3 Indifference curve

When we show these combinations on a graph showing cups of tea on the X-axis and biscuits on Y-axis we obtain a curve as is shown in the figure 7.1. It is called an Indifference Curve because it joins the points of indifference on the graph.



**Fig. 7.1 An Indifference Curve and the falling marginal rate of substitution**

In figure 7.1, IC is an indifference curve. The different points on it show the various combinations of Tea and Biscuits. The consumer likes all of them equally. Therefore, he is indifferent among them. By joining these points we obtain the Indifference curve IC. Although in the successive combinations the amount of biscuits goes on diminishing as we move from the left side of the indifference curve to the right side, the increase in the quantity of cups of tea is sufficient to compensate him for the loss of biscuits so that the consumer is indifferent among them.

### A. CHECK YOUR PROGRESS

#### Fill in the Blanks

- An indifference curve represents a combination of \_\_\_\_\_ that gives the consumer equal satisfaction.
- The slope of the indifference curve is known as the \_\_\_\_\_.

- c) Indifference curves are always \_\_\_\_\_ to the origin.
- d) Two indifference curves can never \_\_\_\_\_ each other.
- e) The assumption of a \_\_\_\_\_ preference implies that more is always preferred to less.

**Answers:**

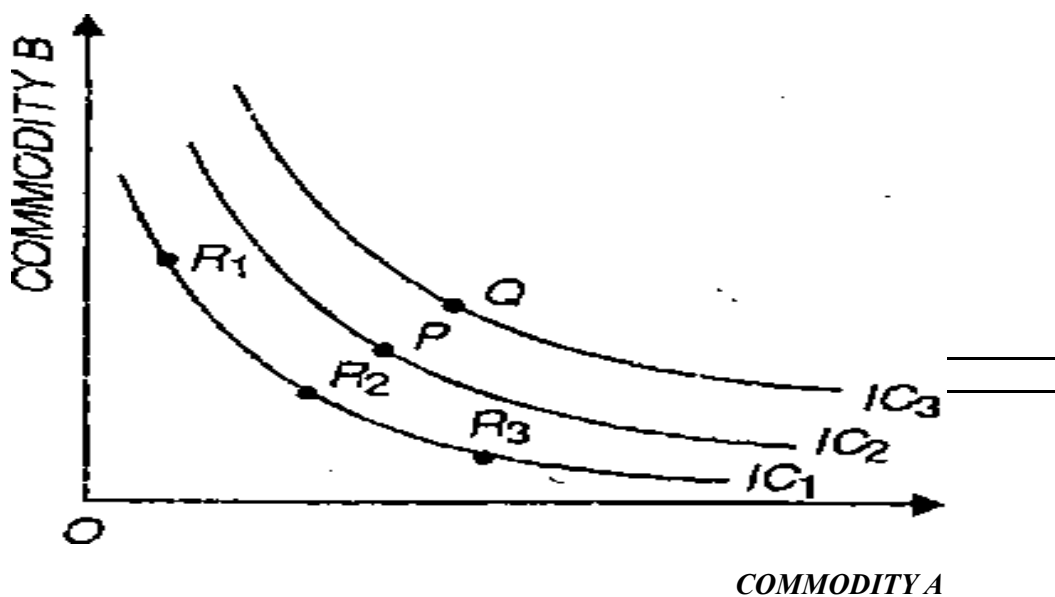
- a) goods
- b) marginal rate of substitution (MRS)
- c) convex
- d) intersect
- e) monotonic

#### **7.2.4 Indifference Map**

It is possible for us to build up higher and higher schedules of the two commodities which contain greater quantities of both the commodities. However, the combinations in each of them are such that the consumer is indifferent between them. The schedule given above (fig. 7.1) gave us only one Indifference curve. We can build higher schedules, say double the cups and biscuits, three times the cups and biscuits. These will give us higher and

higher Indifference curves. The set of indifference curves representing the different levels of satisfaction obtainable from different schedules of indifference is called an Indifference Map. This is shown for commodities A and B in Fig. 7.2. The Indifference Map is a geometrical expression of a number of indifference schedules on the assumption that the commodities constituting the combinations of each schedule are finitely divisible.

In Fig. 7.2 there are three combinations of commodity A and commodity B. These are  $R_1$ ,  $R_2$ ,  $R_3$  among which the consumer is indifferent. Therefore, these may be taken to give an equal level of satisfaction to the consumer. Hence, these combinations lie on the same indifference curve  $IC_1$ . However, combinations P and Q are in the north-east of these combinations. They show greater amounts of both the commodities. Combinations P and Q are lying on higher indifference curves and show greater amounts of both the commodities. Therefore, combinations P and Q are preferred to those on the  $IC_1$ . We may, therefore, say that the higher an indifference curve is, the greater the level of satisfaction it represents.



7.2.5 Marginal Rate of Substitution (MRS)  
Fig. 7.2 An Indifference Map



A study of the Indifference curve shows that as the consumer gets one more unit of the commodity on the horizontal axis, his total satisfaction is increased. If he wants to maintain his satisfaction at the same level, he has to sacrifice some units of the commodity on the vertical axis. If by obtaining one unit of a commodity A, he is prepared to give up five units of the commodity B and maintain his satisfaction at the same level, then five units of commodity B is the marginal rate of substitution for one unit of the commodity A.

According to Prof. Bilas, “The marginal rate of substitution of X for Y is defined as the amount of Y the consumer is just willing to give up to get one more unit of X and maintain the same level of satisfaction.”

The marginal rate of substitution between two commodities is shown by the slope of the indifference curve showing their combinations. If the two commodities are X and Y, the marginal rate of substitution between them is written as  $MRS_{yx} = \Delta X / \Delta Y$ . It is the rate at which the consumer is willing to substitute Y for X. The main characteristic of the MRS is that it diminishes as one commodity is increased and the other commodity is decreased in the consumer's indifference schedule. As a result the indifference curve slopes from left down to the right. It means a negative and diminishing rate of substitution of one commodity for the other.

Prof. J.R. Hicks has built up the Principle of Diminishing Marginal Rate of Substitution. This principle is similar to the law of diminishing marginal utility and is yet different. According to Hibdon, “The law of Diminishing Marginal Rate of Substitution states that the consumer will be willing to forgo smaller and smaller units of Y in order to have successive additional units of A”. We can explain the law much better with the help of the indifference schedule which we have given earlier. We reproduce the same schedule here and calculate the MRS of cups of tea for biscuits.

In table 7.2, all the combinations give the same satisfaction to the consumer. If he chooses combination A he gets one cup of tea and fifty biscuits. In the combination B, he gets one more cup of tea and is prepared to give twelve biscuits for it. The MRS here is therefore 1: 12. In the combination C, he is willing to sacrifice only ten biscuits for another cup of tea.

The MRS falls to become 1: 10. In the successive combinations D, E and F, the MRS continues to fall. This illustrates the diminishing marginal rate of substitution.

**Table 7.2**  
**Marginal rate of substitution**

Combination	Cups of Tea	Biscuits	MRS of tea for Biscuits
A	1	50	-
B	2	38	1: 12
C	3	28	1: 10
D	4	21	1: 7
E	5	17	1: 4
F	6	15	1: 2

MRS of X for Y is the ratio of the change in the quantity of Y which would keep the consumer on the same indifference curve for a change in the marginal quantity of X.

$$MRS_{xy} = \frac{\Delta Y}{\Delta X}$$

Since MRS is denoted as the slope of an indifference curve, it is commonly negative and falling. The convex indifference curve falling from left down to the right shows the Law of Diminishing Marginal Rate of Substitution.

Prof. Hicks has given his justification for assuming a diminishing MRS. There are two reasons for this. In the first place, each particular want is satiable. Therefore, as a consumer obtains more and more of one commodity, his intensity of the need for it goes on diminishing. As a result, the consumer will be prepared to sacrifice less amount of the other commodity in order to obtain more and more of this commodity.

Secondly, goods are imperfect substitutes for one another. Normally, a commodity is not completely substitutable for another. If it were, then the two commodities are the same. There is no need to distinguish between the two. But goods are imperfect substitutes just as tea and coffee are. Commodities are to some extent complementary also. Therefore, the MRS of one for the other must diminish. In his opinion if it does not diminish then consumer's equilibrium is rendered unstable. Since in practice we see consumer's passing from one point of equilibrium to another with change in prices without any instability of

behaviour, we can safely assume that the MRS is always diminishing around the point of consumer's equilibrium.

There are limitations to this law also. But these are in the nature of rare exceptions. The first is the case of perfect complementarity. For example, the left foot and right foot shoes have no rate of substitution. Secondly, there is the case of perfect substitutes wherein MRS becomes infinite. An example is the products of two firms in perfect competition. Consumer's indifference curves in this situation would be straight lines.

These are, however, extreme cases not commonly found in consumer's choice, the diminishing *MRS* must not be confused with the diminishing marginal utility of the cardinal utility analysis.

The two concepts are entirely different. The main differences are as follows:

- a) MRS denotes the rate of commodity substitution. It has no subjective element in it. It just tells us as to how much amount of one commodity the consumer is willing to forgo to get a small amount of another and yet remain on the same indifference curve. It is an objective thing.
- b) It does not need the assumption of independent commodities in the combinations. It allows complementarity and substitution. As such MRS is a wider concept than diminishing marginal utility.
- c) The law of diminishing MRS does not need the assumption of constant marginal utility of money because it deals with physical amounts of the commodity. Money does not come anywhere in its justification. The law of diminishing marginal utility cannot do without these assumptions.

## **B. CHECK YOUR PROGRESS**

### **Case Study**

Scenario: Rina has ₹100 to spend on two goods: chocolates and coffee. She loves both, but she's willing to give up 2 chocolates to get 1 extra cup of coffee while still feeling equally satisfied. This pattern continues, but as she consumes more coffee, she is willing to give up fewer chocolates for each additional cup.

Her current choice shows that she gives up:

- 2 chocolates for the 1st cup of coffee
- 1 chocolate for the 2nd cup of coffee
- 0.5 chocolate for the 3rd cup of coffee

This reflects a diminishing willingness to trade chocolates for coffee.

### **Questions:**

1. What economic concept is being illustrated in Rina's changing willingness to substitute chocolates for coffee?

- A) Law of Supply
- B) Diminishing Marginal Utility
- C) Marginal Rate of Substitution
- D) Opportunity Cost

2. Explain in your own words why Rina is willing to give up fewer chocolates for each additional cup of coffee.

### **7.3 ASSUMPTIONS OF INDIFFERENCE CURVE ANALYSIS**

The indifference curve analysis given by Hicks and Allen is built on the following assumptions:

#### **1. Rational behaviour of the consumer**

It is assumed that the consumer behaves rationally which means that he tries to obtain the maximum satisfaction from his expenditure on consumer goods. As such the consumer is supposed to choose such a combination of his needed consumer goods as provides him with the maximum possible satisfaction.

#### **2. Scale of Preference**

Another assumption of the analysis is that the consumer is able to arrange the available combinations of goods according to preference or indifference for them. Between two combinations he is assumed to be either indifferent or prefer one to the other. In technical language, it is called 'Scale of Preference'. Stated simply it means that if there are a number of combinations, the consumer is able to arrange them in an ascending or descending order of his preference and is able to indicate the combinations among which he is indifferent. This assumption may be called the assumption of ordering ability.

#### **3. Concept of ordinal utility**

The indifference curve analysis is based on the concept of ordinal utility. Ordinal Utility implies that the consumer is in a position to rank the alternative combinations, available to him by a simple comparison of the satisfaction obtainable from the given combinations. Ordinal utility does not require quantitative measurement of utilities of different combinations.

#### **4. Diminishing marginal rate of substitution**

Another assumption behind the indifference curve analysis is that of 'diminishing marginal rate of substitution'. This means that as the amount of a commodity with the consumer goes on increasing he is prepared to exchange lesser and lesser amounts of the other commodity for equal units of the commodity whose amount is increasing.

#### **5. Assumption of consistency**

It is assumed that the consumer is consistent in his behaviour. If he is indifferent

between combination *A* and combination *B*, and is also indifferent between combinations *B* and *C*, then he must be indifferent between combinations *A* and *C*. Stated negatively, this assumption requires that if the consumer prefers *A* to *B* and *B* to *C*, then he does not prefer *C* to *A* in any circumstances.

#### **6. Scale of preferences is independent of the market prices**

It is further assumed that the consumer is not influenced in his preference or indifference between combinations by the market prices of different goods. In other words, he is supposed not to regard a higher-priced commodity as superior and lower priced commodity as inferior.

#### **7. Weak ordering**

Indifference curve analysis is based on the weak ordering form of preference hypothesis. According to J.R. Hicks, weak ordering implies that there is a possibility of the consumer being indifferent between any two combinations along with the possibility of preferring one combination to the other. The consumer may prefer *A* to *B* or *B* to *A*, or he may be indifferent between two combinations. As against weak ordering, strong ordering means that the consumer is allowed to indicate his preference only. The possibility of indifference between two combinations is ruled out in strong ordering.

#### **8. Assumption of transitivity**

Another assumption underlying indifference curve analysis is that consumer's preference or indifference relations do not contradict the consumer's position of indifference between combinations taken as whole and taken separately. It means that if the consumer prefers *A* to *B*, *B* to *C* and *C* to *D*, then, he also prefers *A* to *D*. Likewise, if he declares his indifference between pairs of combinations separately, then he is indifferent between all of them. His indifference lies all over his choice field.

#### **9. Assumption of continuity**

The indifference curve analysis given by Hicks and Allen was based on the assumption of continuity. Continuity means that the consumer is in a position to rank all conceivable combinations of the needed goods according to his preference or indifference. This means further that the consumer is never tired of ordering the combinations available to him, howsoever small the difference in satisfactions may

be between the combinations. The consumer is assumed to make minute comparisons so that different sets of indifference curves are available from him. Prof. Hicks gave up this assumption in his 'Revision of Demand Theory'.

### **C. CHECK YOUR PROGRESS**

#### **Multiple Choice**

**1. Which of the following is an assumption of indifference curve analysis?**

- A) Consumers are irrational
- B) Utility is cardinally measurable
- C) Preferences are consistent and transitive
- D) Indifference curves intersect each other

**2. Indifference curve analysis assumes that the consumer:**

- A) Can measure satisfaction in numbers
- B) Prefers more of a good to less
- C) Has unlimited income
- D) Always consumes goods in equal quantity

**3. According to the assumptions, the marginal rate of substitution (MRS):**

- A) Increases as more of one good is consumed
- B) Remains constant throughout
- C) Diminishes as one moves down the indifference curve
- D) Becomes zero on the budget line

**4. The assumption of transitivity implies that:**

- A) If A is preferred to B, and B to C, then A is preferred to C
- B) All goods are perfect substitutes
- C) The consumer has an infinite number of choices

D) The consumer can't make any preference ranking

**5. The assumption of monotonic preferences means:**

A) The consumer prefers less to more

B) The consumer is indifferent to all bundles

C) More of a good leads to greater satisfaction

D) Utility can be measured objectively

**Answers:**

1. C) Preferences are consistent and transitive

2. B) Prefers more of a good to less

3. C) Diminishes as one moves down the indifference curve

4. A) If A is preferred to B, and B to C, then A is preferred to C

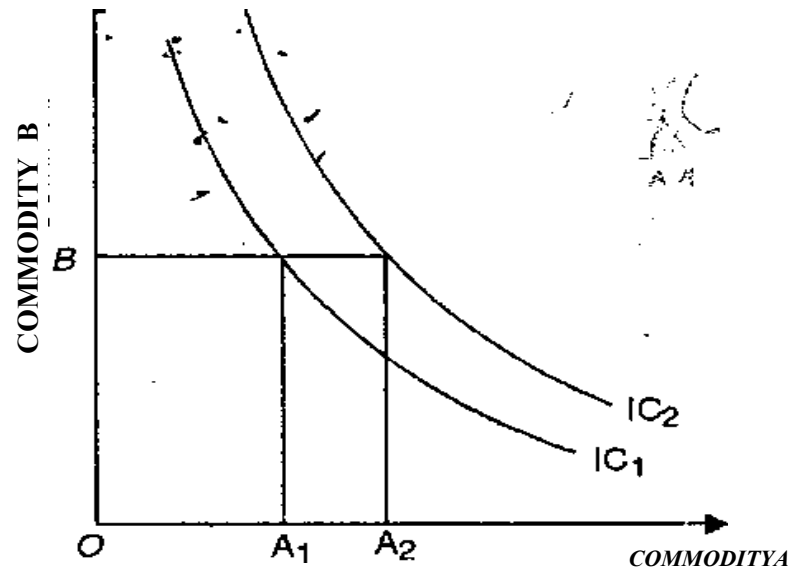
5. C) More of a good lead to greater satisfaction

## 7.4 PROPERTIES OF INDIFFERENCE CURVES

The indifference curves, as prepared from consumer's indifference schedules, possess some properties that we must note before we make use of them as tools of the analysis of demand. These properties are of rationality, transitivity and the diminishing marginal rate of substitution, when these are interpreted in their geometrical form.

**(1) Higher Indifference curves represent higher levels of satisfaction:** An indifference curve that lies above and to the right of another indifference curve represents preferred combinations of commodities, and therefore, higher levels of satisfaction. In Fig. 7.3, the indifference curve  $IC_2$  lies above and to the right of the indifference curve  $IC_1$ . Since  $IC_2$  is the higher indifference curve, it shows  $A_1A_2$  more of commodity A with the same amount of the commodity B given by OB. If this were not the case, there would be no difference between the points  $A_1$  and  $A_2$ .



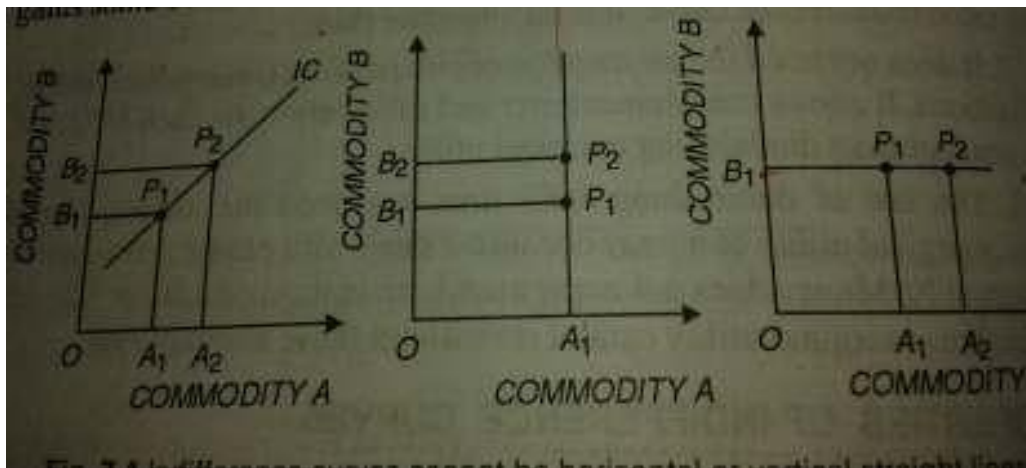


2) Indifference Curves must slope from left downward to the right:

**Fig. 7.3 Higher indifference curves represent higher levels of satisfaction**

Indifference curves must slope down from left to the right, that is, they must have a negative slope. Our assumption that the consumer would like to have more of both commodities helps in proving this. As we move from left to the right on an indifference curve, it means more of the commodity represented on the X-axis. With every increase in the amount of one commodity, the consumer becomes better off. If the consumer is to be on the same indifference curve he should possess such combinations of the commodities as neither make him better off nor worse off. Therefore, he must be made to give up some amount of the commodity on the Y-axis, as he gains some of the commodity on the X'-axis.

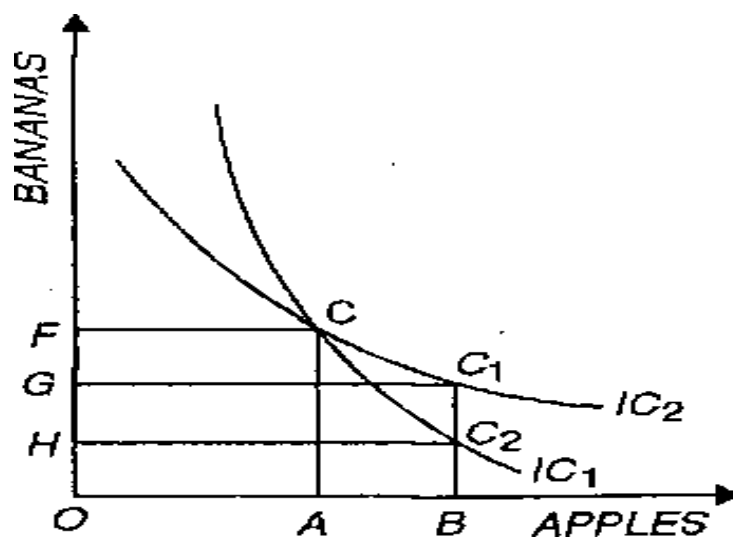
***Fig. 7.4 Indifference curves cannot be horizontal or vertical straight***



*lines, nor can they be upward rising straight lines.*

The diagram (Fig. 7.4) shows the three impossible shapes of indifference curves. In all the three cases the consumer has the points  $P_1, P_2$  on the same indifference curve. These points show two combinations of commodity A and commodity B. In all the three diagrams the combinations shown by  $P_1$  and  $P_2$  do not contain any less of one of the commodities in order to obtain more of the other commodity. The consumer is able to obtain more of both commodities in the extreme left diagram and is yet having the same satisfaction. In the central figure the consumer has more of commodity B. In the extreme right figure, he has more of A with the same satisfaction. This is against our assumption of diminishing MRS.

3). Indifference curves do not intersect: Third, Indifference curves can never meet or intersect so that only one indifference curve can pass through any one point in the indifference map. In other words, one combination of commodities can lie only on one indifference curve. We can easily prove this property by showing that if two indifference curves intersect, it leads to absurd results. In figure 7.5, two indifference curves  $IC_1$  and  $IC_2$  cut each other at C. Since points (combinations) C and  $C_1$  lie on the same indifference curve  $IC_2$ , the consumer is indifferent between them. So they may be supposed to give equal satisfaction to him. Thus we have:



**Fig. 7.5 Indifference Curves Cannot Intersect**

$$OA \text{ of apples} + OF \text{ of bananas} = OB \text{ of apples} + OG \text{ of bananas} \quad \dots\dots (1)$$

Similarly, combinations C and  $C_2$  lie on the same indifference curve  $IC_1$ , and the consumer is indifferent between them. Therefore,

$$OA \text{ of apples} + OF \text{ of bananas} = OB \text{ of apples} + OH \text{ of bananas}$$

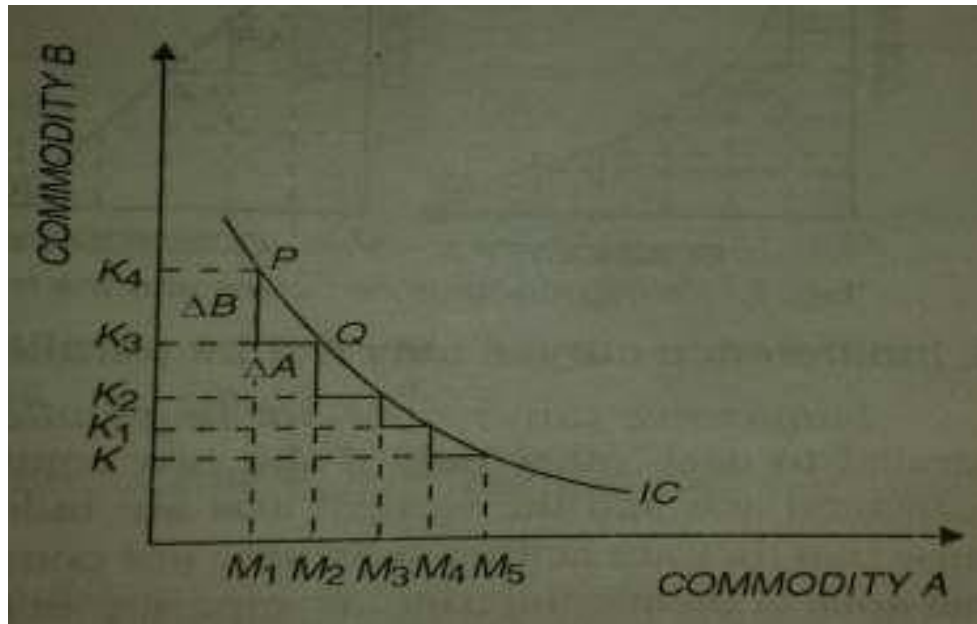
... (2)

The left hand sides of (1) and (2) are equal, therefore

OB of apples + OG of bananas = OB of apples + OH of bananas

The amount OB of apples is common to both sides. We, therefore, arrive at the result that OG of bananas is equal to OH of bananas, which is obviously absurd. We conclude that indifference curves cannot intersect.

**4) Indifference Curves are Convex to the Origin :** Indifference curves are convex to the origin. This is equivalent to saying that the marginal rate of substitution between the commodities diminishes as we move from left down to the right along the indifference curve as shown in figure 7.6.

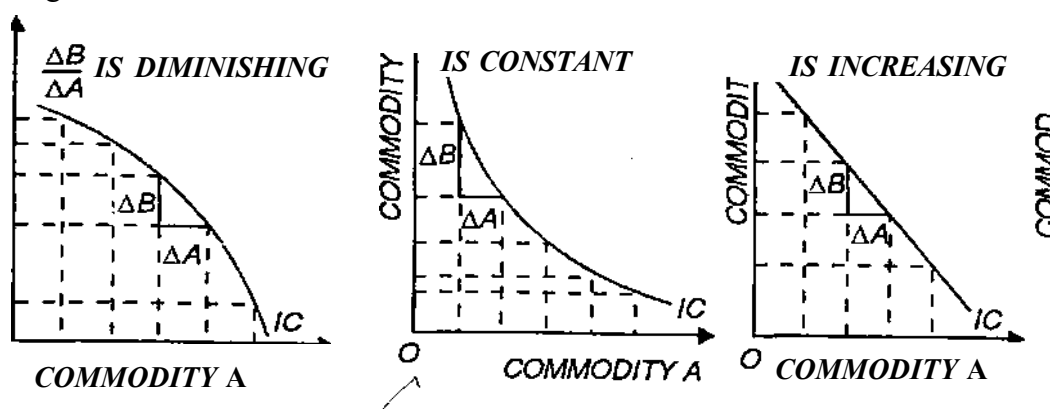


**Figure 7.6** *Diminishing Marginal Rate of Substitution and the negative diminishing slope of an indifference curve.*

Points (combinations) **P** and **Q** lie on indifference curve **IC** but as we move from **P** to **Q**, it means a small ( $M_1 M_2 = \Delta A$ ) increase of commodity A but a corresponding loss ( $K_3 K_4 = \Delta B$ ) of commodity B. The marginal rate of substitution of **B** for **A** is  $\Delta A / \Delta B$ .

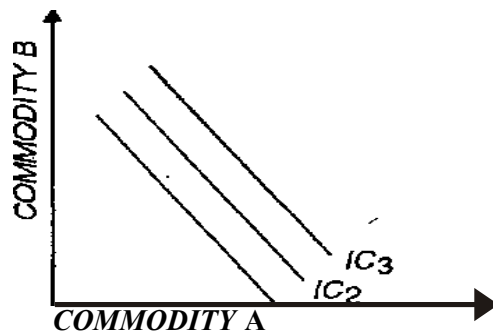
Next, if the consumer is given the same increment ( $M_1M_2 = M_2M_3$ ) in commodity A, he is prepared to part with less ( $K_3K_2$ ) of B than before. In other words, the  $MRS_{AB}$  goes on diminishing along the indifference curve IC.

The justification for assuming a diminishing marginal rate of substitution has already been given. Besides that, we can think of two other theoretical possibilities of the trend of change in the marginal rate of substitution. It may remain the same or it may increase as we move along the indifference curve. In the former case shown in the central part of the figure 7.7 below, the indifference curve is a straight line and in the latter case shown on the extreme right; it is concave to the origin. However, these are remote possibilities. A straight line indifference curve shows perfect substitutes on the  $x$  and  $y$  axis; therefore, the marginal rate of substitution remains the same in spite of the fact that the stock, of one commodity continues to increase, and that of the other diminish, with the consumer. In the case where indifference curve is concave to the origin, it will induce the consumer to substitute one commodity entirely for the other. It means that the consumer will like to have only one commodity by spending all on it. This is called monomania and it shows practically that the consumer would not like to have a variety of goods. This conclusion is contrary to general experience. Therefore, generally, indifference curves are expected to be convex to the origin.

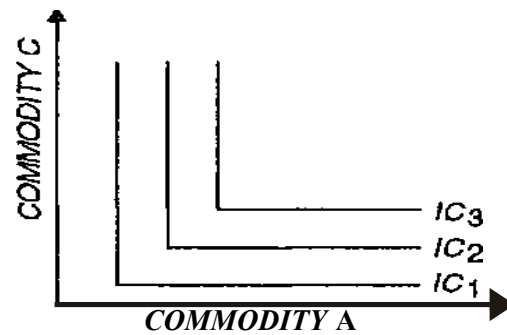


**Fig. 7.7 Falling Indifference Curves and the Marginal Rate of Substitution**

- 5) Indifference Curves May not be Parallel to each other.** They can be parallel to each other only if the two commodities being shown on the horizontal axis and the vertical axis are independent of each other in the sense that they are neither substitute nor complementary goods, and further that none of them is 'inferior' or 'superior' in relation to each other whatever the amounts of each with the consumer. The assumption of independence and absence of any income effects by Dr. Marshall, if introduced in the indifference curves, would give us a set of indifference curves parallel to each other and always equidistant from one another. It is obvious that this is an extreme case. Normally, a consumer demands goods which are related goods for which the income effect is positive. Therefore, the normal position of indifference curves is that they converge on both sides to one another as we go left upwards or right downwards but do not meet.
- 6) Indifference curves for perfect substitutes and perfect complements-** Straight-line indifference curves show that the two goods being shown on the two axes are perfect substitutes. It means that the consumer does not distinguish at all between the satisfaction yielding quality of the two goods in question. The 'indifference curves' here must be straight lines connecting the axes because the marginal rate of substitution stays unchanged regardless of how much of each commodity the consumer possesses. In the event of perfect complementarity between the two commodities, on the other extreme, goods can be used only in definite, fixed proportions. In this case the indifference curves must be rightangular, showing that more of commodity *A* without any addition of commodity *B*, or more of commodity *B* without any addition of commodity *A*, leaves the consumer on an unchanging indifference level. The figures 7.8 (a) and (b) show perfect substitutes and perfect complements on their axes, and the associated indifference curves in the two cases.



**7.8 (a) Straight line Indifference Curves:**  
**Goods perfect substitutes**



**7.8 (b) Right Angled Indifference Curves:**  
**goods perfect complements**

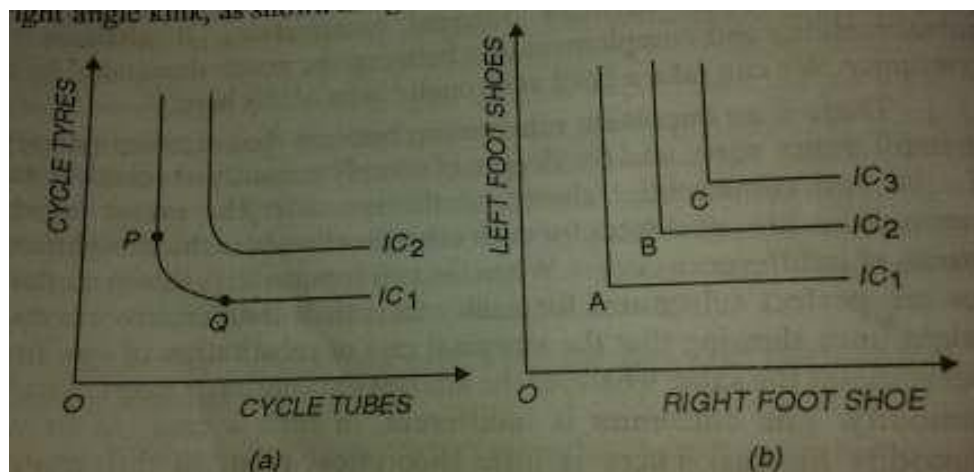
### 7) Complementarity of commodities and curvature of Indifference curves

: One of the merits of indifference-preference analysis is its recognition of interdependence between different commodities. It analyses the substitutability and complementarity between the goods demanded by the consumer. We can take a brief and rough view of this here.

There is an important relationship between the curvature (slope) of an indifference curve and the degree of complementarity or substitutability of the two commodities shown on the two axis. The extent to which commodities are substitutes for each other is reflected in the straightness or flatness of indifference curves. When the two commodities shown on the two axes are perfect substitutes for each other, their indifference curves are straight lines showing that the marginal rate of substitution of one for the other remains the same whatever the amount the consumer may have of one commodity. The consumer is indifferent, in such a case, as to which commodity he has. There is little theoretical point in differentiating between perfect substitutes, for they are the same commodity. This is an extreme case. The lesser the substitutability of the two commodities, the greater is the convexity of indifference curves to the origin and vice versa. The greater the complementarity between the two, the greater the convexity of the indifference curves.

The relationship between the convexity of indifference curves and the nature of the two commodities may differ in different parts of the indifference curves.

Commodities may be good substitutes when combined in certain proportions but not so good in others. Similarly, about complementarity also we just cannot say that the two commodities are equally good complements along the whole of the indifference curve. There are some commodities that are good substitutes or complements within a particular range but not out of it. For example, consider indifference curve  $IC_1$  in figure 7.9 (a) within the range  $PQ$ , cycle tyres and tubes can be substituted for each other. Old tyres can be used with new tubes and new tyres can be run with old tubes. Thus, if we assume a constant level of satisfaction, it is possible to increase the consumption of tyres, to some extent, at the expense of consumption of tubes. But this kind of substitution is possible within certain limits only, such as, between points **P** and **Q** in the figure. Within this range the two commodities are substitutes but out of these limits, the complementary relationship between them is more important. Thus, it is not appropriate always to say that commodities are either substitutes or **complements**. They may be to some extent complements, but are substitutes beyond a point. Indifference curves take an interesting shape when the two commodities shown on the two axes are complementary in nature and are used only in fixed proportions, for example, the two feet of shoes. In such cases the indifference curves are parallel to the two axes having a sudden right angle kink, as shown in figure 7.9(b).



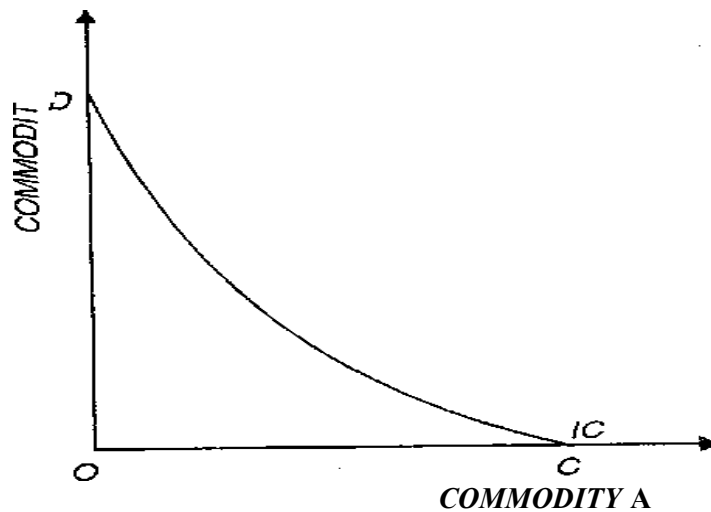
**Figure 7.9 Indifference Curves and Complementary Goods**



**8) Indifference curves do not touch the horizontal or the vertical axis:**

Indifference curves have the basic assumption that the consumer purchases combinations of different commodities. Therefore, he is not supposed to purchase only one commodity because in that case the indifference curve will touch one axis. Purchasing only one commodity means monomania, that is consumer's lack of interest in the other commodity or his insistence on purchasing only one commodity. Figure 7.10 shows an indifference curve, meeting the horizontal axis at C and a vertical axis at D. This violates the basic assumption of indifference curves because at point C the consumer is purchasing only the commodity d. Similarly, at the point D the consumer is purchasing only commodity B, nothing of commodity A. This is against our basic assumption that the consumer purchases the two commodities in a combination.

***Fig. 7.10 Indifference Curves do not touch either axis***



### **C. CHECK YOUR PROGRESS**

#### **Case Study**

**Background:** Aman is a college student who enjoys two things—watching movies and eating burgers. He has a fixed budget every week and tries to balance both activities in a way that brings him the most satisfaction. His preferences are shown through a series of indifference curves.

He observes the following:

- If he substitutes 1 burger for 2 movie tickets and still feels equally satisfied, he is moving along the same indifference curve.
- As he keeps increasing the number of movie tickets, he is willing to give up fewer burgers—indicating diminishing marginal rate of substitution.
- His indifference curves never intersect.
- His indifference curves are downward sloping and convex to the origin.

#### **Questions:**

1. Suppose Aman's income increases, and he can afford more of both goods. How will this affect the position of his indifference curve?
2. If Aman begins to value burgers much more than movies, how might his indifference curves change in shape or slope?

## **7.5 LET US SUM UP**

The indifference curve analysis is in many ways similar to the cardinal utility analysis but it has important differences with that analysis also. An indifference curve is the locus of all those points representing various combinations of two commodities giving the same satisfaction to the consumer. Whereas indifference schedule is a table representing the

various combinations of goods which give equal satisfaction to the consumer.

The set of indifference curves representing the different levels of satisfaction obtainable from different schedules of indifference is called an Indifference Map. According to Prof. Bilas, "The marginal rate of substitution of X for Y is defined as the amount of Y the consumer is just willing to give up to get one more unit of X and maintain the same level of satisfaction." The marginal rate of substitution between two commodities is shown by the slope of the indifference curve showing their combinations. The main characteristic of the MRS is that it diminishes as one commodity is increased and the other commodity is decreased in the consumer's indifference schedule.

The indifference curve analysis given by Hicks and Allen is built on the following assumptions; such as the consumer behaves rationally, consumer is able to arrange the available combinations of goods according to preference, the consumer is in a position to rank the alternative combinations, Diminishing marginal rate of substitution, the consumer is consistent in his behaviour, the consumer is not influenced in his preference or indifference between combinations by the market prices of different goods, Indifference curve analysis is based on the weak ordering form of preference, consumer's preference or indifference relations do not contradict the consumer's position of indifference between combinations taken as whole and taken separately, and finally the consumer is never tired of ordering the combinations available to him.

The indifference curves, as prepared from consumer's indifference schedules, possess some properties that we must note before we make use of them as tools *of the* analysis of demand. These properties are; Higher Indifference curves represent higher levels of satisfaction, Indifference Curves must slope from left downward to the right, Indifference curves do not intersect, Indifference Curves are Convex to the Origin, Indifference Curves May not be Parallel to each other, Indifference curves for perfect substitutes and perfect complements, Complementarity of commodities and curvature of Indifference curves, and Indifference curves do not touch the horizontal or the vertical axis.

## 7.6 Glossary

- **Indifference Schedule:** A table showing combinations of two goods that give equal satisfaction to the consumer.
- **Indifference Curve:** A graph connecting all combinations of goods providing the same level of utility.
- **Indifference Map:** A collection of multiple indifference curves representing different satisfaction levels.
- **Marginal Rate of Substitution (MRS):** The rate at which a consumer trades one good for another while maintaining equal satisfaction.
- **Diminishing MRS:** The principle that as a consumer substitutes one good for another, the willingness to give up the good decreases.
- **Convexity of Indifference Curve:** The bowed-in shape of indifference curves reflecting diminishing marginal rate of substitution.

## 7.7 SELF ASSESSMENT QUESTIONS

1. Give basic assumptions on which the indifference curve is built?

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2. Compare Indifference Curve Analysis with Marginal Utility Analysis of Demand.

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3. What is Marginal Rate of Substitution (*MRS*)?

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### **7.8 LESSON END EXERCISE**

1. Explain the concept of an indifference curve with the help of an indifference schedule and indifference map. Discuss its properties in detail.
2. What is the Marginal Rate of Substitution (MRS)? Explain the concept of diminishing MRS with an appropriate example and diagram.

### **7.9 SUGGESTED READING**

- Advanced Economic Theory. Micro Economic Analysis, 2012, Ahuja, H.L., S. Chand and Company Ltd, New Delhi.
- Principles of Economics, Mishra and Puri, 2007, Himalaya Publishing House, New Delhi.
- Economic Theory, Chopra, P.N., Kalyani Publishers, New Delhi

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**CONSUMER EQUILIBRIUM UNDER UTILITY APPROACH****STRUCTURE**

- 8.0 Learning Objectives and Learning Outcomes
- 8.1 Introduction
- 8.2 Equilibrium of the Consumer through Utility analysis
  - 8.2.1 Consumer's Equilibrium with One Commodity
  - 8.2.2 Consumer's Equilibrium with Two Commodities
- 8.3 Limitations of Cardinal Utility analysis of Demand
- 8.4 Let Us Sum Up
- 8.5 Glossary
- 8.6 Self-Assessment Questions
- 8.7 Lesson End Exercise
- 8.8 Suggested Readings

**8.0 LEARNING OBJECTIVES AND OUTCOMES****Learning Objectives:**

By the end of this chapter, the learner will be able:

- To understand the concept of consumer's equilibrium using the cardinal utility approach
- To explain consumer equilibrium with one commodity.
- To describe consumer equilibrium with two commodities.
- To understand the conditions required for achieving equilibrium in each case.
- To apply the law of diminishing marginal utility and the law of equi-marginal

utility to real-life decision making.

### **Learning Outcomes:**

After studying this chapter, students will be able to:

- Define and explain consumer's equilibrium under the cardinal utility approach.
- Demonstrate how equilibrium is attained when a consumer consumes only one good.
- Analyze the situation when a consumer consumes two goods and allocates income to maximize satisfaction.

## **8.1 INTRODUCTION**

A consumer is an economic agent who uses goods and services for the direct satisfaction of his/her wants. Generally, the consumer is thought of as an individual but in practice consumers consist of institutions, individuals, and groups of individuals or households. The consumer behaviour refers to the way in which consumers spend their income. The consumer derives utility from his expenditures. The consumer chooses his expenditures and maximises his utility given his income and the prices of goods and services.

Consumer's equilibrium refers to a situation where in a consumer gets maximum satisfaction out of his given income and he has no tendency to make any change in his existing expenditure. "A consumer is in equilibrium when he regards his actual behaviour as the best possible under the circumstances and feels no necessity to change his behaviour as long as circumstances remain unchanged,"

In the words of Samuelson, "The consumer is in equilibrium when he maximises his satisfaction given his income and the market prices."

Consumer's equilibrium through utility analysis is based on the assumptions such as rational consumer, Cardinal utility, independent utility, and marginal utility of money is constant.

Consumer's equilibrium through utility analysis is discussed with reference to; single commodity and two or more commodities.

## **8.2 EQUILIBRIUM OF THE CONSUMER THROUGH UTILITY ANALYSIS**

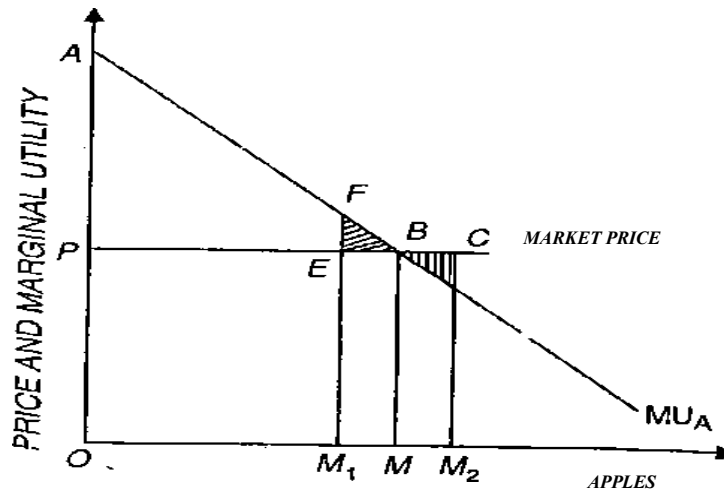
The aim of the consumer in the expenditure of his income is to obtain the maximum utility from the goods purchased. The law of diminishing marginal utility tells us that as consumer purchases more and more units of a commodity, he gets less and less additions of utility from the successive units of expenditure. At the same time as he purchases more and more of one commodity a lesser amount of income is left with him to be spent on other goods. Therefore, in the choice of his expenditure on different goods and services, the consumer is guided by the Law of Diminishing Marginal Utility of a commodity on the one side and the reduced income left with him on the other. A sensible consumer will balance his expenditure over different commodities so that he gets the maximum satisfaction. When he does so, he is said to be in equilibrium. A consumer is in equilibrium when he has no intention to change the pattern of consumption of different goods.

### **8.2.1 Consumer's Equilibrium with One Commodity**

Suppose a consumer has to decide the amount of expenditure on a single commodity.



How many units of that commodity will he buy? The process of determination of consumer equilibrium in this case can be illustrated with the help of Fig. 8.1.



**Fig. 8.1 Consumer's Equilibrium with one commodity**

In Fig. 8.1 the marginal utility of apples is shown to be falling in the marginal utility curve starting from point A. The market price of apples is given at the level OP. The consumer gets a surplus utility from the first unit of apples equal to AP. The consumer's surplus on successive units of apples goes on diminishing. The surplus utility is zero at the point B. Therefore, the consumer's surplus satisfaction is the maximum with the purchase of OM apples. Or we can say since the falling MU curve of apples intersects the market-price horizontal line at the point B, the consumer decides to purchase OM of apples. He does not buy less or more of apples because in these cases the utility obtained from the purchase of apples shall be less than that obtained in the present case. Suppose he purchases only OM apples. This will save him money income equal to area EBMM<sub>1</sub>. But the loss in the utility shall be EBMM<sub>1</sub>. He shall have a net loss in utility equal to the shaded area EFB. It diminishes his total utility. Similarly, we can show that by spending MM<sub>2</sub> more on apples the consumer suffers a loss of utility equal to the shaded area BCD. Hence it is in the best interest of the consumer to purchase OM apples.

## A. CHECK YOUR PROGRESS

### Case study

**Background:** Aarav, a college student, loves chocolates and often buys them from his local grocery store. Each chocolate bar costs ₹10. He has a weekly allowance of ₹50, which he uses only to buy chocolate bars. The satisfaction (utility) he gains from consuming chocolates diminishes with each additional bar he eats.

Below is the utility Aarav gets from each chocolate bar:

Chocolate Bar No.	Marginal Utility (MU)
1	50
2	40
3	30
4	20
5	10
6	0

### Questions:

1. What is the price of one chocolate bar, and how much is Aarav's total allowance?
2. Using the concept of consumer's equilibrium, determine how many chocolate bars Aarav will buy to maximize his satisfaction.

(Hint:  $MU = Price$  for equilibrium)

3. What will be his total utility at equilibrium?
4. What concept does this case illustrate from the cardinal utility approach?

## 8.2.2 Consumer's Equilibrium with Two Commodities

In finding out the equilibrium of the consumer with two commodities, we are guided by the principle of equi-marginal utility applicable to the consumer. Suppose the consumer has to

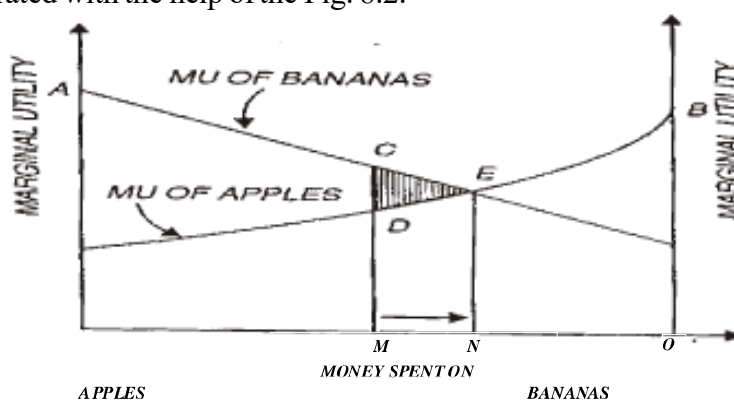
distribute his money income of 100 between apples and bananas. Let us call these commodities A and B. The consumer shall be in equilibrium with regard to the purchase of two commodities when the following condition is satisfied.

$$\frac{\text{Marginal Utility of A}}{\text{Price of A}} = \frac{\text{Marginal Utility of B}}{\text{Price of B}}$$

Price of A

Price of B

The condition given above states that in the consumer's equilibrium condition, the ratio of the marginal utility of apples to their price must be the same as the ratio of marginal utility to price for bananas. The condition given above can be reduced to a simpler equation if we consider the marginal utilities of the money spent on the two commodities rather than the marginal utility of their physical units. If we assume that the marginal utility of money is a given constant, then consumer's equilibrium requires that the marginal utilities of the last units of money spent on the two goods give equi-marginal utility to the consumer. This is easily illustrated with the help of the Fig. 8.2.



**Fig. 8.2 Consumer's Equilibrium with two Commodities**

In Fig. 8.2, we show money spent on apples and bananas on the horizontal axis and the marginal utilities of the two commodities along the respective vertical axes. The total money with the consumer is  $OO'$  which he has to allocate between apples and bananas. The curve  $AE$  shows the falling marginal utility of expenditure on bananas. The curve  $BD$  shows the

diminishing marginal utility of expenditure on apples.

Since the two marginal utility curves intersect at the point E, the marginal utilities of expenditure on apples and bananas are equal at this point. It is EN. The consumer spends ON on bananas and the remaining amount O'N is spent on apples. This pattern of spending the limited income gives the maximum total utility to the consumer. Any change in this pattern of expenditure shall reduce the total utility of the consumer. This can be easily seen in the diagram. Suppose, the consumer reduces his expenditure of bananas to OM and increases his expenditure on apples by MN. This change in spending increases consumer's total utility by the area MNED and reduces his total utility by the area MNEC. There is a net loss in the total utility equal to the shaded area CDE. Thus, it is clear that the consumer will be in equilibrium with a pattern of expenditure which gives him equal marginal utility in case of the two goods.

## B. CHECK YOUR PROGRESS

### Fill in the Blanks:

1. Consumer's equilibrium is attained when the ratio of \_\_\_\_\_ to price is equal for both goods.
2. In consumer's equilibrium, the entire \_\_\_\_\_ must be spent on the two goods.
3. The condition for equilibrium is  $MU_x P_x = MU_y P_y$  or  $\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$ , where MU represents \_\_\_\_\_.
4. The consumer reallocates expenditure until the \_\_\_\_\_ utility per rupee is the same for all goods.
5. Consumer's behavior is based on the assumption that he is \_\_\_\_\_ and wants to maximize satisfaction.
6. The law of \_\_\_\_\_ marginal utility plays a key role in consumer equilibrium.

### Answers:

1. marginal utility	2. Income	3. marginal utility
4. marginal	5. Rational	6. diminishing

### 8.3 LIMITATIONS OF CARDINAL UTILITY ANALYSIS OF DEMAND

Utility analysis was the first attempt at building up a systematic theory of demand. Its development was spanned over a century and a half and was perfected to its present form by Prof. Marshall. Although A.C. Pigou and many other successors of Marshall tried to clear up ambiguities in the analysis, yet the form in which Marshall had put it could not be defended. The main points of criticism of this theory are as:

1. **Subjective nature of Utility-** The use of the word 'utility' to explain the origin of demand has been criticised. While market demand is an objective phenomenon, the utility theorists tried to give a subjective explanation of the same. Therein they involved themselves in difficult psychological and philosophical questions. The critics point out that human beings do not engage in deliberative and careful comparisons or calculations of marginal utility derived from the consumption of a commodity.
2. **Difficulty in measuring utility-** Utility analysis is based on the assumption of cardinal measurement of utility. At a very early stage of development of the theory, doubt was expressed about the quantitative measurability of utility. Marshall tried to measure it through the assumption of constant marginal utility of money but could not free it from its subjective colour. Subsequently, an objective unit of measurement called 'util' was introduced. But all this did not stop the tide of criticism on the measurability of utility.

3. **Too many assumptions-** Critics of the utility analysis point out that while it assumes 'too much', it proves 'too little'. Marshall, who perfected the theory to its final form, assumed too much under 'other things remaining the same'. If the theory is to have any realism and relevance, some of the assumptions ought to be let out of Marshall's list. The indifference preference analysis built up by Hicks and Allen achieves the same results as the marginal utility theory. It is better because it is based on fewer assumptions.

4. **Unrealistic assumption of constant marginal utility of Money-** Marshall's statement of the Law of Demand is based on the assumption that marginal utility of money to the consumer does not change even as he purchases more or less of the commodity he wants. This assumption is not justified for those commodities which claim a major part of consumer's budget such as wheat, atta, ghee clothing and fuel. The assumption is practically invalid.

5. **Ignores Income Effect-** Marshallian analysis of demand applies to the one commodity case only and therefore the income effect is ignored. As Professor Hicks has remarked, "Theory of demand for a single commodity is only the beginning of demand theory. The general theory of demand is a theory of the relation between the set of prices at which purchases are made, and the set of quantities which are purchased." To be really useful, Marshall's theory needed to be generalised by taking into consideration the income effect of price change of a commodity.

6. **Fails to explain Giffen Paradox-** The marginal utility analysis does not divide 'price effect' into 'income effect' and the 'substitution effect'. The demand theorem (curve) derived from it simply tells us that the amount demanded of a commodity extends with a fall in its price and vice versa. Marshall could not explain as to why the demand for some (Giffen) goods such as bread rose up as their prices also went up. The Marshallian demand curve is the usual price-quantity demand curve along which real income changes although money income remains constant. This demand curve, therefore, puts together the change in amount demanded as a result of the income and the substitution effects. This is why the analysis failed to explain Giffen Paradox.

### **C. CHECK YOUR PROGRESS**

#### **True/False Statements:**

1. Utility analysis assumes that utility can be measured numerically, which is not possible in real life.
2. The concept of diminishing marginal utility is universally accepted without any exceptions.
3. Utility analysis ignores the effect of substitutes and complementary goods.
4. According to utility analysis, consumer behavior is influenced only by price and utility, not by habits or advertising.
5. One major limitation of utility analysis is that it assumes constant marginal utility of money.

#### **Answers:**

- |         |          |         |
|---------|----------|---------|
| 1. True | 2. False | 3. True |
| 4. True | 5. True  |         |

### **8.4 LET US SUM UP**

Consumer's equilibrium refers to a situation where in a consumer gets maximum satisfaction out of his given income and he has no tendency to make any change in his existing

expenditure. “A consumer is in equilibrium when he regards his actual behaviour as the best possible under the circumstances and feels no necessity to change his behaviour as long as circumstances remain unchanged,”

Consumer’s equilibrium through utility analysis is based on the assumptions such as rational consumer, Cardinal utility, independent utility, and marginal utility of money is constant.

The aim of the consumer in the expenditure of his income is to obtain the maximum utility from the goods purchased. Therefore, in the choice of his expenditure on different goods and services, the consumer is guided by the Law of Diminishing Marginal Utility of a commodity on the one side and the reduced income left with him on the other. A consumer is in equilibrium when he has no intention to change the pattern of consumption of different goods.

Consumers’ equilibrium through utility analysis is explained under two different situations i.e. with respect to single commodity; and with two commodities. In finding out the equilibrium of the consumer with two commodities, we are guided by the principle of equi-marginal utility applicable to the consumer.

Utility analysis was the first attempt at building up a systematic theory of demand. Its development was spanned over a century and a half and was perfected to its present form by Prof. Marshall. Further, this analysis is criticised on the basis of certain points, i.e., Subjective nature of Utility, Difficulty in measuring utility, too many assumptions, Unrealistic assumption of constant marginal utility of Money, ignores Income Effect, and fails to explain Giffen Paradox.

## 8.5 GLOSSARY

- **Consumer’s Equilibrium** – A state where the consumer maximizes total utility given their income and the prices of goods.
- **Law of Equi-Marginal Utility** – A consumer reaches equilibrium when the ratio of marginal utility to price is equal for all goods.
- **One Commodity Equilibrium** – The point where marginal utility of a good equals



its price, ensuring maximum satisfaction from that good.

- **MU = Price (P)** – The equilibrium condition for one commodity, where the satisfaction from the last unit equals its price

## 8.6 SELFASSESSMENT QUESTIONS

1. What is consumer's equilibrium? Give its assumptions.

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2. Explain the conditions of consumer's equilibrium when the consumer Consumes a single commodity and several commodities?

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3. Total utility is maximum, when marginal utility (MU) is zero. Explain with an illustration?

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## 8.7 LESSON END EXERCISE

1. Explain the concept of consumer's equilibrium using the cardinal utility approach. How does a consumer attain equilibrium when consuming only one commodity? Illustrate with a schedule and diagram.

Q2. What is the law of equi-marginal utility? How does a consumer attain equilibrium when consuming two commodities under the cardinal utility approach? Explain with a suitable example.

2.

## **8.8 SUGGESTED READINGS**

- Economic Theory, Chopra, P.N., Kalyani Publishers, New Delhi.
- Advance Economic Theory (Micro Economic Analysis), Ahuja, H.L., S. Chand, New Delhi.
- Managerial Economics, Mehta P.L., Sultan Chand & Sons, Delhi.
- Principles of Micro Economics, Misra & Puri, Himalaya Publishing House, New Delhi.

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**CONSUMER EQUILIBRIUM UNDER INDIFFERENCE****CURVE APPROACH****STRUCTURE**

- 9.0 Learning Objectives and Outcomes
- 9.1 Introduction
- 9.2 Assumptions
- 9.3 Price Line
  - 9.3.1 Shifting Price Line with Change in Consumer's Income
  - 9.3.2 Shifting Price Line with Change in Price of the Commodity
  - 9.3.3 Consumer Indifference Map
- 9.4 Equilibrium of the Consumer
  - 9.4.1 Unstability of Consumer Equilibrium
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**9.0 LEARNING OBJECTIVES AND OUTCOMES****Learning Objectives**

After reading this chapter, you will be able:

- To define budget line
- To explain how this budget line shifts

- To explain consumer's equilibrium through indifference curve analysis.

### **Learning Outcomes**

After completing this chapter, students will be able to:

- Identify and define the concept of a budget line and its components.
- Analyze the factors that cause shifts in the budget line, including changes in income and prices.
- Evaluate consumer's equilibrium using indifference curve analysis, integrating both preferences and budget constraints.

## **9.1 INTRODUCTION**

Every consumer aims at spending his income in a way that gives him maximum satisfaction. When a consumer gets maximum satisfaction from his expenditure, he is said to be in equilibrium. Therefore, a consumer is in equilibrium when he obtains the maximum satisfaction from his expenditure on the commodities he wants to purchase. Consumer's equilibrium shows a situation in which the consumer purchases such a combination of the commodities that he gets the maximum satisfaction from his given income and with given prices of the commodities. The point of equilibrium is such that he does not want a change from it. The pattern of the consumption of the commodities as well as the rate of consumption per unit of time is the best possible from the point of view of the consumer. Consumer's equilibrium can also be defined as a point of rest for the consumer. In other words, consumer's equilibrium is a situation where the consumer does not want to move either forward or backward. The reason is that the point of equilibrium is regarded by the consumer as the ideal point. In the words of Tiber Scitovsky, "A consumer is in equilibrium when he regards his actual behaviour as the best possible under the circumstances and he feels no urge to change his behaviour as long as circumstances remain unchanged".

## **9.2 ASSUMPTIONS**

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

1. Prices of the commodities are given to the consumer.
2. Consumer's income is also given.
3. The consumer knows the prices of the commodities and the possible combinations of the two commodities which he can choose.
4. The consumer can spend his income in small amounts also.
5. The consumer is rational and wants to obtain the maximum satisfaction.
6. The consumer knows the combinations among which he is indifferent. He knows his indifference map fully.
7. There is perfect competition in the market from where he is purchasing the commodities.
8. The commodities he is purchasing are divisible enough to form different combinations acceptable to the consumer

### **9.3 BUDGET LINE**

In order to study consumer's equilibrium, we assume that the consumer has the given income with which he wants to purchase at the given prices of the commodities. The consumer wants to go higher and higher up on his indifference curves in his indifference map. But choice is limited to the combinations of the commodities he can purchase with his given income at the given prices. Suppose the consumer has an income of Rs. 5 to spend on biscuits and cups of coffee. He wants to purchase a combination of the commodities which gives him the highest possible satisfaction. Suppose further that the cup offered is a special big cup of coffee priced at Re. 1. The biscuit is priced at 5 paise.

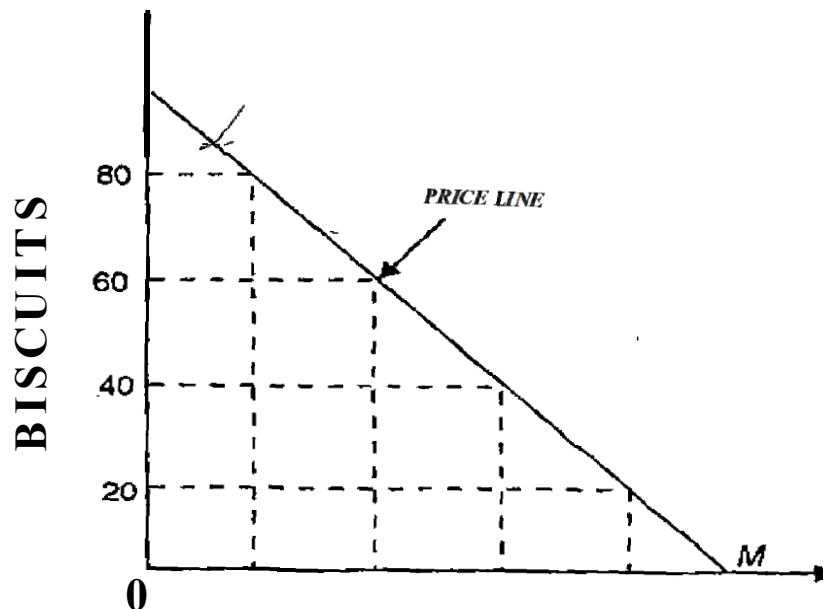
Now, if the consumer spends his total income of Rs. 5 on cups of coffee alone, he can purchase five cups. On the other hand, if he purchases biscuits alone, he can get hundred biscuits by spending his total income. These are extreme points of his choice. Generally the consumer will purchase combinations of coffee and biscuits. The following table gives the obtainable combinations of coffee and biscuits with the income of Rs. 5 at the given prices.

**Table 9.1**  
**The Attainable Combinations of Coffee and Biscuits**

Cups of Coffee Re. 1 per cup	Biscuits Re. 0.5 per biscuit
0	100
1	80
2	60
3	40
4	20
5	0

The schedule given above shows the various combinations available to the consumer at given prices with his given income. He has to choose a combination out of this set which gives him the maximum satisfaction. We can show all the combinations available to him on a graph. These points showing these combinations shall lie on a straight line shown as LM in the figure 9.1. This line joining the points of five cups on the X-axis and hundred biscuits on the Y-axis is called the price line. The price line shows all those combinations which can be bought by the consumer at the given prices. Therefore, it is also called the price-opportunity line or budget line. It shows the possible combinations of consumer's consumption. Therefore, it is also known as the consumption possibility line.

The price line is a straight line sloping from left down to the right. It has only one slope throughout which shows the constant price ratio for the two commodities. It has a negative slope which shows that the consumer can have more of one commodity only by sacrificing some of the other. The point of consumer's equilibrium must be a point on this line.



### Figure 9.1: Price Line or Budget Line

If consumer's income changes or there is a change in the price of the two commodities, the price line also changes its position. The change in the position of the price line can be shown through figures as under.

#### A. CHECK YOUR PROGRESS

Answer the Following Questions Briefly:

1. Define a budget line.

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.....

2. What happens to the budget line when income increases?

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.....

3. How does a fall in the price of one good affect the budget line?

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4. When is a consumer said to be on the budget line?

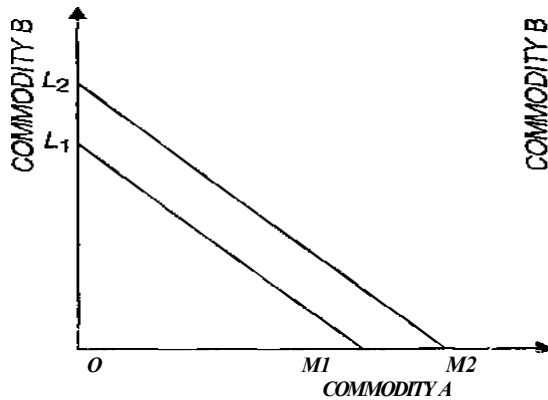
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### 9.3.1 Shifting Price Line with Change in Consumer's Income

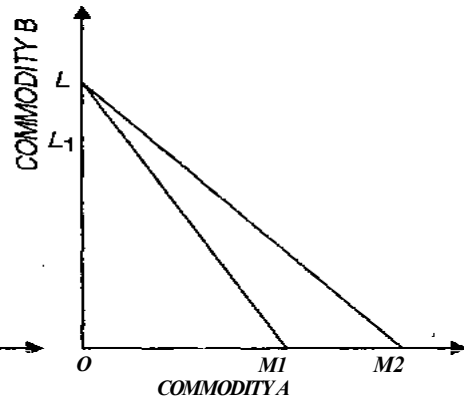
The position of the price line depends upon consumer's income and the product prices. If prices remain at the same level, a rise in income leads to a shift of the price line to the right hand side in a parallel position. A fall in the income level results in a parallel shift to the left hand side depending upon the amount of income fall.

In figure 9.2  $L_1 M_1$  was the position of the price line when the consumer had a lower level of income. The income level was just enough to purchase  $OM_1$  of commodity A or  $OL_1$  of commodity B at the given prices of the two commodities.

As consumer's income increases, he is enabled to purchase  $OM_2$  of commodity A or  $OL_2$  of commodity B. The new price line after the increase in income is  $L_2 M_2$ . It is parallel to the earlier price line  $L_1 M_1$  because the prices of the two commodities are maintained constant.



**Fig. 9.2 Increase in consumer's income price remaining the same**



**Fig. 9.3 Fall in the price of commodity A only.**



### 9.3.2 Shifting Price Line with Change in Price of the Commodity

Change in price of any one of the two commodities results in a change in the slope of the price line. The diagram given above on the right-hand side (Fig. 9.3) shows the change in the slope of the price line when commodity A becomes cheaper and the price of commodity B remains the same. In the diagram the consumer had a level of income enough to purchase OL of commodity B or OM of commodity A. As the price of commodity A falls, the consumer is able to purchase  $OM_2$  of the commodity A, thereby giving the consumer a new price line  $OM_2$ . The price line is branching from the same point L because the price of commodity B is maintained constant.

The description of the changes in the position of the price line given above shows that a knowledge of the price line is necessary to find out the attainable combinations with given income and prices. It provides a full view of the income side of the consumer.

### 9.3.3 Consumer Indifference Map

The price line shows the combinations of commodities which the market offers at the given prices to the consumer with a given level of income. For equilibrium of the consumer we must also know his scale of preferences. Consumer's preferences take the form of the indifference schedule which when presented graphically gives us the consumer's indifference map. A set of indifference curves is drawn to represent the consumer's tastes or preferences. The map shows the combinations of the commodities on different indifference which he considers to be giving him equal satisfaction. The indifference map of a consumer shows all the properties of normal indifference curves. All indifference curves slope from left down to the right. Further, all indifference curves are convex to the origin. They do not touch any one of the two axes. Higher indifference curves represent higher levels of satisfaction.

## **B. CHECK YOUR PROGRESS**

### **Multiple Choice Questions (MCQs)**

**1. What happens to the budget line if income increases and prices remain constant?**

- a) It pivots outward from the X-axis
- b) It shifts inward
- c) It shifts outward parallelly
- d) It remains unchanged

**2. If the price of Good X decreases and income remains the same, the budget line:**

- a) Shifts inward
- b) Pivots outward from X-axis
- c) Becomes vertical
- d) Shifts parallel outward

**3. The budget line remains unchanged when:**

- a) Prices increase but income decreases proportion
- b) Income and prices increase in same proportion
- c) Only price of one good falls
- d) Income increases but prices fall

**4. A parallel shift of the budget line to the left occurs due to:**

- a) Fall in income
- b) Rise in price of one good
- c) Rise in income
- d) Fall in price of both goods

**5. Which of the following affects both the position and the slope of the budget line?**

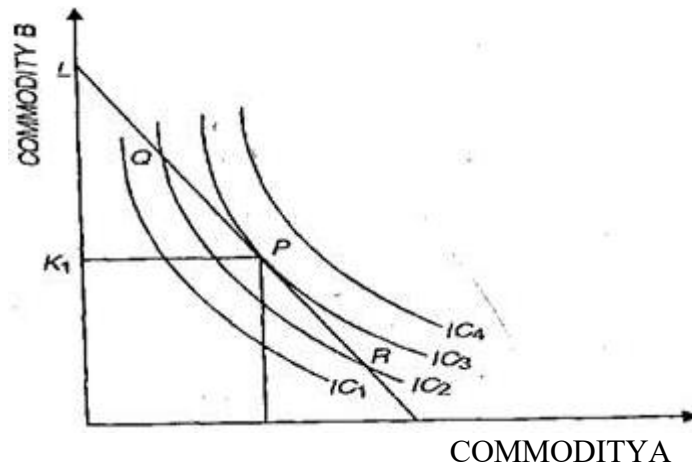
- a) Change in preferences
- b) Change in income
- c) Change in price of one good
- d) None of the above

### **Answers:**

1. c      2. b      3. b      4. a      5. c

## 9.4 EQUILIBRIUM OF THE CONSUMER

Given the indifference map of the consumer and his price line, we can find out the combination which gives him the maximum satisfaction. For this we superimpose the price line on consumer's indifference map. The Fig. 9.4 shows the indifference map and the price line together.



**Figure 9.4: Consumer's Equilibrium Through Indifference Curves**

The aim of the consumer is to obtain the highest combination he can on his indifference map. In other words, he tries to go to the highest indifference curve attainable with his given price line. He would be in equilibrium only at such a point which lies on his price line as well as on the highest attainable indifference curve. Let us look for this point in the figure 9.4 given above.

Consumer's equilibrium point is a common point between the price line and one of the indifference curves in the indifference map. There are many points on the price line which are also on some indifference curve in the map. We are interested in the common point which is on the highest indifference curve. This is the point where the price line LM is touching the highest possible indifference curve  $IC_3$  from below. The consumer is in equilibrium at the point P. This point shows a combination of the two commodities which the consumer can buy with his income at given prices and which is also on the highest possible indifference curve the consumer can reach.

Equilibrium P lies at the point of touch of the price line LM and the indifference curve  $IC_3$ . It gives us the condition of consumer's equilibrium. At this point the slope of the price line must be equal to the slope of the indifference curve. The slope of the indifference curve shows the marginal rate of substitution (MRS) at the point P. Slope of the price line is the (inverse) ratio of the prices of the two commodities. Both the slopes have a negative sign with them because the price line and the indifference curves both slope from left down to the right. Thus, the equilibrium condition being satisfied at the point P is,

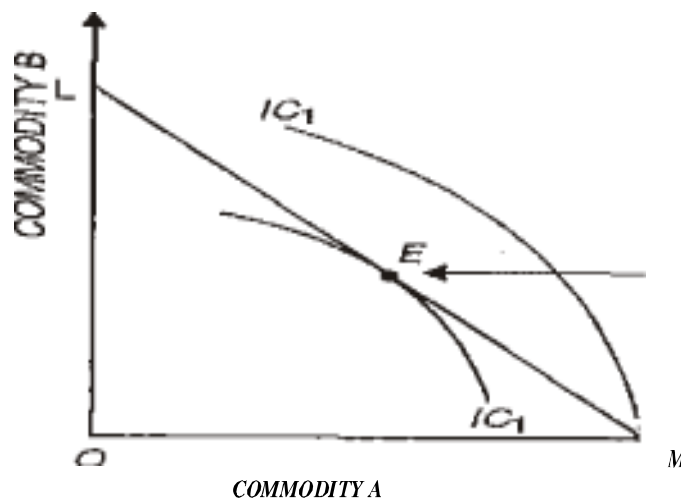
$$(\text{Price of A})/(\text{Price of B}) = \text{MRS}_{AB} = \text{Marginal rate of Substitution of A for B}$$

The equilibrium condition given above states that the rate at which the individual is willing to substitute commodity A for commodity B must equal to the rate at which he can substitute A and B in the market at given prices. Consumer's equilibrium also requires another condition. It is that the marginal rate of substitution (MRS) should be diminishing at the point of equilibrium. In other words, indifference curve should be convex to the origin at the point of touch with the price line. If this condition is not satisfied, the equilibrium of the consumer cannot be stable.

#### 9.4.1 Unstability of Consumer Equilibrium

Suppose that the marginal rate of substitution is not falling then it can either be constant or

increasing. The constant marginal rate of substitution is not possible since it shows that the utility derived from the consumption of goods remains the same. The second possibility of increasing marginal rate of substitution is also ruled out because it shows that the utility derived from another unit is more than the utility got from its previous unit. So this is also absurd. Thus MRS can be only diminishing i.e. IC should be convex to the origin. This can be shown with the help of figure 9.5.



**Fig. 9.5 Consumer's equilibrium will be unstable if the IC curve is convex to the origin**

Figure 9.5 measures commodity A on X-axis and commodity B on Y-axis. LM is the price line. E is a point where indifference curve (IC) is tangent to the price line. So, on point E the ratio of the prices of two goods and MRS is the same. But point E is not a stable equilibrium point because here MRS is increasing. IC is concave to the origin. It means that any movement to the right or left of point E will give more utility to the consumer as it will take him to a higher indifference curve. So E is not a point of stable equilibrium. Hicks called point E as the 'minimum utility point'. In this case, the consumer will be in equilibrium at point R where indifference curve touches the price line on its lower point M.

### C. CHECK YOUR PROGRESS

#### True or False

1. Consumer equilibrium can be achieved with any combination of goods regardless of income. (\_\_\_)
2. The consumer's equilibrium point maximizes total utility subject to the budget constraint. (\_\_\_)
3. Indifference curves can intersect each other. (\_\_\_)
4. The marginal utility per rupee spent on one good should be equal to that of another good at equilibrium. (\_\_\_)
5. Consumer equilibrium cannot be analysed.
6. The law of diminishing marginal utility states that as consumption increases, marginal utility eventually decreases. (\_\_\_)
7. Consumer equilibrium is reached when the consumer spends all their income on a single good. (\_\_\_)
8. Total utility always increases as more units of a good are consumed. (\_\_\_)

#### Answers

- |          |         |          |          |
|----------|---------|----------|----------|
| 1. False | 2. True | 3. False | 4. True  |
| 5. False | 6. True | 7. False | 8. False |

Overall, the conditions for consumer's equilibrium are:

- (i) The indifference curve should be tangent to the price line at the point of equilibrium.
- (ii) The slope of the price line should be equal to the slope of the indifference curve.
- (iii) The indifference curve should be convex to the origin at the point of equilibrium.

One thing should be clear that consumer's equilibrium is not a stable or permanent thing. It undergoes a change with changes in the consumer's income and the prices of the goods he purchases.

### 9.5 LET US SUM UP

Every consumer aims at spending his income in a way that gives him maximum satisfaction. When a consumer gets maximum satisfaction from his expenditure, he is said to be in equilibrium. Thus, Consumer's equilibrium shows a situation in which the consumer purchases such a combination of the commodities that he gets the maximum satisfaction. Consumer's equilibrium can also be defined as a point of rest for the consumer.

In earlier chapter, the concept of utility analysis is used to explain consumer's equilibrium. Further, in this chapter, the consumer's equilibrium is explained with the help of indifference curve analysis, which is based upon certain assumptions, viz., Prices and income are given to the consumer, consumer can spend his income in small amounts, rational consumer, consumers' knows his indifference map, perfect competition prevails, and the commodities are divisible.

For studying consumer's equilibrium, we assume that the consumer has the given income with which he wants to purchase at the given prices of the commodities. The consumer wants to go higher and higher up on his indifference curves in his indifference map. But choice is limited to the combinations of the commodities he can purchase with his given income at the given prices. The price line shows all those combinations which can be bought by the consumer at the given prices. Therefore, it is also called the price-opportunity line or budget line. The price line is a straight line sloping from left down to the right. It has only one slope throughout which shows the constant price ratio for the two commodities. The point of consumer's equilibrium must be a point on this line.

If consumer's income changes or there is a change in the price of the two commodities, the price line also changes its position, which further leads to shifting of price/budget line due to change in income of the consumer or prices of the commodities. Consumer's preferences take the form of the indifference schedule which when presented graphically gives us the consumer's indifference map. A set of indifference curves is drawn to represent the consumer's tastes or preferences. Given the indifference map of the consumer and his price line, we can find out the combination which gives him the maximum satisfaction. The aim of the consumer is to obtain the highest combination he can on his indifference map. In other words, he tries to go to the highest indifference curve attainable with his given price line. He would be in equilibrium only at such a point which lies on his price line as well as on the highest attainable indifference curve.

Consumer's equilibrium point is a common point between the price line and one of the

indifference curves in the indifference map. We are interested in the common point which is on the highest indifference curve.

## 9.6 SELF ASSESSMENT QUESTIONS

1. Show how a consumer attains equilibrium with the help of indifference curves?

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2. Explain the uses of indifference curves.

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3. Explain the proposition that it is good to allow people exchange the goods under rationing?

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## 9.8 GLOSSARY

- **Assumptions of Consumer Behavior:** Basic conditions assumed for analyzing consumer choices, such as rationality, income constraints, and preference consistency.
- **Price Line (Budget Line):** A graphical representation showing all possible combinations of two goods a consumer can buy with a fixed income and given prices.
- **Income-Induced Shift of Price Line:** The movement of the budget line caused by changes in consumer's income, shifting it outward or inward while prices stay constant.
- **Price-Induced Rotation of Price Line:** The pivoting of the budget line when the price of one commodity changes, altering the slope but keeping income and the other price unchanged.



- **Consumer Indifference Map:** A collection of indifference curves depicting different levels of satisfaction, illustrating consumer preferences over combinations of goods.
- **Consumer Equilibrium:** The optimal consumption point where the consumer maximizes satisfaction within their budget, typically where the budget line is tangent to an indifference curve.
- **Instability of Consumer Equilibrium:** A situation where small changes in income or prices disrupt the consumer's optimal choice, causing the equilibrium to be unstable or shift unpredictably.

## 9.9 LESSON END EXERCISE

1. How an increase or decrease in income shifts the price line outward or inward, affecting consumption choices?
2. How the consumer attains equilibrium by maximizing satisfaction subject to budget constraints using price lines and indifference curves?
3. Introduction to indifference curves and maps illustrating consumer preferences across different combinations of goods?

## 9.9 SUGGESTED READINGS

- Advance Economic Theory, Ahuja, H.L., S. Chand & Sons, New Delhi.
- Economic Theory, Chopra P.N., Kalyani Publishers, New Delhi.
- Principles of Micro Economics, Misra & Puri, Himalaya Publishing House, New Delhi.

**DEMAND FORECASTING****STRUCTURE**

10.0 Learning Objectives and Learning Outcomes

10.1 Introduction

10.2 Meaning

10.2.1 Definition

10.2.2 Procedure to Prepare Sales Forecast

10.3 Types of Forecasting

10.4 Forecasting Techniques

10.5 Criteria of good Forecasting Method

10.6 Significance of Forecasting

10.7 Let Us Sum Up

10.8 Glossary

10.9 Self-Assessment Questions

10.10 Lesson End Exercise

10.11 Suggested Reading

## **10.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

The specific objectives of this chapter are:

- To Define sales/demand forecasting.
- To Explain types and techniques of forecasting.
- To portray the significance of demand forecasting.

### **Learning Outcomes**

After studying this chapter, you will be able to:

- Understand and clearly define the concept of sales or demand forecasting.
- Identify and differentiate between various types and methods used in forecasting demand.
- Recognize the importance and practical benefits of demand forecasting in business planning and decision-making.

## **10.1 INTRODUCTION**

Forecasts are becoming the lifetime of business in a world, where the tidal waves of change are sweeping the most established of structures, inherited by human society. Commerce just happens to be one of the first casualties. Survival in this age of economic

predators requires the tact, talent and technique of predicting the future. Forecast is becoming the sign of survival and the language of business. All requirements of the business sector need the technique of accurate and practical reading into the future. Forecasts are, therefore, very essential requirement for the survival of business. Management requires forecasting information when making a wide range of decisions. The sales/demand forecast is particularly important as it is the foundation upon which all company plans are built in terms of markets and revenue. Management would be a simple matter if business was not in a continual state of change, the pace of which has quickened in recent years. It is becoming increasingly important and necessary for business to predict their future prospects

in terms of sales, cost and profits. The value of future sales is crucial as it affects costs profits, so the prediction of future sales is the logical starting point of all business planning.

## **10.2 MEANING OF FORECAST**

A forecast is a prediction or estimation of future situation. It is an objective assessment of future course of action. Since future is uncertain, no forecast can be percent correct. Forecasts can be both physical as well as financial in nature. The more realistic the forecasts, the more effective decisions can be taken for tomorrow.

### **10.2.1 Definition**

In the words of Cundiff and Still, “Demand forecasting is an estimate of sales during a specified future period which is tied to a proposed marketing plan and which assumes a particular set of uncontrollable and competitive forces”. Therefore, demand forecasting is a projection of firm’s expected level of sales based on a chosen marketing plan and environment.

### **10.2.2 Procedure to Prepare Sales Forecast**

Companies commonly use a three-stage procedure to prepare a sales forecast. They make an environmental forecast, followed by an industry forecast, and followed by a company's sales forecast, the environmental forecast calls for projecting inflation, unemployment, interest rate, consumer spending, and saving, business investment, government expenditure, net exports and other environmental magnitudes and events of importance to the company.

The industry forecast is based on surveys of consumers' intention and analysis of statistical trends is made available by trade associations or chamber of commerce. It can give indication to a firm regarding the direction in which the whole industry will be moving. The company derives its sales forecast by assuming that it will win a certain market share.

Sales forecasting is the process of estimating future sales over a specific period based on various factors such as historical data, market trends, consumer behavior, and business strategies. A well-prepared sales forecast helps businesses in production planning, budgeting, staffing, and inventory management.

Here is a detailed explanation of the step-by-step procedure for preparing a sales forecast:

### **1. Define the Objectives of Forecasting:**

The first step is to clearly identify **why** the sales forecast is being prepared. The objective could vary depending on business needs—such as for setting sales targets, planning raw material purchases, deciding on advertising budgets, or expanding into new markets. Clear objectives ensure that the forecast is relevant and aligned with the company's goals.

### **2. Analyze Market Conditions:**

Study the **current and expected market environment**. This includes:

- Consumer preferences and purchasing patterns
  - Competitive landscape and industry trends
  - Economic indicators like inflation, interest rates, and GDP
  - Seasonal and cultural influences (e.g., festivals, holidays)
- This helps in understanding external factors that may influence demand.

### **3. Collect and Organize Historical Sales Data:**

Accurate past sales data is crucial for forecasting. Gather and analyze data related to:

- Monthly or yearly sales volume
  - Customer segments and buying frequency
  - Sales by product category or region
- This step helps identify patterns such as seasonality, cyclical trends, and long-term growth.

### **4. Choose an Appropriate Forecasting Method:**

Select a forecasting technique based on the available data, nature of the product, and forecast duration:

- **Quantitative Methods** (data-driven):
  - Time series analysis
  - Moving averages
  - Exponential smoothing
  - Regression analysis
- **Qualitative Methods** (judgment-based):
  - Expert opinions
  - Market research
  - Delphi technique
  - Sales force estimates

For a new business or product with no past data, qualitative methods may be more appropriate. Established businesses with good historical records often use quantitative models.

### **5. Apply the Forecasting Method:**

Implement the chosen technique to generate sales estimates. Use statistical tools, software, or spreadsheets to analyze data trends and project future sales. The forecast should reflect realistic assumptions about customer behavior and market dynamics.

### **6. Make Necessary Adjustments:**

Adjust the forecast to account for expected internal or external changes, such as:

- New product launches or discontinuation of old ones
- Pricing strategy changes
- Marketing campaigns or seasonal offers
- Supply chain issues or policy changes

- Entry into new markets

These adjustments help make the forecast more reliable.

### **7. Validate the Forecast:**

Once the initial forecast is prepared, it should be reviewed by relevant departments (sales, marketing, finance) for accuracy and practicality. Comparing it with similar past forecasts or industry benchmarks can help verify its reliability.

### **8. Monitor, Compare, and Revise:**

After implementation, continuously **track actual sales** versus the forecast. Analyze deviations and revise the forecasting model if needed. Regular monitoring improves the accuracy of future forecasts and helps in making better decisions over time.

### **Conclusion:**

An effective sales forecasting process enables organizations to anticipate demand, reduce uncertainty, optimize resources, and stay competitive in the market. The accuracy of the forecast depends not only on the method used but also on the quality of data and the insightfulness of adjustments made.

### **A. CHECK YOUR PROGRESS**

#### **True or False Statements:**

1. Sales forecasting is only useful for new businesses entering the market.
2. Qualitative forecasting methods rely more on expert judgment than numerical data.
3. Adjustments to the forecast are made to account for changes like new product launches or seasonal factors.
4. Historical sales data is not required when using time series or moving average forecasting methods.
5. The forecasting process ends once the sales forecast is finalized and implemented.

#### **Answers:**

1. False      2. True      3. True      4. False      5. False

### **10.3 TYPES OF FORECASTING**

Forecasting can be broadly classified into; Passive Forecast and Active Forecast. Under passive forecast prediction about future is based on the assumption that the firm does not change the course of its action. Under active forecast, prediction is done under the condition of likely future changes in the actions by the firms.

- I. Short term demand forecasting and long term demand forecasting:** In a short run forecast, seasonal patterns are of much importance. It may cover a period of three months, six months or one year. It is one which provides information for tactical decisions. Which period is chosen depends upon the nature of business. Such a forecast helps in preparing suitable sales policy. Long term forecasts are helpful in suitable capital planning. It is one which provides information for major strategic decisions. It helps in saving the wastages in material, man hours, machine time and capacity. Planning of a new unit must start with an analysis of the long term demand potential of the products of the firm.

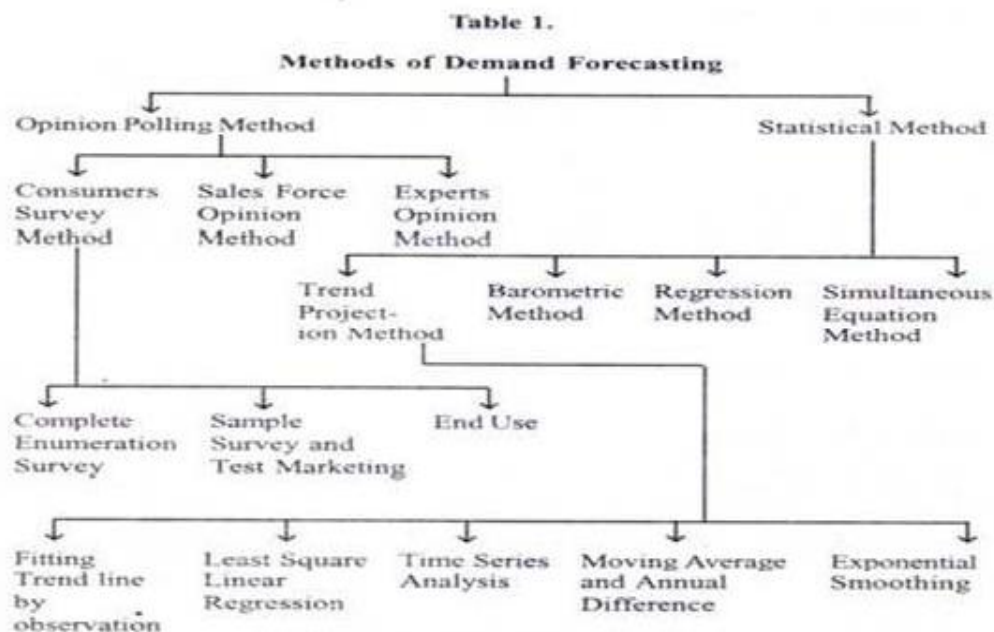


- II. External and Internal forecast:** External forecast deals with trends in general business. It is usually prepared by a company's research wing or by outside consultants. Internal forecast includes all those that are related to the operation of a particular enterprise such as sales group, production group, and financial group. The structure of internal forecast includes forecast of annual sales, forecast of products cost, forecast of operating profit, forecast of taxable income, forecast of cash resources, forecast of the number of employees, etc.

#### 10.4 FORECASTING TECHNIQUES

Demand forecasting is a difficult exercise. Making estimates for future under the changing conditions is a Herculean task. Consumers' behaviour is the most unpredictable one because it is motivated and influenced by a multiplicity of forces. There is no easy method or a simple formula which enables the manager to predict the future. Economists and statisticians have developed several methods of demand forecasting. Each of these methods has its relative advantages and disadvantages. Selection of the right method is essential to make demand forecasting accurate. In demand forecasting, a judicious combination of statistical skill and rational judgement is needed. Mathematical and statistical techniques are essential in classifying relationships and providing techniques of analysis, but they are in no way an alternative for sound judgement. Sound judgement is a prime requisite for good forecast. The judgment should be based upon facts and the personal bias of the forecaster should not prevail upon the facts. Therefore, a mid way should be followed between mathematical techniques and sound judgment or pure guess work

The various methods of demand forecasting can be summarised in the form of a chart:



The more commonly used methods of demand forecasting are discussed below:

### **I. Opinion Polling Method**

In this method, the opinion of the buyers, sales force and experts could be gathered to determine the emerging trend in the market.

**The opinion polling methods of demand forecasting are of three kinds:**

**(1) Consumer's Survey Method or Survey of Buyer's Intentions:** In this method, the consumers are directly approached to disclose their future purchase plans. This is done by interviewing all consumers or a selected group of consumers out of the relevant population. This is the direct method of estimating demand in the short run. Here the burden of forecasting is shifted to the buyer. The firm may go in for complete enumeration or for sample surveys. If the commodity under consideration is an intermediate product then the industries using it as an end product are surveyed.

**(a) Complete Enumeration Survey:** Under the Complete Enumeration Survey, the firm has to go for a door to door survey for the forecast period by contacting all the households in the area. This method has an advantage of first hand, unbiased information, yet it has its share of disadvantages also. The major limitation of this method is that it requires lot of resources, manpower and time. In this method, consumers may be reluctant to reveal their purchase plans due to personal privacy or commercial secrecy. Moreover, at times the consumers may not express their opinion properly or may deliberately misguide the investigators.

**(b) Sample Survey and Test Marketing:** Under this method some representative households are selected on random basis as samples and their opinion is taken as the generalised opinion. This method is based on the basic assumption that the sample truly represents the population. If the sample is the true representative, there is likely to be no significant difference in the results obtained by the survey. Apart from that, this method is less tedious and less costly. A variant of sample survey technique is test marketing. Product testing essentially involves placing the product with a number of users for a set period. Their reactions to the product are noted after a period of time and an estimate of likely demand is made from the result. These are suitable for new products or for radically modified old products for which no prior data exists. It is a more scientific method of

estimating likely demand because it stimulates a national launch in a closely defined geographical area.

**(c) End Use Method or Input-Output Method:** This method is quite useful for industries which are mainly producer's goods. In this method, the sale of the product under consideration is projected as the basis of demand survey of the industries using this product as an intermediate product, that is, the demand for the final product is the end user demand of the intermediate product used in the production of this final product. The end user demand estimation of an intermediate product may involve many final good industries using this product at home and abroad. It helps us to understand inter-industry relations. In input-output accounting two matrices used are the transaction matrix and the input coefficient matrix. The major efforts required by this type are not in its operation but in the collection and presentation of data.

### **(2) Sales Force Opinion Method**

This is also known as collective opinion method. In this method, instead of consumers, the opinion of the salesmen is sought. It is sometimes referred as the “grass roots approach” as it is a bottom-up method that requires each sales person in the company to make an individual forecast for his or her particular sales territory. These individual forecasts are discussed and agreed with the sales manager. The composite of all forecasts then constitutes the sales forecast for the organisation. The advantages of this method are that it is easy and cheap. It does not involve any elaborate statistical treatment. The main merit of this method lies in the collective wisdom of salesmen. This method is more useful in forecasting sales of new products.

### **(3) Experts Opinion Method**

This method is also known as “Delphi Technique” of investigation. The Delphi method requires a panel of experts, who are interrogated through a sequence of questionnaires in which the responses to one questionnaire are used to produce the next questionnaire. Thus any information available to some experts and not to others is passed on, enabling all the experts to have access to all the information for forecasting. The method is used for long term forecasting to estimate potential sales for new products. This method presumes two conditions: Firstly, the panellists must be rich in their expertise, possess wide range of

knowledge and experience. Secondly, its conductors are objective in their job. This method has some exclusive advantages of saving time and other resources.

## **II. Statistical Method**

Statistical methods have proved to be immensely useful in demand forecasting. In order to maintain objectivity, that is, by consideration of all implications and viewing the problem from an external point of view, the statistical methods are used. The important statistical methods are:

### **(1) Trend Projection Method**

A firm existing for a long time will have its own data regarding sales for past years. Such data when arranged chronologically yield what is referred to as 'time series'. Time series shows the past sales with effective demand for a particular product under normal conditions. Such data can be given in a tabular or graphic form for further analysis. This is the most popular method among business firms, partly because it is simple and inexpensive and partly because time series data often exhibit a persistent growth trend. Time series has got four types of components namely, Secular Trend (T), Secular Variation (S), Cyclical Element (C), and an Irregular or Random Variation (I). These elements are expressed by the equation  $O = TSCI$ . Secular trend refers to the long run changes that occur as a result of general tendency.

Seasonal variations refer to changes in the short run weather pattern or social habits. Cyclical variations refer to the changes that occur in industry during depression and boom. Random variation refers to the factors which are generally able such as wars, strikes, flood, famine and so on. When a forecast is made the seasonal, cyclical and random variations are removed from the observed data. Thus, only the secular trend is left. This trend is then projected. Trend projection fits a trend line to a mathematical equation. The trend can be estimated by using Graphical and Least Square Method.

### **(2) Barometric Technique**

A barometer is an instrument of measuring change. This method is based on the notion that "the future can be predicted from certain happenings in the present." In other words, barometric techniques are based on the idea that certain events of the present can be used to predict the directions of change in the future. This is accomplished by the use of economic

and statistical indicators which serve as barometers of economic change.

### **(3) Regression Analysis**

It attempts to assess the relationship between at least two variables (one or more independent and one dependent), the purpose being to predict the value of the dependent variable from the specific value of the independent variable. The basis of this prediction generally is historical data. This method starts from the assumption that a basic relationship exists between two variables. An interactive statistical analysis computer package is used to formulate the mathematical relationship which exists.

### **(4) Econometric Models**

Econometric models are an extension of the regression technique whereby a system of independent regression equation is solved. The requirement for satisfactory use of the econometric model in forecasting is under three heads: variables, equations and data. The appropriate procedure in forecasting by econometric methods is model building. Econometrics attempts to express economic theories in mathematical terms in such a way that they can be verified by statistical methods and to measure the impact of one economic variable upon another so as to be able to predict future events.

## **B. CHECK YOUR PROGRESS**

### **Case Study**

**Background:** Urban Threads is a startup that sells trendy, eco-friendly clothing online. After six months of operation, the company noticed inconsistent sales patterns — high spikes during social media campaigns and sudden drops in certain weeks. The team wants to use forecasting to plan inventory better and avoid stockouts or overstocking.

Due to limited past data, they are unsure which forecasting technique will give reliable results. The marketing team believes qualitative inputs will help, while the finance team insists on using sales figures for a quantitative approach.

**Questions:**

1. Which forecasting technique should Urban Threads use given its limited data: qualitative or quantitative? Explain why.
2. How can the company use moving average or trend analysis once more data becomes available?
3. What role can social media campaign results play in improving demand forecasting?

**10.5 CRITERIA OF A GOOD FORECASTING METHOD**

There are thus, a good many ways to make a guess about future sales. They show contrast in cost, flexibility and the adequate skills and sophistication. Therefore, there is a problem of choosing the best method for a particular demand situation. There are certain economic criteria of broader applicability. They are:

**(i) Accuracy:** The forecast obtained must be accurate. How is an accurate forecast possible? To obtain an accurate forecast, it is essential to check the accuracy of past forecasts against present performance and of present forecasts against future performance. Accuracy cannot be tested by precise measurement but by judgment.

**(ii) Plausibility:** The executive should have good understanding of the technique chosen and they should have confidence in the techniques used. Understanding is also needed for a proper interpretation of results. Plausibility requirements can often improve the accuracy of results.

**(iii) Durability:** Unfortunately, a demand function fitted to past experience may back cost vary greatly and still fall apart in a short time as a forecaster. The durability of the forecasting power of a demand function depends partly on the reasonableness and simplicity of functions fitted, but primarily on the stability of the understanding relationships measured in the past. Of course, the importance of durability determines the allowable cost of the forecast.

**(iv) Flexibility:** Flexibility can be viewed as an alternative to generality. Along lasting function could be set up in terms of basic natural forces and human motives. Even though fundamental, it would nevertheless be hard to measure and thus not very useful. A set of variables whose co-efficient could be adjusted from time to time to meet changing conditions in more practical way to maintain intact the routine procedure of forecasting.

**(v) Availability:** Immediate availability of data is a vital requirement and the search for reasonable approximations to relevance in late data is a constant strain on the forecasters patience. The techniques employed should be able to produce meaningful results quickly. Delay in result will adversely affect the managerial decisions.

**(vi) Economy:** Cost is a primary consideration which should be weighted against the importance of the forecasts to the business operations. A question may arise: How much money and managerial effort should be allocated to obtain a high level of forecasting accuracy? The criterion here is the economic consideration.

**(vii) Simplicity:** Statistical and econometric models are certainly useful but they are intolerably complex. To those executives who have a fear of mathematics, these methods would appear to be Latin or Greek. The procedure should, therefore, be simple and easy so that the management may appreciate and understand why it has been adopted by the forecaster.

**(viii) Consistency:** The forecaster has to deal with various components which are independent. If he does not make an adjustment in one component to bring it in line with a forecast of another, he would achieve a whole which would appear consistent.

## **10.6 Significance of Forecasting**

Forecasting reduces the risk associated with business fluctuations which generally produce

harmful effects in business, create unemployment, induce speculation, discourage capital formation and reduce the profit margin. Forecasting is indispensable and it plays a very important part in the determination of various policies. In modern times forecasting has been put on scientific footing so that the risks associated with it have been considerably minimised and the chances of precision increased. In most of the advanced countries there are specialised agencies. In India businessmen are not at all interested in making scientific forecasts. They depend more on chance, luck and astrology. They are highly superstitious and hence their forecasts are not correct. Sufficient data are not available to make reliable forecasts. However, statistics alone do not forecast future conditions. Judgment, experience and knowledge of the particular trade are also necessary to make proper analysis and interpretation and to arrive at sound conclusions. Decision support systems consist of three elements: decision, prediction and control. It is, of course, with prediction that marketing forecasting is concerned. The forecasting of sales can be regarded as a system, having inputs appraises and an output. This simplistic view serves as a useful measure for the analysis of the true worth of sales forecasting as an aid to management. In spite of all these no one can predict future economic activity with certainty. Forecasts are estimates about which no one can be sure.

### **C. CHECK YOUR PROGRESS**

#### **Fill in the Blanks:**

1. A good forecasting method should be \_\_\_\_\_ to understand and apply.
2. It must produce \_\_\_\_\_ results that can be trusted over time.
3. The method should be \_\_\_\_\_ enough to adapt to changing conditions.
4. A good forecasting technique must be \_\_\_\_\_ in terms of time and resources.
5. The chosen method should be \_\_\_\_\_ with the nature of the business and its products.

#### **Answer**

1. Reliable
2. Cost-effective
3. Compatible
4. Flexible
5. Simple



## 10.7 LET US SUM UP

Forecasts are becoming the lifetime of business in a world, where the tidal waves of change are sweeping the most established of structures, inherited by human society. Forecast is becoming the sign of survival and the language of business. Management requires forecasting information when making a wide range of decisions. The sales/demand forecast is particularly important as it is the foundation upon which all company plans are built in terms of markets and revenue. Forecast is a prediction or estimation of future situation. It is an objective assessment of future course of action. The more realistic the forecasts, the more effective decisions can be taken for tomorrow. Therefore, demand forecasting is a projection of firm's expected level of sales based on a chosen marketing plan and environment. Companies commonly use a three-stage procedure to prepare a sales forecast.

Forecasting can be broadly classified into; Passive Forecast and Active Forecast. Under passive forecast prediction about future is based on the assumption that the firm does not change the course of its action. Under active forecast, prediction is done under the condition of likely future changes in the actions by the firms. Demand forecasting is a difficult exercise. Making estimates for future under the changing conditions is a Herculean task. Consumers' behaviour is the most unpredictable one because it is motivated and influenced by a multiplicity of forces. There is no easy method or a simple formula which enables the manager to predict the future. Economists and statisticians have developed several methods of demand forecasting. Each of these methods has its relative advantages and disadvantages.

The more commonly used methods of demand forecasting are broadly classified into two categories, i.e., Opinion Polling Methods and Statistical Methods.

Forecasting reduces the risk associated with business fluctuations which generally produce harmful effects in business, create unemployment, induce speculation, discourage capital formation and reduce the profit margin. Forecasting is indispensable and it plays a very important part in the determination of various policies. Decision support systems consist of three elements: decision, prediction and control. It is, of course, with prediction that marketing forecasting is concerned. This simplistic view serves as a useful measure for the analysis of the true worth of sales forecasting as an aid to management. In spite of all these no one can predict future economic activity with certainty. Forecasts are estimates about

which no one can be sure. Therefore, the ideal forecasting method is one that yields returns over cost with accuracy, seems reasonable, can be formalised for reasonably long periods, can meet new circumstances adeptly and can give up-to-date results. The method of forecasting is not the same for all products. There is no unique method for forecasting the sale of any commodity. The forecaster may try one or the other method depending upon his objective, data availability, the urgency with which forecasts are needed, resources he intends to devote to this work and type of commodity whose demand he wants to forecast.

## 10.8 GLOSSARY

**Demand Forecasting:** The process of estimating future demand for a product or service using historical data, market trends, and analytical techniques.

**Sales Forecasting:** A business activity that predicts future sales volume over a specific period to guide production, inventory, and financial planning.

**Forecasting Techniques:** The methods used to estimate demand, including qualitative (e.g., expert opinion, Delphi method) and quantitative (e.g., trend analysis, regression models).

**Importance of Demand Forecasting:** Helps firms in resource planning, inventory control, budgeting, and minimizing future business uncertainties.

**Qualitative Forecasting:** A forecasting method based on expert judgment, opinions, or intuition, often used when data is limited or uncertain.

**Quantitative Forecasting:** A technique that relies on numerical data and statistical tools to predict future demand patterns with greater accuracy.

## 10.9 SELFASSESSMENT QUESTIONS

1. What is Delphi method? Describe its main advantages and limitations.

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2. What is trend projection? Why this method is often employed in economic forecasting?

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3. What are the main characteristics of accurate forecasts?

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4. What is the basic shortcoming of trend-projection that barometeric approaches improve on?

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#### **10.10 LESSON END EXERCISE**

1. Explain the essential criteria of a good forecasting method. Why is it important for a forecasting technique to meet these criteria in a business environment?
2. "The success of business planning largely depends on the quality of forecasting methods used." Elaborate on this statement by discussing the key features that make a forecasting method effective and applicable in practical situations.

#### **10.11 SUGGESTED READING**

- Advance Economic Theory, Ahuja, H.L., S. Chand & Sons, New Delhi.
- Economic Theory, Chopra P.N., Kalyani Publishers, New Delhi.
- Principles of Micro Economics, Misra & Puri, Himalaya Publishing House, New Delhi.

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## **FACTORS OF PRODUCTION**

### **STRUCTURE**

- 11.1 Learning Objectives and Outcomes
- 11.2 Introduction
- 11.3 Factors of Production
  - 11.3.1 Fixed Factors
  - 11.3.2 Variable Factors
- 11.4 Production Function
- 11.5 Let Us Sum Up
- 11.6 Self-Assessment Questions
- 11.7 Suggested Reading

### **11.0 LEARNING OBJECTIVES AND OUTCOMES**

#### **Learning Objectives**

After reading this chapter, you will be able:

- To define production function.
- To explain fixed and variable factors of production.

#### **Learning Outcomes**

After completing this chapter, the learner will be able to:

- Accurately define and interpret a production function.

- Differentiate between short-run (with fixed factors) and long-run (all factors variable) production.
- Apply the concepts of fixed and variable inputs to real-life production scenarios.
- Illustrate how the use of factors of production leads to efficient output.
- Demonstrate an understanding of the law of variable proportions and returns to scale.

## 11.1 INTRODUCTION

Supply of goods and services comes out of production. And supply analysis, therefore, must be based on the theory of production. As we have equilibrium of the consumer in the theory of demand, here we have equilibrium of the producer. With changes in conditions of production, the equilibrium of the producer continues to change his production and induce thereby changes in supply. As we shall see later, theory of demand and theory of production are essentially similar. But in so far as production is a process distinctly different

from demand, there are some differences. For a clear understanding of the theory of production and its differences with the theory of demand, some points about the process of production need to be borne in mind.

The process of production can be looked at from two different angles. From the technologist's point of view, it is a purely physical process in which quantities of raw materials and labour are transformed into quantities of output, the quantities being rigidly determined by the laws of physical science. The technologist is mainly interested in these physical laws which describe the behaviour of the amounts of product that may be expected through different methods of production. The other viewpoint takes production not as a process of physical nature but of human action. This is an economist's perspective on production.

## **11.2 FACTORS OF PRODUCTION**

For improving their economic positions men undertake production. They secure the necessary resources; supervise the work of transformation of these inputs into output. Inputs are those things that a firm buys for use in production and prepare the output. An input may be a commodity, such as a raw material, or a service, or a piece of information about the technology of production. Traditionally, the inputs sufficient for the production of a given product have been classified by economists into four factors of production-land, labour, capital and organisation. Capital was the produced 'factor', i.e., a class of means of production that had been produced, in turn, through the combination of other resources. Land, labour were thought to be the 'original' factors, 'labour' including all services provided directly by human beings and 'land' representing all other nature-given things and services that could be used for production. The fourth factor of production was the organising and entrepreneurial ability, the act of risk-taking and uncertainty-bearing.

This classification was adopted by economists on the belief that the remuneration earned by each class was governed by different laws. This classification, though it provided a grouping useful for a number of purposes, is no longer held by modern economists. They believe that this distinction between different factors is not of much economic significance because the laws governing price determination of all productive services are the same. Actually, the one classification we require in the theory of production and price is between fixed and variable factors.

### 11.2.1 Fixed Factors

Fixed factors are those factors whose total cost is constant over some range of output. For example, the total cost of using machinery remains constant whether output is at zero or rises to 10,000 units. Output greater than 10,000 units might be possible only with the introduction of, and expenditure upon, additional machinery. It is very much possible that the services of some factors will be fixed for greater ranges of output than for others. A further distinction among fixed factors is between 'divisible' and 'indivisible' fixed factors. Divisible fixed factors are those whose total cost is constant, although technically the factors consist of separable units which may be independently utilised. Fundamentally they are variable factors, though the exigencies of construction or mode of hire may compel that they be purchased as a unit. Indivisible factors, on the other hand, are constructed as a single mass: the irreducible unit must serve over a wide range of outputs. Divisibility or indivisibility thus refers to the mode of use, not to the terms of payment of the fixed factors.

### 11.2.2 Variable Factors

Variable factors are those whose cost changes with movements in output. The precise line distinguishing them from fixed factors is in the increased total cost of using them with continuously increased output.

## A. CHECK YOUR PROGRESS

### Case Study

**Background:** Sunrise Organic Farm is a small-scale agricultural enterprise located in a rural area of Punjab. The farm produces organic vegetables like tomatoes, spinach, and carrots. The land for cultivation is owned by Mr. Arjun, who inherited it from his father. To manage the daily operations, he employs 10 workers—some for sowing and harvesting, others for packaging and transporting goods. He also invested ₹8 lakhs in a drip irrigation system, composting machines, and solar-powered cold storage. Mr. Arjun supervises the operations, takes key decisions on what to grow each season, and sells the produce directly to local markets and online through a website he developed.



The success of Sunrise Organic Farm lies in the effective combination of all factors of production:

- Land (natural resource) – farmland used for organic farming
- Labour – farm workers performing various tasks
- Capital – machinery, equipment, and technology used
- Entrepreneurship – Mr. Arjun’s role in managing and taking risks

**Questions:**

1. Identify and explain the four factors of production in the case of Sunrise Organic Farm.
2. Why is Mr. Arjun considered an entrepreneur? Mention two roles he plays as one.
3. If Mr. Arjun increases investment in technology (capital), how might it affect productivity and labour use?

### 11.3 PRODUCTION FUNCTION

A firm produces output with the help of various combinations of inputs by harnessing available technology. The production function is a technological relationship between physical inputs or factors and physical output of a firm. It is a mathematical relationship between maximum possible amounts of output that can be obtained from given amount of inputs or factors of production, given the state of technology. It expresses flow of inputs resulting in flow of output in a specific period of time. It is also determined by the state of technology. Algebraically, production function can be written as:

$$Q = f(A, B, C, D, \dots)$$

where Q stands for the maximum quantity of output, which can be produced by the inputs represented by A, B, C, D, ..., etc. where f(.) represents the technological constraint of the

firm.

The relationship between inputs and the resulting outputs is generally summed up in a mathematical form which is called production function. The word 'function' in mathematics means the precise relationship that exists between one dependent variable and many (or one) independent variables. The production function formalises the relationship between the maximum quantity of output (dependent variable) yielded by a productive process and the quantities of the various inputs used in that process. Algebraically, a production function is written as  $x = f(a_1, a_2, \dots, a_n)$ . This equation tells us the quantity of the product  $x$ , which is produced on the given quantities of  $a_1, a_2, a_3, \dots, a_n$  (of the inputs  $a_1, a_2, a_3, \dots, a_n$  respectively) employed in the production process.

**1. It is a technical relation-** Concerned with the physical aspects of production inside a firm and representing a state of technology or method of organisation employed, the production function concept is external to economics; it is given to the economist by the production engineer. The engineer or technician can tell the economists the various combinations of inputs that are possible and the outputs resulting from them by using a particular process of production. The engineer presents the production function in the form of a table showing the various production processes, the various combinations of inputs and the obtainable outputs from these processes. The technician is interested in physical combinations, the producer is interested in the cost of these combinations and the revenues they can fetch in the market.

**2. It has economic importance-** Although the Production Function is given to the firm by the technician, it has important economic implications for the firm. Production function expresses the relationship between a quantity of output and the requirements of inputs for production of the quantity. Stated in alternative terms, production function relates the various amounts of inputs with the maximum possible outputs which can be obtained out of the inputs. Every producer is interested in minimising the output from a given combination of inputs. The form of production function of a firm is determined by the state of technology. A short-period production function is different from a long-period production function.

**3. Production functions differ from firm to firm and industry to industry.** The economic theorist is interested in the properties or features shared by all production functions. Economic theorist analyses two kinds of input-output relations in production function:

first, the relation where quantities of some inputs are fixed while quantities of other inputs vary; second, where all the inputs are variable and the relationship is between changes in the amounts of all inputs and the resulting outputs.

#### **11.4.1 Short Term Production Function**

**Short-run Production Function** A Short run production function is a technical relationship between the maximum amount of output produced and the factors of production, with at least one factor of production kept constant among all the variable factors. A two factor short run production function can be written as:  $Q = f(\bar{L}, K)$  where,  $Q$  stands for output,  $L$  for Labour which is a variable factor here,  $K$  for Capital, and  $f(\cdot)$  represents functional relationship. A bar over letter  $K$  indicates that use of capital is kept constant, that is, it is a fixed factor of production. Supply of capital is usually assumed to be inelastic in the short run, but elastic in the long run. This inelasticity of the factor is one of the reasons for it to be considered fixed in the short run. Hence, in the short run, all changes in output come from altering the use of variable factor of production, which is labour here.

#### **Long-run Production Function**

**Long-run Production Function** In long run, all factors can be varied, thus, for a long-run production function all inputs vary proportionally. Consider a long-run two factor production function:  $Q = f(L, K)$  where,  $Q$  stands for output,  $L$  for Labour and  $K$  for Capital (here,  $K$  is without bar, that is, it represents a variable factor like  $L$ ). The basic assumption we make about the production function is monotonicity, which means as the factor labour ( $L$ ) increases, given the factor capital ( $K$ ), the production  $Q$  also increases. Similarly, as the factor capital ( $K$ ) increases, given the factor labour ( $L$ ), the production  $Q$  increases. Thus, the first derivative of the production function is positive w.r.t.  $L$  and  $K$  i.e.,  $f'(L) > 0$ ,  $f'(K) > 0$ . In other words the marginal product of labour and capital are positive. The second assumption we usually make about the production function is with the curvature. The assumption is the concavity i.e.,  $f''(L) < 0$ ,  $f''(K) < 0$ ; diminishing returns to the marginal product of  $L$  and  $K$ .

## B. CHECK YOUR PROGRESS

### Fill in the Blanks

1. A \_\_\_\_\_ function shows the relationship between physical inputs and physical output of a firm.
2. In the short-run production function, \_\_\_\_\_ factors remain constant while only one input is variable.
3. The Law of Variable Proportions operates in the \_\_\_\_\_ run.
4. \_\_\_\_\_ product is the additional output obtained by employing one more unit of a variable input.
5. Total Product (TP) increases at an increasing rate during the stage of \_\_\_\_\_ returns.
6. The point where marginal product starts declining is called the point of \_\_\_\_\_ returns.
7. When TP reaches its maximum and MP becomes zero, the firm is at the point of \_\_\_\_\_ output.
8. \_\_\_\_\_ product is calculated by dividing total product by the number of units of variable input.
9. In the long run, all factors of production are considered \_\_\_\_\_.
10. The shape of the Total Product curve is typically \_\_\_\_\_ in the beginning and then flattens out.

### Answers:

- |                    |               |                |
|--------------------|---------------|----------------|
| 1. Production      | 2. Fixed      | 3. Short       |
| 4. Marginal        | 5. Increasing | 6. Diminishing |
| 7. Maximum         | 8. Average    | 9. Variable    |
| 10. Upward sloping |               |                |

### **Total Product (TP)**

Total Product (TP) of a factor is the maximum amount of output (Q) produced at different levels of employment of that factor keeping constant all the other factors of production. Total product of Labour (TPL) is given by:

$$TPL = Q = f(L)$$

### **Average Product (AP)**

Average product is the output produced per unit of factor of production, given by:

Average Product of Labour,  $AP_L = Q/L$  and Average Product of Capital,

$$AP_K = Q/K$$

### **Marginal Product (MP)**

Marginal Product (MP) of a factor of production is the change in the total output from a unit change in that factor of production keeping constant all the other factors of production. It is given by: Marginal Product of Labour,  $MPL = \Delta Q / \Delta L$

Marginal Product of Capital,  $MP_K = \Delta Q / \Delta K$  where,  $\Delta$  stands for “change in” and  $\partial$  denotes partial derivation in case of a function with more than one variable [here we are considering a production function with two factors of production,  $Q = f(L, K)$ ].

## **11.4 LET US SUM UP**

For improving their economic positions men undertake production. They secure the necessary resources; supervise the work of transformation of these inputs into output. Therefore, inputs are those things that a firm buys for use in production and prepare the output.

The inputs sufficient for the production of a given product have been classified by economists into four factors of production-land, labour, capital and organisation.

The other classification we require in the theory of production and price is between fixed and variable factors. Fixed factors are those factors whose total cost is constant over some range of output. Whereas, variable factors are those whose cost changes with movements in output. Further, the relationship between inputs and the resulting outputs is generally summed up in a mathematical form which is called production function.

To sum up, production function is a technical relationship which is concerned with the physical aspects of production inside a firm and representing a state of technology or method of organisation employed. Also, the concept of production function is external to the economics; it is given to the economist by the production engineer. Although, the Production Function is given to the firm by the technician, it has important economic implications for the firm. Production functions differ from firm to firm and industry to industry and the economic theorist is interested in the properties or features shared by all production functions.

## 11.5 GLOSSARY

- **Land** – Refers to all natural resources used in the production process, like soil, minerals, and water.
- **Labour** – The human effort, both physical and mental, applied in producing goods and services.
- **Capital** – Man-made tools, machinery, buildings, and equipment used to produce goods and services.
- **Entrepreneur** – An individual who organizes the factors of production and takes business risks to earn profits.
- **Production Function** – A functional or mathematical relationship between input (factors) and output (goods or services).
- **Marginal Product (MP)** – The additional output generated by employing one more unit of a variable input.

- **Law of Variable Proportions** – Explains how output changes when the quantity of one input is varied while others are held constant.

#### **11.6 SELFASSESSMENT QUESTIONS**

1. What are the fixed factors of production?

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2. Write a note on the managerial use of the production function?

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#### **11.7 LESSON END EXERCISE**

1. Explain the four factors of production in detail. How does each factor contribute to the process of production? Give suitable examples.
2. Define the production function. Explain the relationship between inputs and output using the concept of the production function. How does it help a firm in decision-making?
3. Discuss the Law of Variable Proportions. Explain its three stages with the help of a diagram and examples.

#### **11.8 SUGGESTED READINGS**

- Economic Theory, Chopra P.N., Kalyani Publishers, New Delhi.
- Managerial Economics, Mehta, P.L., S. Chand, Delhi.
- Micro Economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

### **LAW OF VARIABLE PROPORTION**

#### **STRUCTURE**

12.0 Learning Objectives and Learning Outcomes

12.1 Introduction

12.2 Law of Variable Proportion

12.2.1 Assumptions

12.2.2 Explanation

12.2.3 Diagram

12.2.4 Phases of The Law

12.3 Let Us Sum Up

12.4 Self-Assessment Questions

12.5 Suggested Reading

#### **12.0 LEARNING OBJECTIVES AND OUTCOMES**

##### **Learning Objectives**

The objectives of this chapter are:

- To describe the meaning of law of variable proportion.
- To explain the conditions necessary for Law.
- To define different stages of the Law.

##### **Learning Outcomes**

After completing this chapter, the learner will be able to:

- Clearly define and state the law of variable proportion.



- Identify the assumptions and limitations of the law.
- Illustrate the law through a schedule and diagram.
- Distinguish between the three stages of production and understand their economic significance.
- Apply the law to evaluate efficiency in short-run production decisions.

## **12.1 INTRODUCTION**

The law of variable proportions in production is one of the fundamental laws of economics. A French economist was the first to discuss this law. The law deals with behaviour of production in the short run. In the short run, factors of production are of two types: (i) fixed factors of production, (ii) variable factors of production. In the short run, the volume of production can be changed only by altering the variable factors of production. This is because the quantity of fixed factors like the plant size cannot be changed as desired due to the short span of time at the disposal of the producer.

## **12.2 LAW OF VARIABLE PROPORTION**

Law of variable proportions shows the production function with one factor variable while other factors of production are kept constant/fixed. The ratio of variable factor to fixed factors in the production process increases when the proportion of variable factor to fixed factors is increased. We can explain this law with the help of an example. Suppose, there are two factors of production, land and labour. Land is a fixed factor while labour is a variable factor. Further, we assume that cultivate a piece of land of one acre with 10 labourers. And the ratio of land to labour is 1:10. Now to increase the size of production, 15 labourers are put to work on the same piece of land. It will change the ratio of land to labour to 1:15. This variation in the ratio of the factor inputs causes a change in the size of production not at constant rate but at various rates. This tendency of change in the production in response to changes in factor proportions is termed 'the law of variable proportions'. This law shows that continuous change in proportion of the factors of production changes the product first at increasing rates, then at constant rates and finally the output change takes place at diminishing rates.

The law of variable proportions exhibits the direction and the rate of change in the firm's output when the amount of only one factor of production is varied. The law is known as the law of variable proportions because in this law we study the effects of variations in factor proportions on the firm's production.

According to Leftwitch, "The law of variable proportions states that if the input of one resource is increased by equal increments per unit of time while the inputs of other resources are held constant, total product (output) will increase, but beyond some point the resulting output increases will become smaller and smaller."

### 12.2.1 Assumption

The law of variable proportions holds good only if the following conditions prevail:

1. **Constant technology.** The law of variable proportions assumes the techniques of production as constant. The reason is that if the state of technology changes then marginal and average product may rise instead of diminishing.
2. **Short run.** The law specially operates in the short run because here some factors are fixed and the proportion of others has to be varied. It assumes that one factor is variable while the others are fixed.
3. **Homogeneous factors.** This law is based on the assumption that the variable resource is applied unit by unit. And each factor unit is homogeneous or identical in amount and quality.
4. **Changeable input ratio.** Lastly, the law supposes the possibility of the ratio of fixed factors to variable factors being changed. In other words, it is possible to use various amounts of a variable factor with fixed factors of production.

#### A. CHECK YOUR PROGRESS

##### Case study

**Background:** Green Harvest is a small organic farm with a fixed size of land and machinery. The owner decides to increase milk production by hiring more labour. With 1 worker, milk output is 80 litres/day. As more workers are hired, total output increases but not at the same rate:

Number of Workers	Total Output (Litres/Day)
1	80
2	180
3	270
4	340
5	380

6	390
7	385

The owner notices that after a certain point, additional workers aren't increasing output as much as before, and eventually, output starts to decline.

**Case-Based Questions:**

1. Identify the stage where diminishing marginal returns begin. Explain how this illustrates the Law of Variable Proportion.
2. Discuss any two assumptions of the Law of Variable Proportion based on the scenario. Are these assumptions realistic for Green Harvest Organic Farm?
3. If land and equipment are fixed, what could be the reason behind the decline in output after hiring the 6th worker? Relate your answer to the assumptions of the law.

### 12.3.3 Explanation of Law

The law can be explained with the help of a table showing the production function of a farmer. Suppose a farmer has 10 acres of land to cultivate. The land has some fixed investments on it: a tube well, a farm house and farm equipment. In order to increase his farm output, the amount of land and capital is called fixed factors of production. The farmer can vary the number of men to be employed on its cultivation. Any change in the number of men employed will change total output also. The response of output (product) to the increases in the variable factor labour is shown in the table given below. We define the average product and marginal product as follows:

$$\text{Average Product (AP)} = \frac{\text{Total Product (TP)}}{\text{units of labour}}$$

$$\text{Marginal Product (MP)} = TP_n - TP_{n-1}$$

Table 12.1

**A Production Function with One Variable Input Labour showing the Three Stages of the Law of Variable Proportions**

Number of men	Total Product (in quintals)	Average Product (in quintals)	Marginal Product (in quintals)	
1	50	50.00	50	Stage I
2	110	55.00	60	
3	135	45.00	25	Stage II
4	150	37.00	15	
5	160	32.00	10	
6	165	27.50	5	
7	165	23.57	0	Stage III
8	160	20.00	-5	

The table 12.1 shows changes in from output when one variable factor, namely labour, is varied. At first, as the number of men is increased from 1 to 2, marginal product as well as the average & product increase. But as more men are employed, the average product falls and the marginal product falls faster. Fall of the average and marginal product continues as more men are put on the farm. Hiring of the seventh man is fruitless, since he adds nothing to production on the farm (Because his marginal product is zero). Henceforth if more men are added they will prove a nuisance to the already working men and will decrease production rather than increase it; in other words, the marginal product of labour would become negative. We state the law of variable proportions with reference to the behaviour of the marginal product. In the given production function shown in the table behaviour of the marginal product clearly shows three stages: in the first MP increases; in the second it continues to fall; and in the third, it becomes negative.

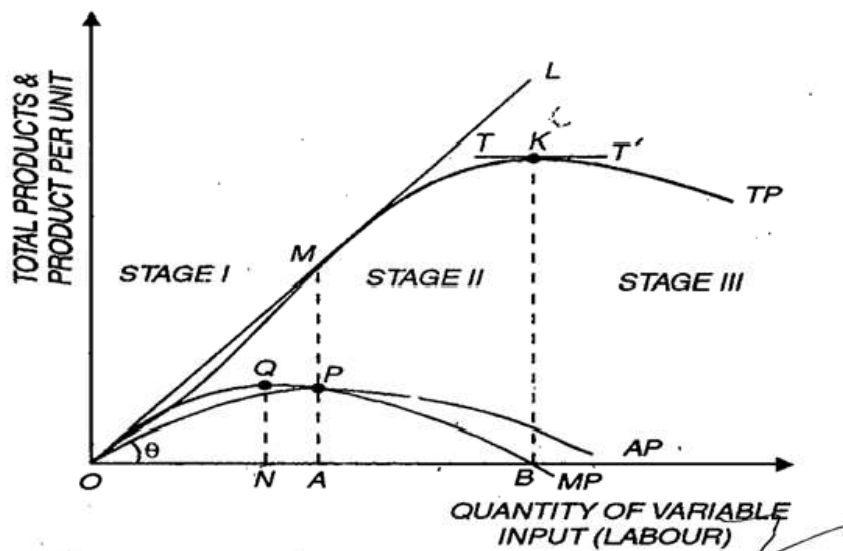
### 12.3.3 Diagrammatic explanation

The law of variable proportions is shown through the figure given below. The horizontal axis shows the units employed of labour, the variable factor. The vertical axis shows the total, the average and the marginal products of the variable factor labour as it is increasingly

employed along with the given fixed resources. In figure 12.1, we find that as the quantity of variable factor is increased relative to the fixed factors, total product TP rises at first, remains constant at point and then starts falling. We can derive the shapes of the average product and marginal product curves from the total product curve. This is helpful in pinpointing the three stages of the law. As shown in the figure, average product of the variable factor with OA units employed equals total product (AM) divided by the total units of the factor being used (OA). At point P the average product is the maximum and is also equal to the marginal product. In the initial stage, the marginal product continues to increase and then falls to equal the average product. Point N marks the end of the 1st stage of the Law of Variable Proportions because MP declines from point P.

Now let us come to the total product (TP) curve. After point M, total product increases but at a lesser rate. As a result, marginal product becomes less than average product. Average product, after attaining a maximum at point P, starts declining and the marginal product curve falls faster than the average product curve. Total product is the maximum (BK) when OB units of the variable factors are employed. The MP at point B is zero. From point A to B is the second stage of the law. In this stage the average product as well as the marginal product curves are falling but are positive.

If more than OB units of the variable factor are employed, total product starts declining. And marginal product becomes negative. It is also called the stage of negative returns. In this stage, when a variable factor is used in a greater quantity, it adds nothing to the total product. Rather it reduces the total product. Here applies the proverb 'Too many cooks spoil the broth'. Thus, when the variable factor is used in a larger quantity than what is fruitful, it reduces the total product. The third stage of the law is where the marginal product of the variable factor is negative.



## B. CHECK YOUR PROGRESS

## Fill in the blanks

1. The Law of Variable Proportion is also known as the Law of \_\_\_\_\_ Returns.
2. It applies in the \_\_\_\_\_ run, where only one factor is variable and the others are fixed.
3. The law states that as more units of a \_\_\_\_\_ factor are added to fixed factors, the total output initially \_\_\_\_\_ at an increasing rate, then at a \_\_\_\_\_ rate, and finally starts to \_\_\_\_\_.
4. This law is based on the concept of \_\_\_\_\_ product and \_\_\_\_\_ product.
5. The point where marginal product starts to fall but remains positive is called the stage of \_\_\_\_\_ returns.

**6. When the marginal product becomes zero or negative, the total product also starts to \_\_\_\_\_.**

**7. The law is applicable only when the technology and other factors are kept \_\_\_\_\_.**

**8. The law helps in determining the most \_\_\_\_\_ use of a variable input in production.**

**Answers:**

- |                    |                |  |
|--------------------|----------------|--|
| 1. Diminishing     | 2. Short       | 3. Variable, increases, diminishing, decline |
| 4. Marginal, total | 5. Diminishing | 6. Decline                                   |
| 7. Constant        | 8. Efficient   |  |

#### **12.3.4 Different Phases of the Law**

The three stages of the law of variable proportion are easily identified in figure 12.1. Marginal product increases as we employ more units of the variable factor till ON units are employed. This is the first phase of the law popularly called the stage of increasing returns. If we add more variable factor units, marginal product starts falling but average product rises so long as marginal product is above it. Both are equal to AP when OA variable factor units are employed. Here the first phase of the law of variable proportions, the stage of increasing returns, is over. Point A corresponds to the maximum average product of the variable factor with given fixed resources. The second phase of the law starts with the employment of more units of the variable factor after OA. Average product and also marginal product of the factor start falling. The OBth unit of the variable factor has a marginal product which is zero. The second stage, therefore, ends here. The second stage of the law is called the Law of Diminishing Returns.

The third stage starts after the employment of more than OB units. If more units of labour



are added, they have a marginal productivity less than zero. The additional units of the variable factor employed in the third stage are not only redundant but harmful also, since they hinder rather than help production. This is clear from the fact that the total product (TP) curve continues to fall in the third stage of the Law. In older terminology, point B corresponds to the intensive margin beyond which profitable production will not take place.

In the third stage, fruitlessness of further application of the units of the variable factor is depicted by the falling of the total product. This stage is also termed as the stage of negative returns.

### **C. CHECK YOUR PROGRESS**

#### **Short Answer Type Questions**

Q1. What is the main feature of Stage I in the Law of Variable Proportion?

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Q2. Why is stage II considered the ideal stage for a producer to operate in?

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Q3. What happens to total and marginal product in Stage III of the Law of Variable Proportion?

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### 12.3 LET US SUM UP

The law of variable proportion in production is one of the fundamental laws of economics. A French economist was the first to discuss this law. The law deals with behaviour of production in the short run. Thus, Law of variable proportions shows the production function with one factor variable while other factors of production are kept constant/fixed.

According to Leftwich, “The law of variable proportions states that if the input of one resource is increased by equal increments per unit of time while the inputs of other resources are held constant, total product (output) will increase, but beyond some point the resulting output increases will become smaller and smaller.”

The law of variable proportions assumes Constant technology the techniques of production as constant (constant technology), the law specially operates in the short run because here some factors are fixed and the proportion of others has to be varied, and each factor unit is homogeneous or identical in amount and quality, and finally, the law supposes the possibility of the ratio of fixed factors to variable factors being changed.

Diagrammatically, the law of variable proportion explain with the help of three stages; In the initial stage, the marginal product continues to increase and then falls to equal the average product, the second stage of the law shows that the average product as well as the marginal product curves are falling but are positive, finally, the third stage of the law is where the marginal product of the variable factor is negative.

## 12.4 GLOSSARY

- **Total Product (TP)** – The overall quantity of output produced by all units of input combined.
- **Marginal Product (MP)** – The additional output produced by adding one more unit of the variable input.
- **Fixed Factor** – An input whose quantity cannot be changed in the short run (e.g., land, machinery).
- **Variable Factor** – An input that can be changed or adjusted in the short run (e.g., labor).
- **Diminishing Returns** – The phase where adding more units of a variable input leads to smaller increases in output.

## 12.5 SELF ASSESSMENT QUESTIONS

1. Explain the law of variable proportion in terms of the behaviour of Total physical product, with the help of a diagram?

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2. State and explain the law of diminishing return to a factor?

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3. Explain the relationship between AP and MP using a suitable diagram?

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## **12.6 LESSON END EXERCISE**

Q1. Explain the Law of Variable Proportion with the help of a schedule and diagram. Discuss the three stages of the law and their significance in production.

Q2. What are the main assumptions of the Law of Variable Proportion? Explain why the law is important for producers in the short run.

## **12.6 SUGGESTED READING**

- Economic Theory. Micro Economic Analysis, Ahuja, H.L., S. Chand and Company Ltd, New Delhi.
- Principles of Economics, Mishra and Puri, Himalaya Publishing House, New Delhi.
- 
- Micro Economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

### **LAW OF RETURN TO SCALE**

#### **STRUCTURE**

13.0 Learning Objectives and Outcomes

13.1 Introduction

13.2 Laws of Return to Scale

13.2.1 Meaning

13.3 Constant Returns to Scale

13.4 Increasing Returns to Scale

13.4.1 Causes

13.5 Decreasing Return to Scale

13.5.1 Causes

13.6 Let Us Sum Up

13.7 Glossary

13.8 Self-Assessment Questions

13.9 Lesson End Exercise

13.10 Suggested Readings

## **13.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

Broadly, the objective of this chapter is to explain the concept of law of return to scale. Besides this, an attempt shall be made;

- To describe the three stages of law of returns to scale.
- To explain the causes of diminishing and increasing returns to scale.

### **Learning Outcomes**

After studying this chapter, you will be able to:

- Define the Law of Returns to Scale clearly.
- Identify and describe the three stages of returns to scale
- Explain the causes behind increasing and diminishing returns to scale.
- Differentiate between returns to scale and returns to a factor.
- Analyze how changes in all inputs proportionally affect output in the long run.
- Apply the concept of returns to scale to real-world production scenarios.

## **13.1 INTRODUCTION**

In the previous chapter, we explained the behaviour of output when alteration in factor proportions is made. Factor proportions are altered by keeping the quantity of one or some factors fixed and varying the quantity of other. The changes in output as a result of the variation in factor proportion, as seen before, forms the subject matter of the “law of variable proportions”. Now in this chapter we shall take the study of changes in output when all factors or inputs in a particular production function are increased together proportionately. In other words, we shall study the behaviour of output in response to the changes in the scale. The scale of production in the context of two factor production function means a given amount of labour and capital used in the production process. The proportionate changes in both the factors bring about change

in the scale. Thus, an increase in the scale means that all inputs or factors used in a production process are increased in the same proportion. Increase in the scale thus occurs when all factors or inputs are increased keeping factor proportion unaltered. The term returns to scale refers to the degree by which output changes as a result of a given proportionate change in the amounts of all factors (inputs) used in production.

## **13.2 LAWS OF RETURN TO SCALE**

In the long run, expansion of output can be achieved by variation in the use of all factors as all factors are variable. The laws of returns to scale can be increased by effecting a change in the use of all factors keeping the same proportion or by changes in different proportions. But the concept of returns to scale is concerned with the first case, i.e., the behaviour of output as all inputs are varied by the same proportion.

### **13.2.1 Meaning**

The responsiveness of output to a given proportionate change in the quantities of all inputs is called returns to scale. Here, we try to find out that in what proportion output changes when there is some proportionate change in the amount of all inputs. There are three

possibilities: viz; (a) constant returns to scale, (b) increasing returns to scale and (c) decreasing return to scale. All these possibilities are shown in table 13.1.

**Table 13.1**  
**Varying Returns to Scale**

Case I : Constant Returns to Scale				
Labour Units		Capital Units	Total Output (Quintals)	Returns to Scale
1	+	1	10	Constant
2	+	2	20	
3	+	3	30	

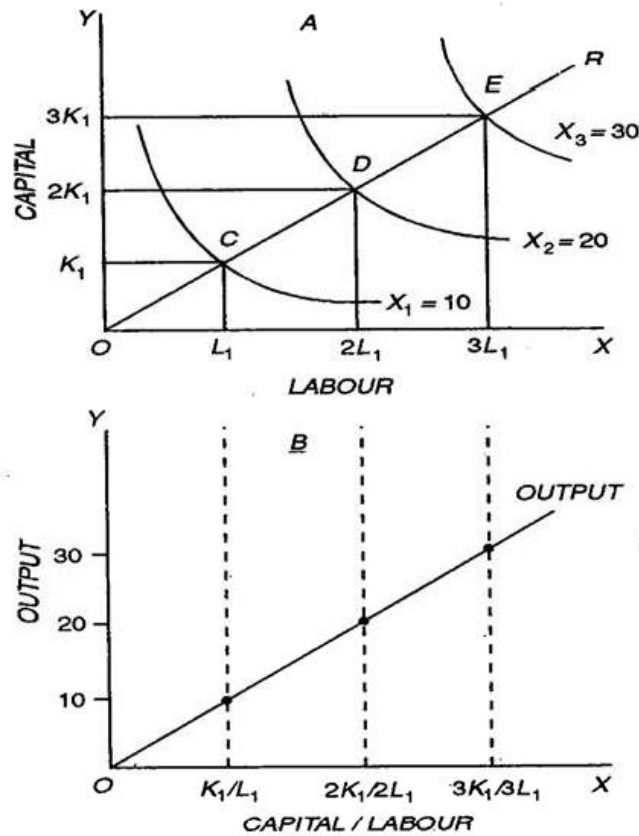
Case II : Increasing Returns to Scale				
Labour Units		Capital Units	Total Output	Returns to Scale
1	+	1	10	Increasing
2	+	2	40	
3	+	3	90	

Case III : Decreasing Returns to Scale				
Labour Units		Capital Units	Total output	Returns to Scale
1	+	1	10	Decreasing
2	+	2	14	
3	+	3	17	

### 13.3 CONSTANT RETURNS TO SCALE

In case of constant returns to scale, when all factors of production are increased in a given proportion, the output would also increase in the same proportion. For example, if the quantity of labour and capital is increased by 10%, output also increases by 10%. If labour and capital are doubled, output also doubles, similarly, if all inputs are reduced by a given proportion, output is reduced by the same proportion.





**Figure 13.1: Constant Returns to Scale**

Figure 13.1 (A), shows that equal increase in inputs is attended by equal increase in output. When the amount of capital ( $k$ ) and labour ( $L$ ) is increased two times, output increases from 10 units to 20 units. Similarly, when the quantity of capital and labour is increased by three times, output also goes up by three times. The OR ray is known as scale line. It shows the proportion in which the two inputs are being used. In case of constant returns to scale, the successive intercepts produced along the scale line by different isoquants of the same length. The intercept CD equals DE. Part B of the figure 13.1 shows the output-input relation. Output has been taken along Y-axis and ratio of capital and labour along X-axis. The figure shows that the output line is linear.

## A. CHECK YOUR PROGRESS

### Fill in the Blanks

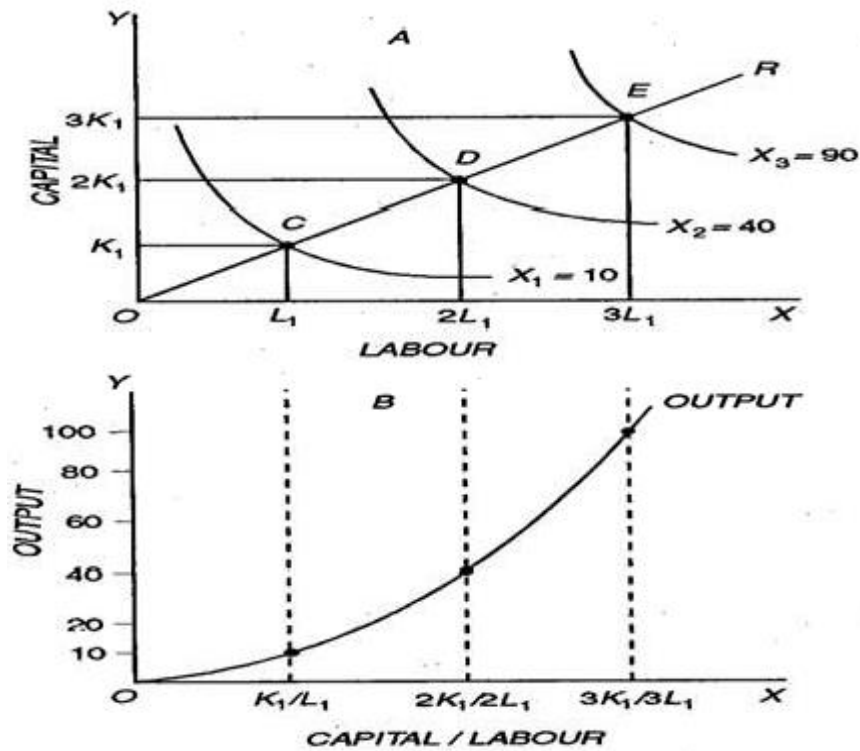
1. The Law of Constant Returns to Scale applies when all inputs are increased in the \_\_\_\_\_ proportion.
2. In this law, the output increases by the \_\_\_\_\_ proportion as inputs.
3. The law is applicable in the \_\_\_\_\_ run when all factors are variable.
4. When inputs are doubled, the output also \_\_\_\_\_.
5. This law shows that production is \_\_\_\_\_ and there is no change in \_\_\_\_\_ productivity.
6. On a graph, constant returns to scale are represented by a \_\_\_\_\_ line from the origin.
7. Constant returns to scale indicate the \_\_\_\_\_ scale of production.

### Answer :

- |                       |             |            |            |
|-----------------------|-------------|------------|------------|
| 1. same               | 2. Same     | 3. Long    | 4. doubles |
| 5. efficient, average | 6. Straight | 7. optimal |            |

## 13.4 INCREASING RETURNS TO SCALE

In case of increasing return to scale, when all factors are increased in a given proportion, output increases by a greater proportion. For example, if the amount of labour and capital is increased by 10%. If the quantity of labour and capital doubles, output more than variables doubles. This increasing returns to scale is shown in figure 13.2.



**Figure 13.2: Increasing Returns to Scale**

Panel A of figure 13.2 shows that a given proportionate increase in the use of labour and capital is attended by more than the proportionate increase in output. When labour and capital are doubled, output increase from 10 units to 40 units, i.e., output more than doubles. Whereas part B of figure 13.2, shows that the output line is concave from above.

It is showing increasing returns to scale. It is evident from the output line that a proportionate increase in the use of labour and capital results in more than a proportionate increase in output.

### 13.4.1 Causes

The causes of increasing returns to scale are:

1. **Specialisation:** Each worker can acquire specialisation in the performance of simple repetitive task rather than many different tasks. As a result, labour productivity registers a rise.
2. **Use of specialised machinery:** A large scale of operation permits the use of more productive specialised machinery which was not feasible at a smaller scale of operation.
3. **Economies of large scale:** Moreover, as a firm expands its scale of production, it comes to enjoy certain economies- financial, technical, marketing, managerial and so forth.
4. **Indivisibility:** Indivisibility is another source of increasing returns to scale. An indivisible factor cannot be sub-divided into parts. The whole of it has to be employed to carry on production. for example, capital and entrepreneur.

## B. CHECK YOUR PROGRESS

### Multiple Choice Questions

**1. When a firm increases all inputs by 50% and output increases by more than 50%, this is called:**

- |                                 |                                |
|---------------------------------|--------------------------------|
| a) Constant Returns to Scale    | b) Increasing Returns to Scale |
| c) Diminishing Returns to Scale | d) Negative Returns to Scale   |

**2. Increasing returns to scale occur in the:**

- |                   |                            |
|-------------------|----------------------------|
| a) Short run      | b) Long run                |
| c) Very short run | d) Both short and long run |

**3. Which of the following is a cause of increasing returns to scale?**

- a) Inefficient use of resources
- b) Specialization and division of labor
- c) Overcrowding of inputs
- d) Fixed factors of production

**4. In the stage of increasing returns to scale, if inputs are doubled, output will:**

- a) Less than double
- b) Double exactly
- c) More than doubled
- d) Decrease

**5. Increasing returns to scale usually lead to:**

- a) Higher average costs
- b) Lower average costs
- c) Constant average costs
- d) Negative profits

**Answer:**

1. B                      2. B                      3. B                      4. C                      5. B

### 13.5 DECREASING RETURNS TO SCALE

In decreasing returns to scale, output increases in a smaller proportion than the increase in all inputs, i.e., in this case as inputs are increased by a particular proportion, output increases less than proportionately. For example, if inputs are increased by 10% output increases by less than 10%. If inputs double, output will less than double (figure 13.3).

Part A of the figure shows that a proportionate increase in the use of labour and capital leads to less than proportionate increase in output. When use of labour and capital doubles, output increases from 10 units to 14 units. Similarly where use of labour and capital is increased three times, output goes up from 14 units to 17 units. It means that as inputs increased by equal increments, output increases less than proportionately.

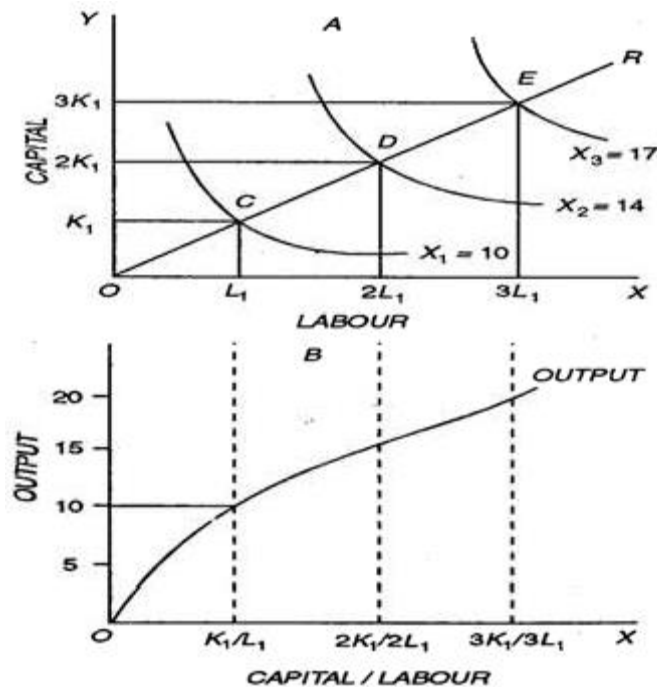


Figure 13.3: Decreasing Returns to Scale

### 13.5.1 Causes of Decreasing Returns to Scale

Decreasing returns to scale caused due to:

1. **Diseconomies of large scale production-** As a firm expands, it experiences growing diseconomies of large scale production. These diseconomies are mainly the result of increasing managerial difficulties. Co-ordination of the work becomes more and more difficult. In large scale businesses, the entrepreneur has to depend upon a team of managers. Lines of communication increases. Decision making becomes difficult. Thus, as the output grows, management becomes overburdened and less efficient in the discharge of its functions as co-ordinator and ultimate decision maker.

2. **Exhaustible National resources-** Another cause for decreasing returns to scale may be found in the exhaustible natural resources. For example, if more and more fishermen are employed to fish in a certain area, the catch of the fish will not increase in the same proportion. Similarly, if we keep the area of mining operation fixed and increase labour and capital equipment, output will not increase in the same proportion as the number of workers or the quantity of capital increased.

### **C. CHECK YOUR PROGRESS**

#### **True and False**

1. The Law of Decreasing Returns states that when more units of a variable input are added, output eventually increases at a diminishing rate.
2. The law applies in the long run when all factors are variable.
3. Marginal product becomes negative in the stage of decreasing returns.
4. Total product continues to increase but at a slower rate during decreasing returns.
5. The law implies that adding more of one input while keeping others fixed will always increase total output indefinitely.
6. Decreasing returns occur due to fixed factors limiting the efficient use of variable inputs.

#### **Answers:**

1. True
2. False
3. False
4. True
5. False
6. True

### 13.6 LET US SUM UP

In the long run, expansion of output can be achieved by variation in the use of all factors as all factors are variable. The laws of returns to scale can be increased by effecting a change in the use of all factors keeping the same proportion or by changes in different proportions. The responsiveness of output to a given proportionate change in the quantities of all inputs is called returns to scale. Here, we try to find out that in what proportion output changes when there is some proportionate change in the amount of all inputs.

There are three possibilities of returns to scale, viz; (a) constant returns to scale, (b) increasing returns to scale and (c) decreasing return to scale. In case of constant returns to scale, when all factors of production are increased in a given proportion, the output would also increase in the same proportion. In case of increasing return to scale, when all factors are increased in a given proportion, output increases by a greater proportion. For example, if the amount of labour and capital is increased by 10%.

The causes of increasing returns to scale are; Specialisation means each worker can acquire specialisation in the performance of simple repetitive task rather than many different tasks, use of specialised machinery, economies of large scale, indivisibility.

In decreasing returns to scale, output increases in a smaller proportion than the increase in all inputs, i.e., in this case as inputs are increased by a particular proportion, output increases less than proportionately. Decreasing returns to scale is caused due to; Diseconomies of large scale production which shows that as a firm expands, it experiences growing diseconomies of large scale production. These diseconomies are mainly the result of increasing managerial difficulties. Co-ordination of the work becomes more and more difficult. Another cause for decreasing returns to scale may be found in the exhaustible natural resources. For example, if more and more fishermen are employed to fish in a



certain area, the catch of the fish will not increase in the same proportion.

To sum up, law of return to scale are a matter of interaction between economies and diseconomies of large scale production. Initially, when a firm expands, it faces increasing returns to scale because of the scale economics. As the scale of operation rises, increasing returns to scale give way to constant returns to scale, because here economies and diseconomies of large scale production balance each other. But if the firm continues to expand its scale of production beyond a point, it experiences diminishing returns to scale. This is due to the fact that eventually the economies of large scale production are swamped by the diseconomies of large scale production and this results in decreasing returns to scale.

### 13. 7 GLOSSARY

- **Returns to Scale:** The relationship between proportional increases in inputs and the resulting changes in output in the long run.
- **Increasing Returns to Scale:** When output increases by a greater proportion than the increase in inputs.
- **Constant Returns to Scale:** When output increases in the same proportion as the increase in inputs.
- **Decreasing Returns to Scale:** When output increases by a smaller proportion than the increase in inputs.
- **Long Run:** The period during which all factors of production are variable and returns to scale can be observed.
- **Proportional Increase:** Equal percentage increase in all inputs during expansion of production scale.
- **Production Efficiency:** The effectiveness of converting inputs into output at different scales of production.

### 13.8 SELFASSESSMENT QUESTIONS

1. Explain the concepts of returns to scale. State the reasons for constant return to scale?

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2. Distinguish between returns to scale and returns to a variable factor. Explain the reasons for increasing returns to scale?

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3. What causes diminishing returns?

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### 13.9 LESSON END EXERCISE

- Q1.** Explain the concept of Returns to Scale. Describe in detail the three types of returns to scale—Increasing, Constant, and Decreasing Returns to Scale—with suitable diagrams and examples.
- Q2.** What are the major causes of Increasing and Decreasing Returns to Scale? How do these stages impact the cost and efficiency of production in the long run?

### 13.10 SUGGESTED READINGS

- Principles of Micro Economics, Misra & Puri, Himalaya Publishing House, New Delhi.
- Micro Economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

- Advance Economic Theory, Ahuja, H.L., Sultan Chand & Sons, New Delhi

## **ECONOMIES AND DISECONOMIES OF SCALE**

### **STRUCTURE**

- 14.0 Learning Objectives and Outcomes
- 14.1 Introduction
- 14.2 Learning Objectives and Outcomes
- 1 4.3 Internal Economies of Scale
- 1 4.4 External Economies
  - 14.4.1 Sources
  - 14.4.2 Criticism
  - 14.4.3 Importance
- 14.5 Diseconomies of Scale
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## **14.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

After reading this chapter, you will be able:

- To define economies and diseconomies of scale.
- To explain the sources of economies and diseconomies of scale.
- To describe the importance of economies and diseconomies of scale.

### **Learning Outcomes**

After studying this chapter, you will be able to:

- Define the concepts of economies and diseconomies of scale clearly.
- Identify and explain various sources of internal and external economies of scale.
- Recognize the causes of internal and external diseconomies of scale.
- Analyze how economies of scale help reduce average cost as output expands.
- Discuss how diseconomies of scale can lead to rising costs and reduced efficiency.
- Understand the importance of managing scale efficiently in long-run production decisions.

## **14.1 INTRODUCTION**

Occurrence of increasing returns is explained in terms of the economies of scale. Economies of scale refer to the situation in which increasing the scale of production reduces the unit

cost of production or raises output per unit of the factor inputs. Broadly, economies of scale are classified as; (a) internal economies of scale and (b) external economies of scale.

## **14.2 INTERNAL ECONOMIES OF SCALE**

When a firm increases its scale of production, the reduced costs or economies which this firm gets as a result are called internal economies. The word 'internal' is used here to denote the limitation of these economies to the firm itself. According to Cairncross, "Internal economies are those which are open to a single factory or a single firm independently of the action of other firms. They result from an increase in the scale of output of a firm and cannot be achieved unless output increases." Internal economies mean increasing return to scale. These are the result of increased division of labour or the improved production methods. The benefit of these economies is received by a firm according to its organisational efficiency.

The main factors responsible for internal economies are as under:

**1. Technical Economies-** Technical factors also affect the returns to scale. Bigger firms are having more of resources at their disposal. They are able to install the most suitable machinery. Some machines are having a technically minimum size. The smaller sized firm may not be able to use such machines to full capacity. As a result, larger firms have lower costs of production because of the full capacity use. Technical economies may arise out of any one of the three reasons.

**(a) Economies of increase of dimension.** When a firm increases its scale of production, its average cost of production falls simply because of the larger volume of production. For example, if a firm doubles the length and breadth of a godown, the godown capacity is more than doubled. This is simple arithmetical example.

**(b) Economies of linking of processes.** As a firm increases its scale of production, it is enabled to link its production processes much better. A large firm is enabled to use all the production processes from the use of a raw material to the marketing of its finished products. Linking of the production processes saves time, material and labour costs.

**(c) Economies of the use of by-products.** A large sized firm is in a position to use its by-products and waste material to produce another product. This lowers the cost of production of the main product. For example, a big sugar factory can have a small plant to produce power alcohol from the residual liquid left after sugar extraction. This lowers the cost of sugar-production.

**2. Managerial Economies-** With the increase in the scale of production a firm can benefit by specialising its managerial departments. Each department is under the charge of an expert. A small firm cannot afford this specialisation. Experts are able to reduce the costs of production under their supervision.

**3. Labour Economies-** Increase in the scale of a firm also enables it to take the advantage of labour economies. A larger firm employs a large number of workers. Each worker is given the kind of job he is fit for. The personnel officer evaluates the working efficiency of the labour if possible. Workers get skilled in their operations which saves production time on the one hand and encourages new ideas on the other. All this leads to falling cost with increased scale.

**4. Marketing Economies-** As the scale of a firm is increased, it obtains economies of purchase and sale. Since the firm purchases on large scale, it gets all the inputs at a cheaper rate compared to the small firms. Similarly, wholesalers charge less for the sale of the products of a large-sized firm.

**5. Financial Economies-** A larger firm is able to reduce its costs of borrowing from the market. A bigger firm is better known to the financial institutions and the stock market. The charges of selling bonds and shares or of borrowing direct from the market are much less than those demanded from smaller firms.

**6. Risk-bearing Economies-** The ability of a larger firm to bear risks of business is much better. Every firm has to face some particular and some general risks in order to

continue production. For example, during depression market prices fall for every firm. There is some particular risk to be borne by a particular firm when the price of a particular product falls in the market. Whether risks are general or of the particular type, a small firm has less ability to face them because of less financial resources and a smaller area of the market for sale. But bigger firms are able to face risks due to the stronger financial position. These risk-bearing economies are also called 'survival economies' because these help the bigger firm to survive the business crisis while the smaller firm fails.

The examples of internal economies given above are also particular to a firm. Hence they are called 'Internal'. These partly help us to explain the increasing returns to scale and partly serve to account for the fall in average cost as the size of the firm increases. Internal economies are connected with a particular firm. Therefore, they are relevant to particular-equilibrium analysis.

## **A. CHECK YOUR PROGRESS**

### **Case Study**

**Background:** Alpha Furniture Pvt. Ltd. started as a small manufacturer of wooden furniture with just 10 workers and basic tools. As the company grew, it began investing in advanced machinery, hired skilled designers, and bought raw materials in bulk directly from suppliers.

Due to these changes, Alpha's average cost per unit dropped significantly, even though total production increased from 500 to 5,000 units per month. With a larger production volume, they were able to divide work more efficiently among departments—design, cutting, polishing, and finishing. The company also introduced a training program for employees, which boosted worker efficiency. On the basis of above case, answers the following:

### **Questions**

- 1 Identify and explain any two internal economies of scale that Alpha Furniture Pvt. Ltd. benefited from.
2. How did division of labor contribute to cost reduction for Alpha Furniture?



3. Why do internal economies of scale result in lower average costs as output increases?

### 14.3 EXTERNAL ECONOMIES OF SCALE

External economies include all those cost reducing benefits or facilities which accrue to a firm when the size of the industry in which the firm is working increases. According to Cairncross, “External economies are those benefits which are shared in by a number of firms or industries when the scale of production in any industry or groups of industries increases.” As the name also tells us these economies are of the common benefit for all the firms working in the expanding industry. Therefore, about external economies Cairncross has observed, “They are not monopolised by a single firm when it grows in size, but are conferred on it when some other firms grow larger.” External economies result from the progress an industry makes in providing the social overhead capital needed by the constituent firms. Use of cost saving machines by research and development, development of the means of communication and transport, advantages of localization, facilities for advertising, insurance, banking, credit, opening of a common training school for labour, publication of industrial journal, opening of information centres etc. are the factors which benefit all the firms and reduce their costs of production. These are, therefore, called external economies.

Let us explain the idea of external economies through an example. Suppose there are seven textile mills in a city which produce cloth not enough to run a printing plant full time. As a result, these firms are compelled to send cloth to another centre for fashion printing. Now, suppose that the size of textile industry in the city increases and the number of firms

risers to twelve. They produce cloth enough for printing to enable a minimum sized printing firm to work in the city itself. This saves costs of transport of cloth to and from the printing plant. It is a common facility made open to all the firms with the increase in the size of the industry itself. We may classify the main sources of external economies in any industry as follows.

#### **14.3.1 Sources of External Economies**

- 1. Physical Factors.** As the size of an industry expands, some physical factors may work to reduce the costs of all the firms working in the industry. An example shall make this point clear. Suppose a few firms are working in an area for coal mining. As they mine coal from underneath the surface earth, they have to pump water out of the coal mines which seeps from the side of the mines. Now if the number of firms, mining coal in the area increases, the costs of pumping out water of each firm shall go down because the share of seeping water needing pumping out for each firm shall be less than before. Similarly, in many other industries such physical factors work to reduce costs as industry's size expands.
- 2. Economies of Concentration.** When the firms in an industry are established at the same place, then all these firms get some common benefit like development of means of transport and communication, availability of specialized trained labour, opening of specialized auxiliary industries to serve this industry etc. Besides this, opening of business and financial institutions to serve this industry is also of common benefit to the individual firms due to their concentration in an area.
- 3. Economies of Information.** As the number of firms in an industry expands, possibilities of many collective and co-operative ventures can be realised. For example, the publication of newspapers and journals giving scientific and commercial information about the industry becomes possible. Similarly, information collection from the firms in the industry is also made easier. Intending purchasers of the industry's products can at once obtain all the information and this helps all the firms.
- 4. Economies of disintegration.** As an industry develops, the firms working in it are more agreeable to the splitting of processes of manufacture and handing over each process to different firms. This makes specialisation possible. The separation of the different stages of production of a commodity with a view to reducing costs is of two types: (1)

horizontal disintegration, and (2) vertical disintegration. Vertical disintegration is illustrated by the separation of the process of cotton refining, spinning and weaving of cloth. Horizontal disintegration takes place when every firm tries to specialize in one particular item in a line of production rather than producing a variety of items. If a firm produces only woollen suiting instead of shirting, suiting and sarees, it is having horizontal disintegration. Both vertical and horizontal disintegration reduce costs for the member firms in an industry by reducing duplication, saving time and materials.

## **B. CHECK YOUR PROGRESS**

### **Case Study**

**Background:** In a region called TechZone, several technology companies including software firms, hardware manufacturers, and training institutes have developed over time. As the number of firms grew, the government invested in better infrastructure—roads, internet connectivity, and power supply.

Local technical colleges began offering specialized courses to meet the industry's skill needs. A pool of skilled workers became available, and suppliers of tech components set up their units nearby. As a result, even small startups in TechZone were able to lower their costs and improve productivity—without expanding their own scale of operation.

### **Answer the following questions:**

1. What are external economies of scale, and which examples from the case study illustrate them?
2. How do skilled labor availability and shared infrastructure benefit all firms in TechZone?
3. Why might even small firms experience cost advantages in an industrial cluster like TechZone?

### **14.3.2 Limitations of External Economies**

Many economists have criticised the concepts of external economies developed by Marshall and Viner. There are two major criticisms made by modern economists.

First, Prof. Tibor Scitovsky has expressed the view that technological external economies are non-existent. Such examples, as have been given, must be dismissed as bucolic or rustic in nature. He takes the classic example of the bee-keeper and the fruit-grower where the two industries provide external economies to each other. Such economies, in his view, are of little importance under modern conditions. He has doubted whether the pollination of fruit by the bees and the gathering of honey from the fruit trees should be regarded as true externalities so much as inappropriabilities. It is a case of the inability of the bee-keeper to charge the fruits grower for the services of his bees because of imperfections of the market mechanism, and the inability of the fruit-grower to charge the bee-keeper.

Second, another criticism has been made against pecuniary external economies. It has been suggested that external pecuniary economies are typically the result of internal economies in another industry where the increased efficiency is passed along in the form of lower prices for intermediate goods. If this is really so, then external economies are more a myth than a reality.

### **14.3.3 Importance of External Economies**

The concept of external economies has proved very useful both in theoretical and applied economies. The main applications of the concept are as under:

- 1. External Effects and Welfare Economics.** External economies belong to the field of general equilibrium analysis in so far as they reflect interdependence between firms

and industries. The concept of external economies has been generalised. It has been pointed out that there are external economies of consumption also. One man's consumption influences the utility of consumption of another person. Examples are, of smoking in a cinema hall, drinking at public places. Another example is the enjoyment a person obtains from a well laid-out flower-garden in the neighbourhood. Thus, it is now realized that external economies are examples of the general external effects we find in common life. Recently a full-fledged analysis of externalities has been introduced in welfare economics, thereby changing the policies based on it substantially.

**2. Importance in Economic Development.** External economies have played a major role in development economics. These are also called 'spill over' or 'linkage' effects. In an article published in the *Economic Journal* (December, 1928), Allyn Young argued that economic progress generates some external economies which make the hitherto unprofitable projects profitable. Prof. Tibor Scitovsky extended the concept of external economies to advocate 'balanced growth' for a developing economy. His use of the concept of external economics was entirely different from the concept used in equilibrium theory, both partial and general. Scitovsky pointed out that it is the internal technical technological and internal pecuniary economies which are of real importance in economic development.

The central idea in balanced growth theory is that in the initial stages the development of an economy must be inter-related horizontally and vertically. Prof. Resenstien-Roden has used the external economies argument to give his 'Theory of the Big Push'. The underlying idea of his thesis is that the development process consists of the propagation of external economies. This process will work better and faster if the development of industries is in the same line of production, especially factor producing industries where there is scope for reaping economies of scale.

**3. A Concept in Macro Dynamics.** The external economies concept as used by modern economists is really dynamic in nature. Marshall evolved the concept at the micro level with reference to only one industry. Development economists have broadened the concept and used it in the general equilibrium analysis of economic growth. Economic development or economic growth is a dynamic phenomenon. Only dynamic concepts can explain it.

**4. Basis of the Theory of Unbalanced Growth.** Albert O. Hirschman has advocated his theory of unbalanced growth with reference to the vertical propagation of external economies. He calls external economies as forward and backward linkages. He has argued that there is a basic core of industries of economic activities which have the maximum vertical propagation of external economies. These industries must be developed first. This policy is of unbalanced growth.

In short, the concept of external economies is the basis of much of theorising in development economics.

#### **14.4 DISECONOMIES OF SCALE**

The economies obtained by a firm or an industry are ultimately limited. A point comes where some factors start operation in the opposite direction and the costs of production start rising. These factors are sometimes called internal and external diseconomies.

##### **14.4.1 Internal diseconomies**

Internal diseconomies are those factors which raise the cost of production of a firm as its scale of production is increased beyond a point. These factors may be the following two:

**1. Unwieldy management.** A main reason for decreasing return to scale is the difficulties of managing a large-sized firm. It becomes difficult to co-ordinate and supervise the work of different departments as specialisation increases. There is a limit to the decentralization of decisions. Beyond a limit the operational efficiency of top management falls. These are the major factors behind internal diseconomies.

**2. Technical difficulties.** The second major reason for the onset of internal diseconomies is technical difficulties of operating a large sized firm. There is a limit to the division of labour and splitting down of production processes. As division of labour is pressed beyond a point, indivisibility of factors comes in. Every machine has an optimum capacity for work and an optimum proportion with other factors. If this proportion is exceeded, internal diseconomies follow.

##### **14.4.2 External Diseconomies**

While internal diseconomies are practically known to exist, external diseconomies are so far a part of economic theory only. Some writers argue that there must be a limit to the

expansion process between industries. The forces which ultimately limit the expansion of an industry may be, called external diseconomies. In support of the contention they give three reasons: (1) When an industry gets localised or concentrated at one place, the cost of transportation increases due to congestion. (2) Similarly, as an industry expands there is scarcity of some raw material or the other which cannot be totally substituted. As a result costs start rising. As an industry expands there are difficulties of obtaining skilled workers, finance and credit because other industries also compete for them. As a result of all the factors, external diseconomies become more forceful as an industry matures.

## **B. CHECK YOUR PROGRESS**

### **Multiple Choice Questions**

1. Diseconomies of scale occur when:
  - a) Output increases faster than input
  - b) Input and output increase in the same proportion
  - c) Cost per unit increases with an increase in output
  - d) The firm operates at minimum cost
2. A major cause of managerial diseconomies is:
  - a) Overuse of cheap raw material
  - b) Complexity in coordination and supervision
  - c) Availability of skilled labor
  - d) Efficient decision-making
3. Communication problems in a large firm are an example of:
  - a) Technical economies
  - b) External economies
  - c) Diseconomies of disintegration
  - d) Internal diseconomies
4. Diseconomies of scale typically lead to:
  - a) Lower marginal cost
  - b) Reduced input use
  - c) Increase in average cost
  - d) Increase in productivity
5. Which of the following is not a diseconomy of scale?
  - a) Poor communication in large firms

- b) Increase in bureaucracy
- c) Lower raw material prices due to bulk buying
- d) Delay in decision-making

Answer Key:

- 1. c
- 2. b
- 3. d
- 4. c
- 5. c

## 14.5 USES OF EXTERNAL ECONOMIES AND DISECONOMIES

The concepts of external economies and diseconomies have been used to classify industries into three types in order to determine their equilibrium. Marshall was the first to do this because he discussed the equilibrium of a perfectly competitive industry in the long period. This classification of industries was used to show the determination of normal price in the three cases of diminishing returns, constant returns and increasing returns.

**1. A Decreasing Cost Industry (Increasing returns)** - External economies are a definite possibility when a young industry expands. The fall in costs of firms in rail-roads, electric supply and communication as the industries expand is a known feature. This is because in these industries a good deal of capacity is created by huge fixed investment. As this capacity is used more and more, average cost of production continues to fall. External economies are much stronger as compared to the external diseconomies. The result is that many public utilities may experience increasing returns as the size of the industry expands. They are examples of decreasing cost industries.

**2. A Constant Cost Industry (constant returns)**- In some industries, the external economies may be just matched by external diseconomies. In such a case as the industry expands, there is no change in their average cost. An industry may be in this category when it has come fairly of age so that its impact on the market for productive services gives rise to external economies and diseconomies in balance with one another.

**3. An Increasing Cost Industry (Diminishing Returns)**- External economies



cannot continue indefinitely. We can easily assume that the fountains of external economies dry up as an industry expands. Rather as the number of firms in an industry increases

further the pressure of demand for specific specialised resources like highly skilled labour or highly specialised machinery or a mineral resource may become so much as to raise costs to the firms in the industry.

We make use of this classification of industries in the long-period price determination of the industries under perfect competition.

#### **14.6 LET US SUM UP**

When a firm increases its scale of production, the reduced costs or economies which this firm gets as a result are called internal economies. According to Cairncross, "Internal economies are those which are open to a single factory or a single firm independently of the action of other firms. They result from an increase in the scale of output of a firm and cannot be achieved unless output increases". The main factors responsible for internal economies are; Technical factors, Managerial Economies, Labour Economies (Increase in the scale of a firm also enables it to take the advantage of labour economies), Marketing Economies (As the scale of a firm is increased, it obtains economies of purchase and sale), Financial Economies (A larger firm is able to reduce its costs of borrowing from the market). A bigger firm is better known to the financial institutions and the stock market, Risk-bearing Economies (The ability of a larger firm to bear risks of business is much better). Every firm has to face some particular and some general risks in order to continue production. Internal economies are connected with a particular firm. Therefore, they are relevant to equilibrium analysis.

On the other hand, External economies include all those cost reducing benefits or facilities which accrue to a firm when the size of the industry in which the firm is working increases. These economies are of the common benefit for all the firms working in the expanding industry. External economies result from the progress an industry makes in providing the social overhead capital needed by the constituent firms. Sources of External Economies includes, Physical Factors, Economies of Concentration, Economies of Information and Economies of disintegration. Many economists have criticised the concepts of external economies developed by Marshall and Viner. There are two major criticisms made by modern economists. First, the view that technological external economies are non-existent and another criticism has been made against pecuniary external economies. It has been suggested that external pecuniary economies are typically the result of internal economies

in another industry where the increased efficiency is passed along in the form of lower prices for intermediate goods. The concept of external economies has proved very useful both in theoretical and applied economies.

The economies obtained by a firm or an industry are ultimately limited. A point comes where some factors start operation in the opposite direction and the costs of production start rising. These factors are sometimes called internal and external diseconomies. Internal diseconomies are those factors which raise the cost of production of a firm as its scale of production is increased beyond a point. The factors which are responsible for these types of economies are: Unwisely management and Technical difficulties.

While internal diseconomies are practically known to exist, external diseconomies are so far a part of economic theory only. The forces which ultimately limit the expansion of an industry may be, called external diseconomies. The concepts of external economies and diseconomies have been used to classify industries into three types in order to determine their equilibrium. This classification of industries was used to show the determination of normal price in three cases, i.e. diminishing returns, constant returns and increasing returns.

#### 14.7 GLOSSARY

- **Diseconomies of Scale:** A rise in average cost per unit when a firm expands beyond its optimal size.
- **Internal Diseconomies:** Cost disadvantages arising within a firm due to expansion, such as poor communication or managerial inefficiency.
- **External Diseconomies:** Cost disadvantages caused by external factors like overcrowding of industries or increased competition for resources.
- **Managerial Diseconomies:** Inefficiencies caused by difficulties in coordination and control in large organizations.

#### 14.8 SELFASSESSMENT QUESTIONS

1. Explain the various economies of scale and diseconomies of scale that accrue to the firm when it expands its scale of production?

2. Explain external economies. How are these economies achieved?

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3. Write notes on: (1) Internal diseconomies and (2) External diseconomies.

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#### **14.9 LESSON END EXERCISE**

Q1. What are Diseconomies of Scale? Distinguish between Internal and External Diseconomies of Scale with suitable examples. Explain how they affect a firm's long-run average cost.

Q2. Discuss the main causes of Diseconomies of Scale in large firms. How do factors like managerial inefficiency, poor communication, and over-expansion contribute to rising costs? Illustrate your answer with real or hypothetical examples.

#### **14.10 SUGGESTED READINGS**

- Advanced economic theory, Ahuja, H.L., S. Chand & Sons, New Delhi.
- Economic theory, Chopra, P.N., Kalyani Publishers, New Delhi.
- Micro economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

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**COST ANALYSIS****STRUCTURE**

- 15.0 Learning Objectives and Outcomes
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- 15.2 Kinds of Costs
  - 15.2.1 Money Cost
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## **15.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

The specific objectives of this chapter are:

- To define different cost concepts.
- To explain short run cost curves.
- To describe the cost curves under long run.

### **Learning Outcomes**

After studying this chapter, you will be able to:

- Define and distinguish between various types of cost concepts such as fixed cost, variable cost, total cost, average cost, and marginal cost.
- Interpret and analyze the behavior of short-run cost curves, including their shapes and interrelationships.
- Describe the nature and derivation of long-run cost curves and understand how they are related to returns to scale.
- Understand the difference between short-run and long-run cost behavior.
- Apply cost concepts to real-life business decision-making situations, such as production planning and pricing.

## **15.1 INTRODUCTION**

In the previous chapters, it has been realised that the marginal cost curve slopes up from left to the right while the marginal revenue curve slopes down from left to the right at the point of their intersection so that a stable and determinate equilibrium of the firm is ensured. But we did not distinguish between the short-run or long-run cost, revenue and equilibrium. Therefore, here in this chapter we explain the concepts of all these costs both in the long run as well as in the short run.

## **15.2 KINDS OF COSTS**

There are different concepts of costs used in Price Theory. These concepts must be clear before we try to know the analysis of cost for equilibrium of the firm. The different concepts of cost are as follows:

### **15.2.1 Money Cost**

When we talk of the cost of a firm, the immediate idea about costs that comes to our mind is the money costs, the costs that accountants often list, the money outlays of a firm on the processes of production of its output. These are the wages and salaries paid to labour, the expenditure on machinery and equipment and the needed repairs, the payment for materials, power, light, fuel and transportation; the disbursements of rents, trademarks, advertisement and insurance and the taxes. However, the accountants may not add all such costs. For



example, in calculating the costs of the firms, the wages of management to the entrepreneur, a reasonable rate of return on the land and capital owned and contributed by him must be added in. Further, provisions for depreciation, obsolescence, and bad debts must be made in calculating the costs of the firm.

While a producer considers only the money costs of procuring the inputs necessary for products, another view of costs interests economists. This is the idea of real costs. They like to look behind the money costs from the social viewpoint. The main reason for the payments made to the factors of production is that there is disutility in rendering the services. This was the view expressed by the neo-classical. Marshall wrote: “The exertions of the different kinds of labour that are directly or indirectly involved in making it, together with the abstinence 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 the commodity.

According to J.L. Hanson, “The money costs of producing a certain output of a commodity is the sum of all the payments to the factors of production engaged in the production of that commodity”. Thus, money cost is the cost which enters the records of the accountants of a company.

### **15.2.2 Opportunity Cost**

Work to an ordinary man is uncomfortable or even painful if done overtime. In the same way, responsibility and risk-bearing in business means worry and nervous wear for the common businessman. Similarly, accumulation of capital whose services are so important for production is the result of a process of abstinence and waiting. It is crystallised, stored up labour. From the social point of view no real cost may be attributed to the services of natural resources, yet from the point of view of an individual, land (or other resource) owner, the sacrifice of an opportunity of using it for some purpose other than the one to which it is being put, constitutes a cost. The forgone opportunity also taken as cost and is termed opportunity cost.

According to Leftwich, “opportunity cost of a particular product is the value of the forgone alternative product that resources used in its production could have produced”.

It is instructive and analytically helpful to think of production costs as opportunity costs or

alternative costs. The resources (or inputs) used in production generally have many alternative uses, that is, they are non-specialized. A driver can be used to drive a taxi, a personal car, a highway truck, a tractor or a road-building bulldozer. He cannot be put to all these employments at the same time. His employment as a taxi driver means the loss of an opportunity of employing him as a truck driver. The sacrifice of an alternative opportunity from the viewpoint of the transport firm is an opportunity cost. A more interesting example of opportunity cost is the dislocation of family life a person has to suffer in agreeing to his wife getting employed. Similarly, a businessman is generally capable of working in a few industries. A machine can be put to a variety of uses. Its employment in one of these uses must pay it at least that much which it can get in the next best employment; it must be priced at least equal to its transfer earnings, which is its opportunity cost.

According to Ferguson, “The alternative or opportunity cost of producing one unit of commodity X is the amount of commodity Y that must be sacrificed in order to use resources to produce X rather than Y”.

### **15.2.3 Social Cost**

The producer calculates and tries to cover his own private costs. He does not think of the effects of his production processes on the society. In some industries, all the costs of production are not entirely borne by the producer, some costs incidental to the production process are borne by others.

Social cost is the total cost of production of a commodity which includes the direct and the indirect costs which the society has to pay for the output of the commodity.

In his *Economics of Welfare*, A.C. Pigou drew a distinction between private and social costs. A mill owner will count his costs of production and never those of the people living around the factory who have to pay in the form of increased laundry bills due to the soot and smoke coming out of the factory chimneys. In this case social cost is more than private cost. Other examples of social cost being more than private costs can be cited: the pollution or wastes by mining and industrial waters, the impairment of health and property values by the air pollution from the fumes and smoke of slaughter house and factories, the crowded parking and other inconveniences caused by cinema houses and circuses, incomplete private compensation for injuries at work or for occupational diseases; and soil erosion,

deforestation, and wasteful depletion of oil and coal reserves. These cases of social cost exceeding private cost call for special attention of the State.

On the other hand, certain cases can be noticed where private cost is more than the social cost. These are cases of firms whose operation renders some services to the other firms or the economies which are not paid for. An engineering college or technical institute in an area helps private industries in that area. The building of the Bhakra-Nangal system of canals has increased land values phenomenally in their areas of Punjab, Karyana and Rajasthan; the Bhakra Board pays for the project more than the society at large. Slum clearance, town and country planning give a face lift to localities increasing the values of houses in them. In many industries, cost of research is borne by one producer in bringing out an innovation while other firms get free hints for improving their methods of production. All these cases are those of social net product being higher than the private net product. This difference between the two costs arises because of the inability of the private enterprise to fully appropriate their product.

#### **15.2.4 Other Costs**

Of all cost concepts mentioned above we shall make use, in price theory, of only the private and money costs of production. Other cost concepts shall be found to be of great use in the discussion of welfare economics or in our discussion on socialist economics.

- 1. Accounting costs and economic costs.** When an entrepreneur undertakes an act of production, he has to pay prices for the factors which he employs for production. He thus pays wages to workers employed, prices for the raw materials, fuel and power used, rent for the building he hires, and interest on the money borrowed for doing business. All these are included in his cost of production and are termed as accounting costs. Thus accounting costs take care, of all the payments and charges made by the entrepreneur to the suppliers of various productive factors.

But it generally happens that an entrepreneur invests a certain amount of own capital in his productive business. If the capital invested by the entrepreneur in his business had been invested elsewhere it would have earned certain amount of interest or dividend. Moreover, an entrepreneur devotes time to his own work of production and contributes his entrepreneurial and managerial ability to do business. Had he not set up his own business

he would have sold his services to others for some positive amount of money. Accounting costs do not include these costs. These costs form a part of the economic cost. Thus, economic costs include: (1) the normal return on money capital invested by the entrepreneur himself in his own business; (2) the wages or salary not paid to the entrepreneur but could have been earned if the services had been sold somewhere else. Likewise, the monetary reward for all factors owned by the entrepreneur himself-and employed by him in his own business are also considered a part of economic costs.

Thus, accounting costs constitute those costs only which involve cash payments by the entrepreneur of the firm. Economic costs take into account not only these accounting costs but in addition, they also take into account the amount of money the entrepreneur could have earned if he had invested his money and sold his own services and other factors in the next best alternative use. Accounting costs are also called explicit costs whereas the cost of factors owned by the entrepreneur himself and employed in his own business are called implicit costs. Thus, economic costs include both accounting costs and implicit costs. The concept of economic cost is important because an entrepreneur must cover his economic cost if he wants to earn normal profits and abnormal profits are over and above these normal profits. In other words, an entrepreneur is said to be earning profits (abnormal) only when his revenues are able to cover not only his explicit costs but also the implicit costs of his output.

7        **Outlay costs and opportunity costs.** Outlay costs involve actual outlay of funds on, say, wages, material, rent, interest etc. Opportunity cost, on the other hand, is concerned with the cost of foregone opportunity; it involves a comparison between the policy that was chosen and the policy that was rejected. For example, the cost of lending or using capital is the interest that it may earn in the next best use of equal risk.

A distinction between outlay costs and opportunity costs can be drawn on the basis of the nature of the sacrifice. Outlay costs involve financial expenditure at some time and thus are recorded in the books of account. Opportunity costs relate to sacrificed alternatives; they are not recorded in the books of account in general.

The opportunity cost concept is very useful, e.g., in a cloth mill which spins its own yarn, the opportunity cost of yarn to the weaving department is the price at which the yarn could

be sold, for measuring profitability of the weaving operations. Similarly, during a boom period a decision of the use of scarce capacity for a given product would involve the use on the opportunity cost of not using it or to make some other product that can yield profit.

**8 Direct or traceable costs and indirect or non-traceable costs-** Direct costs are costs that are readily identified and are traceable to a particular product, operation or plant. Even overhead can be direct as to a department; manufacturing costs can be direct to a product line, sales territory, customer class etc. We must know the purpose of cost calculation before considering whether a cost is direct or indirect.

Indirect costs are neither readily identified nor easily traceable to specific goods, services, operations, etc. but are nevertheless charged to the jobs or products in standard accounting practice. The economic importance of these costs is that these, even though not directly traceable to the product, may bear some functional relationship to production and may vary with output in some definite way. Examples of such costs are electric power, the common costs incurred for general operation of business benefiting all products jointly.

**9 Fixed and variable costs-** Fixed or constant costs are not a function of output; they do not vary with output up to a certain level of activity. These costs require a fixed outlay of funds irrespective of the level of output, e.g., rent, property taxes, interest on loans, depreciation when taken as a function of time and not of output. However, these costs also vary with the size of the plant and are a function of capacity. Therefore, fixed costs do not vary with the volume of output within a capacity level.

Fixed costs, to an economist, are overhead costs and to an accountant indirect cost. However, a clear line of distinction is sometimes not possible; for example, depreciation, often taken as fixed cannot be considered as fully fixed. Although depreciation is mostly related to time, a substantial part of it depends on wear and tear (user cost) which would be strictly variable.

Fixed costs cannot be avoided. These costs are fixed so long as operations are going on. They can be avoided only when operations are completely closed down. We can call them as inescapable or uncontrollable costs. But there are some costs which will continue even after operations are suspended, as for example, the storing of old machines which

cannot be sold in the market. Some of the fixed costs such as advertising, etc. are

programmed fixed costs or discretionary expenses, because they depend upon the discretion of management whether to spend on these services or not.

Variable costs are a function of output in the production period. It is like stock which is used up with the volume of output. Variable costs vary directly and sometimes proportionately with output. Over certain ranges of production they may vary less or more than proportionately depending on the utilisation of fixed facilities and resources in the process of production.

10 **Shut down and abandonment costs-** Shutdown costs may be those which would be incurred in the event of a temporary cessation of business activities and which could be saved if operations were allowed to continue. Shut-down costs, besides fixed costs, cover the additional expenses in looking after the property not disposed of.

Abandonment costs are the costs of retiring a fixed asset from use. For example, a second-hand plant installed in war time may not be useful during peace time. Abandonment thus involves permanent cessation of activity and raises the problem of disposal of abandoned assets.

## **A. CHECK YOUR PROGRESS**

### **Short Answer Type Questions**

**1. What is the difference between fixed cost and variable cost?**

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**2. Define opportunity cost with an example.**

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**3. What is marginal cost and how is it calculated?**

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**15.3    SHORT RUN COST CURVES**

Analysis of costs of a firm depends heavily on the theory of production. The behaviour of cost shows behaviour of the product. If the product increases, costs decrease and vice versa, may it be total, average or marginal costs.

The costs of production of a commodity are the payments made to the factors of production. Given a certain amount of payment to these factors, the greater is the output, the lower is the cost, and vice versa, since the nature of production is different in the short-run (period) from that in the long-run. In the short-run, some factors of production are fixed while others are variable; in the long-run, all inputs are variable; in the short period only the proportion of the inputs can be changed; in the long period, scale of production can be varied. The fixed factors of the firm in the short-run are its plants and equipment, and in some industries, unique kind of skilled labour. Where plant and equipment are large and complicated, requiring heavy investments and actual construction time of many years, as in the case of modern steel plants, the short-run can be of many years' duration. In some other cases, it may be just a few days long, if firms can easily procure additional equipment



and skilled labour, and if their needs for buildings are modest or minimal. In the case of tea shops, the short-run is, for example, only a few days. Let a new public building be constructed in an area, tea shops appear in only a few days. Therefore, the duration of the short and the long-run differs from industry to industry according to the nature of equipment and inputs required, the techniques employed and the stage of development of the area.

### **15.3.1 Total costs in the short run**

Short run is a period of time in which certain inputs cannot be increased or decreased. It means that in the short run there are certain inputs whose amount cannot be change regardless of the amount of output produced. Similarly, there are other inputs known as variable inputs whose amount is amenable to change. A firm's short run total costs are split up into groups, viz., total fixed costs and total variable costs.

$$TC = TFC + TVC$$

Total fixed cost (TFC) is the expenditure incurred on the purchase of fixed inputs whereas total variable cost is the sum spent for the variable inputs. Thus, total costs (TC) are equal to total fixed cost (TFC) and total variable (TVC).

**Total Fixed Costs.** These are the costs incurred on factor-inputs which cannot be changed in the short period. They remain unaffected by changes in the rate of output. Even when the output is reduced to zero, these costs continue unchanged. Fixed costs, also known as supplementary costs, are overhead costs and include rent, interest on long term debts allowance for depreciation, salaries and wages of permanent staff.

**Total Variable Costs.** These are the costs incurred on the purchase of variable factors. The Change when output is changed. As greater quantity of output is produced, more raw materials are required and possibly more labour has to be used. These costs fall to zero when output is zero. These costs are known as variable costs because they change in response to a change in the rate of output. Variable costs are also known as prime costs and they include payments made to the workers, suppliers of raw materials, fuel, power, transportation and that part of depreciation of capital equipment which depends upon the rate of output. The concepts of total fixed cost, total variable cost and total cost can be illustrated with the help of the following table 15.1.

Table 15.1

Output	TFC (Rs.)	TVC (Rs.)	TC (Rs.)
0	60	0	60
1	60	100	160
2	60	180	240
3	60	240	300
4	60	340	400
5	60	500	560
6	60	720	780

Diagrammatically all these costs are shown as under:

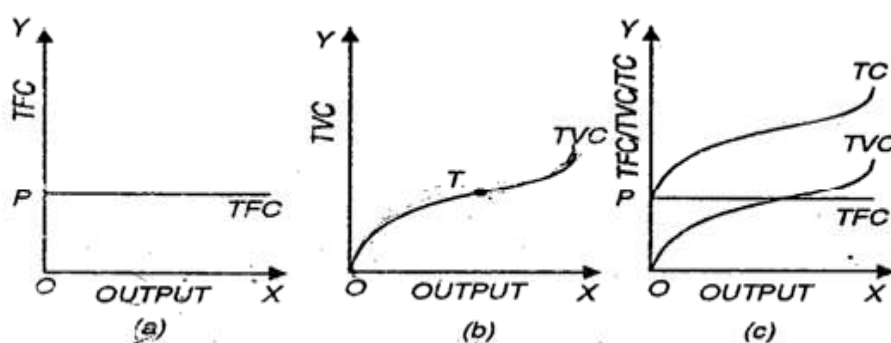


Figure 15.1: The total costs

Figure 15.1 (a) illustrates the behaviour of total fixed cost. TFC curve runs parallel to Y-axis showing that this cost is invariant to changes in the level of output. OP is the total fixed cost at zero output and it remains the same throughout. TFC is, therefore, graphically denoted by a straight line parallel to the output axis.

Figure 15.1 (b) shows the behaviour of total variable cost. TVC curve starts from the origin showing that it is zero when output is zero. The shape of TVC is the result of operation of the law of diminishing returns. Upto point T (the point of inflection) the TVC curve is concave downwards. It is so because the firm is using so little of the variable inputs together with fixed inputs that the law of diminishing returns is not yet operative. It

means that upto point T, TVC increases at a decreasing rate. After point T, TVC is concave upwards showing that TVC increases at an increasing rate, i.e., at point T, the law of diminishing returns begins to operate.

Figure 15.1(c) shows that at every level of output, TC equals TFC plus TVC. Thus TC curve has the same shape as TVC but is everywhere above TVC at a height determined by the level of TFC. Thus, by adding TFC and TVC we obtain TC of the firm.

### 15.3.2 Short run average fixed cost curve

The short run average cost curves that we examine are the average fixed cost, the average variable cost, the average cost and the marginal cost curves.

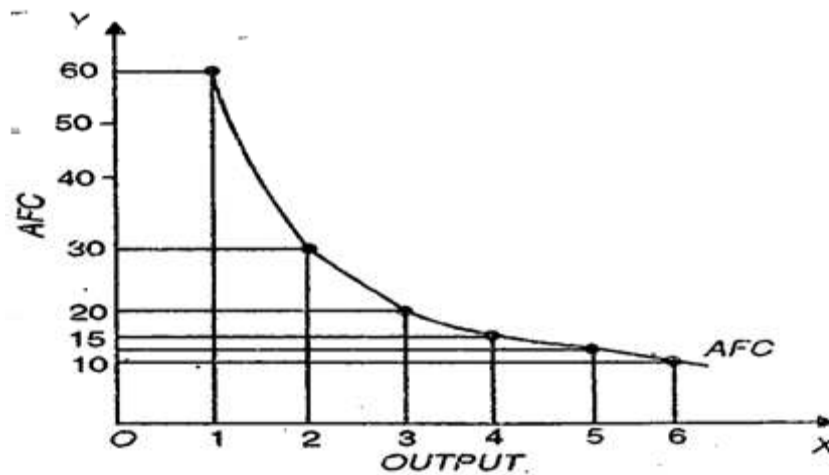
$$AFC = \frac{TFC}{\text{Total output}}$$

As the output of a firm increases, AFC will tend to decline continuously. This is obvious from the very definition of fixed costs which are costs that do not change with output. Whether the firm produces nothing, ten or twenty units, the total fixed cost remains the same. The following table shows the calculation of AFC.

Quantity	TFC (Rs.)	AFC (Rs.)
1	60	60
2	60	30
3	60	20
4	60	15
5	60	12
6	60	10

As the output of a firm increases, AFC will tend to decline continuously. This is obvious from the very definition of fixed costs which are costs that do not change with output. Whether the firm produces nothing, ten or twenty units, the total fixed cost remains the same. The following table shows the calculation of AFC.

Graphically AFC is shown by a falling curve in the figure 15.2. The AFC curve is negatively sloped throughout because as output increases, it gets spread over greater number of units. Mathematically, the AFC curve is a rectangular hyperbola showing the same level of total fixed cost at all its points (Figure 15.2).



**Figure 15.2: Average Fixed Cost curve**

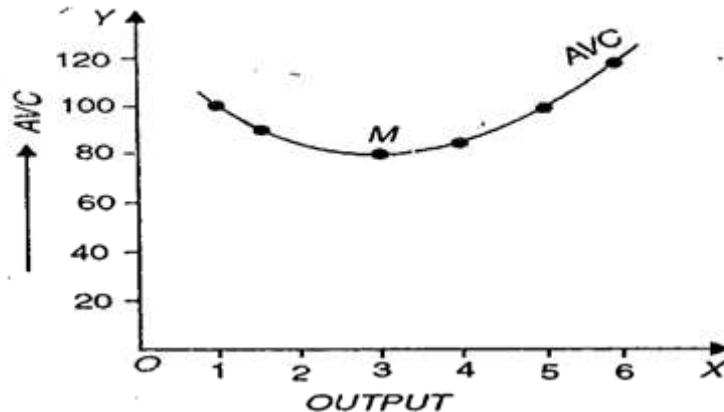
### 15.3.3 Short run average variable cost

The average variable cost is obtained by dividing the total variable cost (TVC) with the corresponding level of output.

$$AVC = \frac{TVC}{\text{Total output}}$$

The average variable cost has usually a U-shape. Its U-shape can be explained in terms of the law of variable proportions. Suppose for example that a factory is designed to employ one hundred workers. The scale of plant is fixed and labour is the only variable resource. The amount of output produced if only one man is employed will be extremely small, but if additional man is employed, the two can split up the job to be performed and can produce more than double the single man's output. This means that the average product of labour increases with the employment of additional man. If doubling of labour (variable) costs would more than double output, labour costs per unit of output (average variable costs) will decrease." It is for this reason that initially with an increase in the average product of the variable factor, average variable costs decrease. When enough units of a variable factor are employed, average product decreases or average variable costs increase.

In the figure 15.3, output has been taken along X-axis and AVC along Y-axis. We find that the Average Variable Cost Curve (AVC) slopes downwards from left to right upto point M and thereafter it rises upwards from left to right.



**Figure 15.3: Average variable cost curve**

#### 15.3.4 Short run marginal cost curve

Marginal cost is defined as the change in total cost resulting from a unit change in output. This can also be defined as the change in total variable cost resulting from a unit change in output. Since fixed costs do not change with output, marginal cost depends, in no way, upon fixed cost. In the words of Ferguson: "Marginal cost is the addition to total cost attributable to the addition of one unit to output." It can be calculated by subtracting the total cost of producing  $n - 1$  units from the total cost of producing  $n$  units. For example, the marginal cost of the second unit produced is  $MC_2 = TC_2 - TC_1$ . Similarly, the marginal cost of third unit produced is  $MC_3 = TC_3 - TC_2$  and so on.

The formula for calculating marginal cost is as follows:

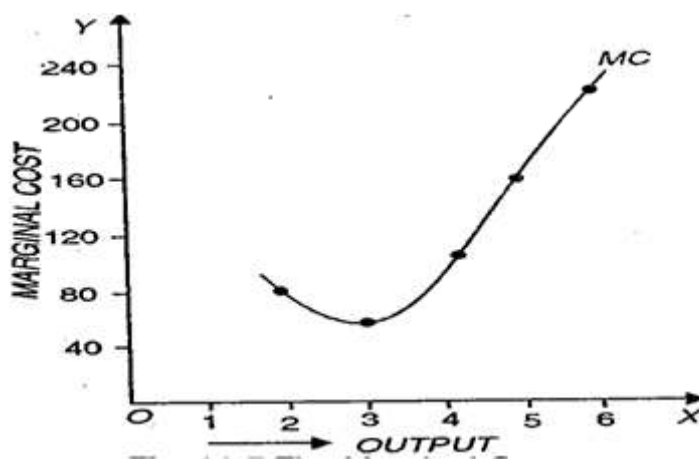
$MC_n = TC_n - TC_{n-1}$  in which  $n$  stands for any number.

Therefore, it is clear that the marginal cost does not depend upon the fixed cost and it is defined either; (a) the change in total cost resulting front a one unit change in output or (b)

as the change in total variable cost resulting from a one unit change in output (Table 15.2 and figure 15.4 below).

Quantity	TFC (Rs.)	TVC (Rs.)	TC (Rs.)	MC (Rs.)
1	60	100	160	
2	60	180	240	80
3	60	240	300	60
4	60	340	400	100
5	60	500	560	160
6	60	720	780	220

It is thus clear from the above table that marginal cost decreases at first reaches a minimum and then rises as output is increased.



**Figure 15.4: Marginal Cost Curve**

### 15.3.5 Relationship between AC and MC

In price theory, the relationship between AC and MC is of great importance. The whole marginal analysis of product pricing depends upon it. Therefore, the relation between AC and MC must be studied in detail. This relation is better explained with the help of a table 15.3 and a figure 15.5.

Table 15.3

Relation Between Average Cost and Marginal Cost

Unit of output	Total cost (Rs.) <i>TC</i>	Average cost (Rs.) <i>AC</i>	Marginal cost (Rs.) <i>MC</i>
1	150	150.0	—
2	190	95.0	40
3	220	73.3	30
4	236	59.0	16
5	270	54.0	34
6	324	54.0	54
7	415	59.3	91
8	580	72.5	165

In the table given above, the following points of relationship between average cost and marginal cost are immediately clear.

1. **Both AC and MC are calculated from total cost of production.** They are derived from the same source.

$$\text{Average Cost} = \frac{\text{Total cost}}{\text{Total Output}}$$

$$\text{Marginal Cost} = \frac{\text{Change in Total Cost}}{\text{Change in unit of Output}}$$

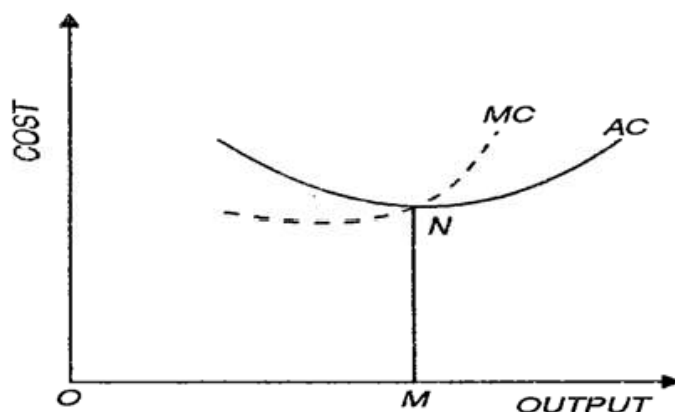
Average cost shows the inclination of the total cost curve over the output axis. Marginal cost is shown by the slope of the total cost curve at a particular level of output. Both Average cost and Marginal cost can be obtained from the total cost curve.

2. **When average cost is falling, the marginal cost is always lower than the average cost.** A common view is that when AC falls, MC falls faster. However, this is not the case throughout. MC reaches a minimum and may then start rising even when the average cost is falling. The only thing to be guaranteed is that the MC lies below AC as long as AC is falling.

3. **When AC is rising, MC lies above AC and rises faster than AC-** When AC is rising, MC is not only greater than AC, but also rises faster than the AC.

4. **MC curve must cut the AC curve at AC's minimum point.** This relationship is derived from the fact that when AC is constant, MC is equal to AC. The diagram (Fig.15.5) shows the relationship between the AC and MC in a very clear way.

In Fig 15.5, the curve AC is U-shaped mainly due to the operation of the law of variable proportions in the short period. The related MC curve is shown as dotted. It is also U-shaped. The MC curve intersects the AC curve at the later minimum point. The minimum point of the AC curve is that from which the perpendicular to the X-axis is shortest. In Fig. 15.5 the output OM is produced at the lowest average cost.



**Figure 15.5: Relationship between Average Cost and Marginal Cost**

#### **15.3.6 Relationship between Different Cost Concepts**

In the short period we have a set of cost concepts which are interrelated with each other. We need the following cost curves for analysis of a firm's output and pricing policies:

1. Average fixed cost
2. Average variable cost
3. Short run average cost
4. Short run marginal cost



**1. Average Fixed Cost Curve (AFC).** Fixed cost is a fixed amount that does not change with variations in output. This amount of cost will have to be borne even when the firm is shut down. They are unavoidable contractual costs. As output increases, average fixed cost ( $AFC = \text{Cost per unit}$ ) goes on falling: Therefore, in figure 15.6 the average fixed cost curve (AFC) approaches the X-axis as output increases. This curve traces a rectangular hyperbola asymptotic to the output and cost axis. This means that the curve approaches (but does not meet) the vertical and the horizontal axes at each end. To call the AFC curve rectangular hyperbola is to say that the fixed cost is fixed as a total amount.

**2. Average Variable Cost Curve (AVC):** Dividing total variable costs with corresponding output gives us average variable cost. In Fig. 15.6 the average variable cost curve (AVC) declines at first, reaches a minimum and then rises. The average product of variable factors increases with output, or what is the same thing, AVC falls. As output is increased by employing more and more of variable factors, proportions continue to alter. For some range of output, the average physical product of the variable factors may remain constant and hence the AVC. But ultimately, as output is expanded still further, the average physical product of the variable factors must diminish, that is to say, the AVC must start rising. On account of the operation of the Law of Variable Proportions, the AVC curve is U-shaped.

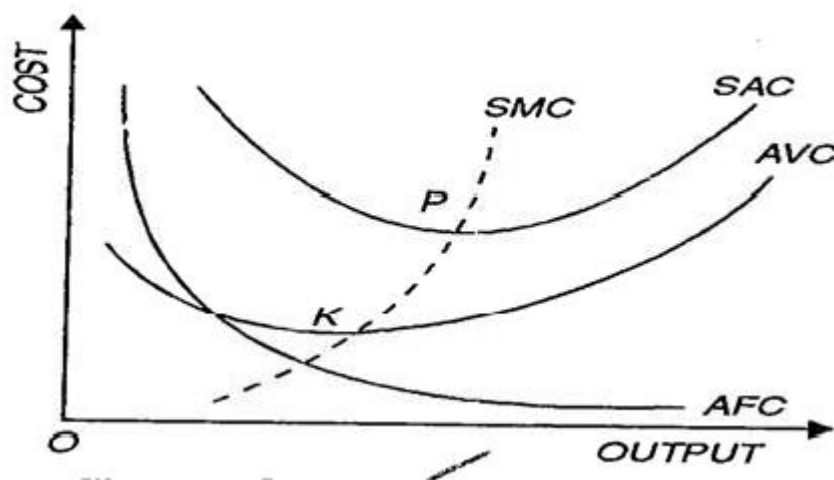
**3. Short-run Average Cost Curve (SAC).** The addition of fixed and variable costs gives us total costs, which when divided by output, give us average cost in the short run. Therefore, we can say that SAC curve in figure 15.6 is the sum of AFC and AVC for each output. Since output increases, variable costs increase faster relatively to fixed costs, the shape of SAC is governed by AVC. Being dependent on AVC mainly, the SAC curve is also U-shaped.

**4. Short-run Marginal Cost Curve (SMC).** Marginal cost means the addition made to total cost on account of the production of one more unit of output. The concept of marginal cost curve helps us in finding out

the equilibrium of a firm. In the short run the marginal cost curve helps us in determining the supply of a product by a firm. In figure 15.6 SMC is the marginal cost curve. We must closely note down its relationship, to the average (AVC and SAC) curves. The marginal cost curve falls faster than the average cost curve and also rises faster than the average cost curve. The marginal cost curve always intersects

the average cost curve from below at its minimum point. This is a purely geometric relationship with no technological reasons behind it and of interest to us. We need to remember only that the SMC curve intersects both AC and SAC at their minimum points.

There is a special relationship between SAC and AVC. As output is increased, fixed costs, as they are defined, do not change; the change in total costs of the firm is brought out only by variable costs. As one more unit of output is produced, fixed costs remain constant; while variable costs, and by the same amount, the total costs, are increased. Therefore, the total costs and variable costs may differ in absolute amounts but register the same increment in them as output increases by a unit, or marginal cost is common to both.



**Figure 15.6: Relationship between Short Run Costs Curves**

## **B. CHECK YOUR PROGRESS**

### **Choose the Correct Option**

1. Which cost curve always declines as output increases, in the short run?

- A) Average Fixed Cost (AFC)
- B) Marginal Cost (MC)
- C) Average Variable Cost (AVC)
- D) Average Total Cost (ATC)

**Answer: A) Average Fixed Cost (AFC)**

2. The marginal cost curve intersects the average total cost curve at:

- A) Its minimum point
- B) Its maximum point
- C) The point where total cost is zero
- D) All points

**Answer: A) Its minimum point**

3. In the short run, the shape of the marginal cost curve is generally:

- A) Downward sloping only
- B) Upward sloping only
- C) U-shaped
- D) Horizontal

**Answer: C) U-shaped**

4. If total fixed cost is ₹500 and output is 10 units, the average fixed cost is:

- A) ₹500
- B) ₹50
- C) ₹10
- D) ₹5

**Answer: B) ₹50**

5. Which of the following statements is true in the short run?

- A) All inputs are variable
- B) Fixed costs do not exist
- C) Variable costs remain constant
- D) Some inputs are fixed and some are variable

**Answer: D) Some inputs are fixed and some are variable**

6. When output increases and marginal cost is rising, it implies that:

- A) Average cost is falling
- B) Diminishing returns have set in

- C) Fixed cost is increasing
- D) Variable cost is constant

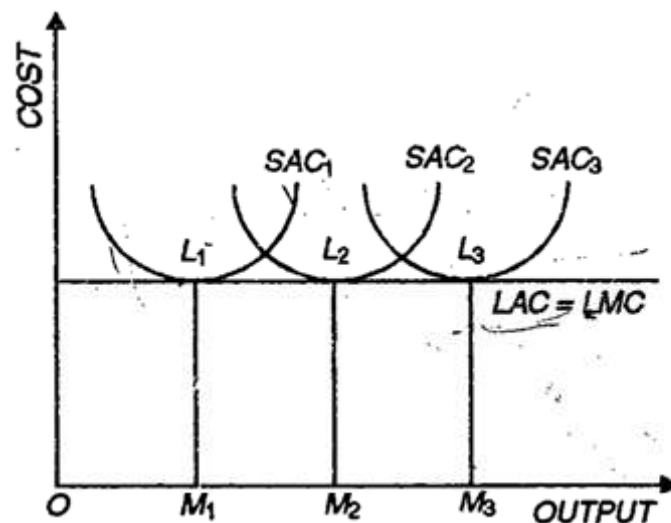
**Answer: B) Diminishing returns have set in**

## 15.5 LONG RUN COST CURVES

In the long-run no factor is fixed and everything including plant size is variable. The firm can change its scale to suit its needs. In the short-run, a firm has no choice but to adjust its production to the demand for its product by changing the proportions of variable factors relative to the fixed factors. Firm has no choice but to adjust its production to the demand for its product by changing the proportions of variable factors relative to the fixed factors.

### 15.5.1 Plant Capacity and Change in Scale

In the long run the firm will like to change, its scale of production to suit its needs. This is because it is always profitable for a firm to change the scale of the plant than to change the proportions of inputs in order to adjust output to the demand for its product in the long period. In the long run the firm will like to change, its scale of production to suit its needs. This is because it is always profitable for a firm to change the scale of the plant than to change the proportions of inputs in order to adjust output to the demand for its product in the long period. This can be explained easily with the help of figure 15.7.



**Figure 15.7: Relationship between short run average cost curves and long run average cost curve**

In figure 15.7, SAC is the average cost curve of a plant of a comparatively small capacity. SAC2 is the average cost of a plant with a higher capacity and SAC shows the average cost of plant with a still bigger capacity (scale). The firm, in planning for its production in the long run, will like to select one such plant with a scale that gives the required output at the lowest average cost. In other words, we can say that in the long run a separate average cost curve from the short-run average cost curve is relevant to the choice of a firm. Call it

the long-run-average cost curve. In the long run too a firm has to plan to build a plant of a capacity which gives the firm the required output at the least possible cost. In other words, the firm has to make its choice among a set of SAC curves<sup>^</sup> and it has to choose one of them. If the firm plans to produce at a lower scale of the plant it will select a plant of a smaller capacity and if the firm wants to produce a greater output, then it will select a plant of higher capacity. The long-run average cost curve, therefore, has at least one point in common with each SAC curve. In other words, the LAC curve touches all the SAC curves.

According to Leftwich, “The long run average cost curve shows the least possible cost per unit of producing various outputs when the firm has time to build any desired scale of plant.”

Figure 15.7 shows a long period technology with constant returns to scale, that is in this figure, an infinite divisibility of all inputs in the long run is assumed. Therefore, the minimum points of all the short-run average cost curves lie in a straight line. Now, if the firm wants to produce an output OM1 it will select a plant of the size shown by SAC and produce the output with average cost ML1. Therefore, L1 lies on the long run average cost. Similarly for producing the output OM2 the firm will make choice for the plant shown in SAC2 with a point L2 that lies on the long-run average cost. Similarly L3 is also on the long-run average cost curve. If we join the points L1, L2 and L3 we get LAC, i.e., the long run average cost curve (or the planning curve as it is also called) which is a straight line.

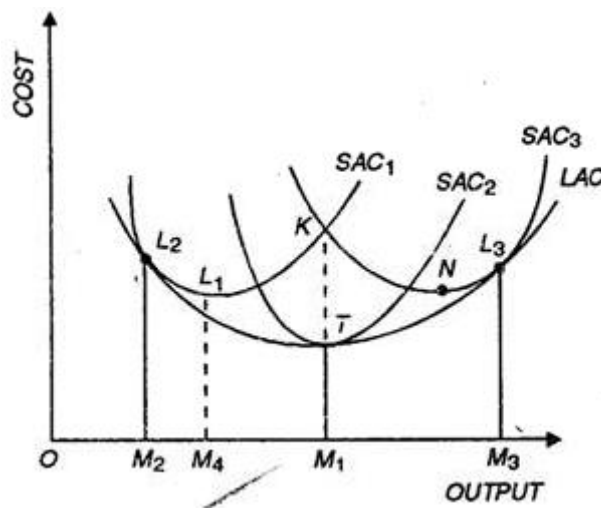
### **15.5.2 Derivation of long run average cost curve under varying returns to scale**

There are two conventional views about the behaviour of long-run average cost:

1. When the plant size is expanded, the full capacity average production cost (minimum short-run average cost) does not either fall or rise. This is the case when there are constant returns to scale. This is the case shown in Figure 15.7.
2. When the plant size is expanded, the full-capacity production cost falls at first, falls to, a minimum and then starts rising as the scale of production is increased further. This view assumes varying returns to scale. This is the case shown in Figure 15.8.

Figure 15.8 depicts the case of a firm which has varying returns to scale. Here the LAC curve is different. It is U shaped. SAC<sub>1</sub>, SAC<sub>2</sub> and SAC<sub>3</sub> represent three successively

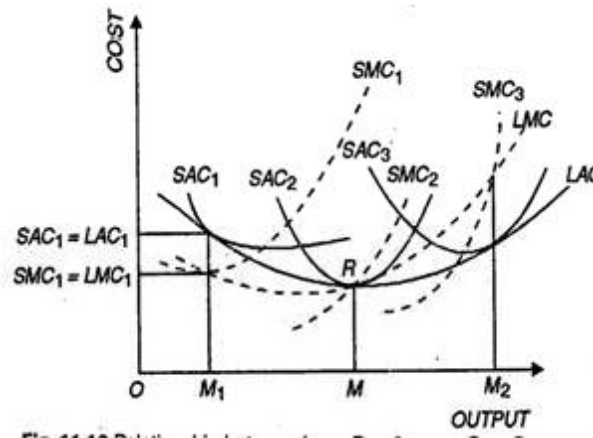
increasing sizes of plant of the firm. Let us assume that  $SAC_3$  represents the size of a plant where full-capacity operation produces output at the lowest possible average cost in the long period. Therefore, point T is the minimum point of the  $SAC_2$  curve as well as that of the long run average cost curve. As we see in figure 15.8, long-run average cost curve is touching (tangential to) all the short-run cost curves. For example, the LAC curve is tangential to  $SAC$  at point  $L_1$  and to  $SAC_3$  at point  $L_3$ . Points  $L_2$ , T and  $L_3$  lie on the long-run average cost curve. If we assume here continuities of scale, that is, if we assume here an infinite number of choices of scale of the plant, the long-run average cost curve will be continuous, being tangential to all the conceivable number of short-run average cost curves representing gradually increasing scales of the plant. Thus, if we assume varying returns to scale, as we often believe them to be in theory, and also assume perfectly divisible scale of plant, the long run average cost curve is a U shaped, continuous curve. Of course, the U shape of the LAC is less pronounced than that of the short-run average cost curve.



**Figure 15.8: Relationship between SAC curves and LAC curve Under varying returns to scale**

### 15.5.3 Long run Marginal Cost Curve





**Figure 15.9: Relationship between LAC curves and LMC curve:**

#### **SMC curves and LMC curve**

1. **Relationship between LAC and LMC.** The long-run average cost curve has also its marginal-cost curve which we call long-run marginal cost curve (LMC in figure 15.9). The long-run marginal cost curve can be derived easily from the long-run total cost curve and LMC bears the same relationship to its average cost curve which the short-run marginal cost curve bears to the short-run average cost curve. That is, it falls and rises faster than the long-run average cost curve and cuts the latter at its minimum point.
2. **LMC and SMC's.** An interesting point that automatically comes to one's mind is: if the LAC curve is tangential to all the SAC curves, what is the relationship between the LMC and the SMC's? The answer is: no such easy, interesting relationship exists between them. We can only say that when the firm has constructed proper scale of plant for producing a given output, short run marginal cost will equal long-run marginal cost at that output.

## C. CHECK YOUR PROGRESS

### Case Study

**Background:** Smart Bake Industries is a medium-sized bakery that produces gourmet breads and pastries. Initially, it operated with a single production unit. As demand grew, the company considered expanding its operations.

In the short run, Smart Bake faced increasing marginal costs due to overuse of existing equipment and space. However, in the long run, it had the option to build a larger facility, invest in advanced baking technology, and hire specialized workers. Over time, these changes led to lower average costs per unit due to economies of scale.

However, after expanding beyond a certain point, SmartBake experienced coordination issues and higher administrative overheads, leading to diseconomies of scale. The company realized that there's an optimal production level where average cost is minimized.

This pattern reflects the U-shape of the long-run average cost (LRAC) curve.

### Question

1. What cost-related benefit did Smart Bake Industries experience when its average cost per unit decreased as production increased in the long run?
2. What caused the average cost to rise after Smart Bake expanded its production beyond a certain point?
3. What is the typical shape of the long-run average cost (LRAC) curve, as reflected in Smart Bake's experience?

## 15.6 LET US SUM UP

There are different concepts of costs used in Price Theory. These concepts must be clear before we try to know the analysis of cost for equilibrium of the firm. The different concepts of cost are:

- **Money Cost-** These are the wages and salaries paid to labour, the expenditure on machinery and equipment and the needed repairs, the payment for materials, power, light, fuel and transportation; the disbursements of rents, trademarks, advertisement and insurance and the taxes. According to J.L. Hanson, "The money costs of producing a certain output of a commodity is the sum of all the payments to the factors of production engaged in the production of that commodity". Thus, money cost is the cost which enters the records of the accountants of a company.
- **Opportunity Cost-** Opportunity cost of a particular product is the value of the forgone alternative product that resources used in its production could have produced". It is instructive and analytically helpful to think of production costs as opportunity costs or alternative costs. According to Ferguson, "The alternative or opportunity cost of producing one unit of commodity X is the amount of commodity Y that must be sacrificed in order to use resources to produce X rather than Y".
- **Social Cost-** Social cost is the total cost of production of a commodity which includes the direct and the indirect costs which the society has to pay for the output of the commodity. examples of social cost being more than private costs can be cited: the pollution or wastes bymining and industrial waters, the impairment of health and property values by the air pollution from the fumes and smoke of slaughter house and factories, the crowded parking and other inconveniences caused bycinema houses and circuses, incomplete private compensation for injuries at work or for occupational diseases; and soil erosion, deforestation, and wasteful depletion of oil and coal reserves.

Of all cost concepts mentioned above we shall make use, in price theory, of only the private and money costs of production. Other costs concepts include: Accounting costs and economic costs, Outlay costs and opportunity costs, Direct or traceable costs and indirect or non-traceable costs, Fixed and variable costs, Shut down and abandonment costs.

Analysis of costs of a firm depends heavily on the theory of production. The behaviour of cost shows behaviour of the product. If the product increases, costs decrease and vice versa, may it be total, average or marginal costs.

The costs of production of a commodity are the payments made to the factors of production.

Given a certain amount of payment to these factors, the greater is the output, the lower is the cost, and vice versa, since the nature of production is different in the short-run from that in the long-run. In the short-run, some factors of production are fixed while others are variable; in the long-run, all inputs are variable.

Also, Short run is a period of time in which certain inputs cannot be increased or decreased. A firm's short run total costs are split up into two groups, viz., total fixed costs and total variable costs. Total fixed cost (TFC) is the expenditure incurred on the purchase of fixed inputs whereas total variable cost is the sum spent for the variable inputs. Thus, total costs (TC) are equal to total fixed cost (TFC) and total variable (TVC).

The short run average cost curves are average fixed cost, average variable cost, average cost and the marginal cost curves. The average variable cost is obtained by dividing the total variable cost (TVC) with the corresponding level of output. The average variable cost has usually a U-shape. Its U-shape can be explained in terms of the law of variable proportions. Marginal cost is defined as the change in total cost resulting from a unit change in output. This can also be defined as the change in total variable cost resulting from a unit change in output. In the words of Ferguson: "Marginal cost is the addition to total cost attributable to the addition of one unit to output." It is thus clear from the above table that marginal cost decreases at first reaches a minimum and then rises as output is increased.

In price theory, the relationship between AC and MC is of great importance. The whole marginal analysis of product pricing depends upon it.

Whereas, in the long-run no factor is fixed and everything including plant size is variable. The firm can change its scale to suit its needs. In the long run the firm will like to change, its scale of production to suit its needs. This is because it is always profitable for a firm to change the scale of the plant than to change the proportions of inputs in order to adjust output to the demand for its product in the long period. This is because it is always profitable for a firm to change the scale of the plant than to change the proportions of inputs in order to adjust output to the demand for its product in the long period.

According to Leftwich, "The long run average cost curve shows the least possible cost per unit of producing various outputs when the firm has time to build any desired scale of plant."

## 15.7 SELFASSESSMENT QUESTIONS

1. What is the relationship between average cost and marginal cost? If the marginal cost is rising, does it mean that average cost must also be rising?

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2. What is the difference between explicit costs and implicit costs? Should both be considered for optimal decision making by the firm?

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3. Explain the concepts of total fixed cost, total variable costs and total cost. How are they related to each other? Illustrate them through curves. Is the distinction between the fixed costs and variable costs relevant in the long run?

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## 15.8 LESSON END EXERCISE

Q1. Explain the different types of costs in economics with suitable examples. include fixed cost, variable cost, total cost, average cost, marginal cost, and opportunity cost. Use real-life examples where possible.

Q2. Discuss the short-run cost curves and their behavior. Why are average cost and marginal cost curves typically U-shaped? Include diagrams and explain the law of variable proportions and how it affects cost behavior in the short run.

Q3. What is the long-run average cost curve? How does it differ from the short-run average cost curve? Explain the concept of economies and diseconomies of scale using a diagram.

### **15.9 SUGGESTED READING**

- Economic Theory, Chopra P.N., Kalyani Publishers, New Delhi.
- Managerial Economics, Mehta, P.L., S. Chand, Delhi.
- Micro Economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

## **DIFFERENT MARKET STRUCTURES AND THEIR CHARACTERISTICS**

### **STRUCTURE**

- 16.0 Learning Objectives and Outcomes
- 16.1 Introduction
- 16.2 Perfect Competition
- 16.3 Pure Monopoly
- 16.4 Imperfect Competition
- 16.5 Let Us Sum Up
- 16.6 Self-Assessment Questions
- 16.7 Lesson End Exercise
- 16.8 Suggested Reading

### **16.0 LEARNING OBJECTIVES AND OUTCOMES**

#### **Learning Objectives**

After reading this chapter you will be able:

- To explain three types of market structure.
- To differentiate between all the three markets conditions.

#### **Learning Outcomes**

After completing this chapter, learners will be able to:

- Identify and describe the three main types of market structures: Perfect Competition, Monopoly, And Monopolistic Competition.
- Compare and contrast the characteristics, advantages, and limitations of each

market structure

- Analyze how each market structure affects pricing, output decisions, and consumer choices

## **16.1 INTRODUCTION**

The shape and nature of revenue functions (sales curves) is different under different market conditions. In practice there exist innumerable varieties of marketing conditions facing different firms for sale of their products. A market structure, or as is commonly said, a 'market' means the whole set of conditions under which a commodity is marketed: the extent and nature of competition in selling, the number and nature of buyers; the nature of the commodity that different sellers offer etc. taking these elements of market into consideration, there can be as many models as the number of combinations of sellers and



nature of the product.

Three broad sets of market conditions are commonly recognised as; perfect competition, monopoly and imperfect competition. This broad classification of markets is based mainly on the number of sellers of the product in the market.

## **16.2 PERFECT COMPETITION**

The model of a market that was a pet of the classical and the neoclassical was perfect competition. Such a market is an imaginary ideal one. A perfectly competitive market incorporates in it certain ideal conditions all of which may not be found in any product's market in practice.

A large number of small unrecognized sellers: The number of sellers is deemed to be large and the amount of sales done by each so small in relation to the market that none of the sellers, taken by himself, is able to influence the price by his own individual action of expanding or with holding his produce. There is to be no agreement or collusion among the sellers.

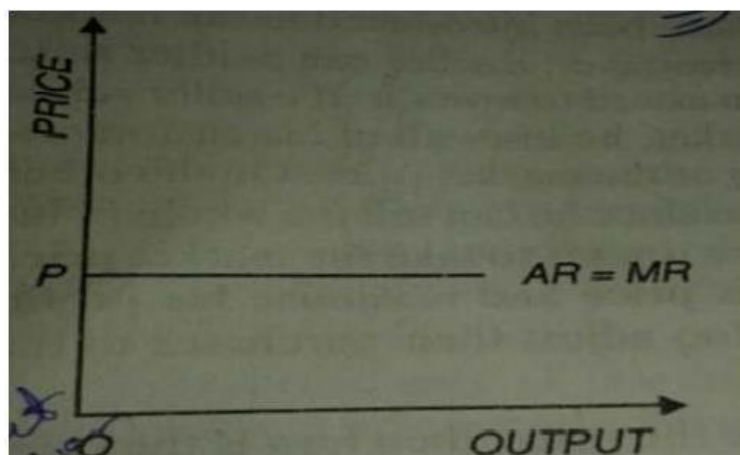
A large number of small unrecognized buyers: Again, here the number of buyers is thought to be large enough to prevent any one buyer from affecting the price in the market by his own action of purchasing more or less, and the purchases made by any one of the buyers are small as compared with the purchases of all the buyers in the market. Further, buyers are also thought to be completely unrecognized.

A homogenous product: All the sellers in the market have a perfectly similar product to offer; the product offered by each of the producers is in every way the same from the viewpoint of the buyers: the sellers' products are similar in colour, shape, design and service so that no one of the buyers has reason to be attached to any one of the sellers; there is no effect of any kind whatever to prejudice buyer's minds in favour of their product.

Free entry and Exit: Any firm from outside the industry must be able to enter the industry without artificial hindrances being erected against it, and any firm working in the industry must be free to go out of it as and when the firm likes.

The four conditions given above have been introduced in the market to ensure that an individual seller is a price taker; a seller can neither raise his price above that of the market nor can afford to lower it. If a seller raises his price above that prevailing in the market, he loses all of his customers, for they go over to the other sellers selling at the market price. On the other hand, he has no incentive to lower his price since he can sell the whole of his production at the going price.

The outstanding feature of pure competition is reflected in the fact that the individual firm has no price policy. To the individual firm the sales schedule looks like a horizontal line parallel to its x-axis (output); the firm has perfectly elastic demand curve of its product. The sales curve of the firm under pre-competition is shown in figure 16.1 as under.



**Figure 16.1: AR and MR under perfect competition.**

Average revenue is equal to marginal revenue at all outputs can be proved with the help of following formula, where elasticity of demand ( $e$ ) for the product of the firm is infinite.

$$AR \frac{e}{e-1} = AR \frac{1}{1-1/e} = \frac{1}{1-1/e}$$

$$= AR \frac{1}{1-0} = AR$$

Sometimes, economists especially British, have used perfect competition for their analysis. This type of market is assumed to have all the conceivable perfections. The four conditions of pure competition given above is refer to only on perfection i.e. complete absence of monopoly power in framing the price. Perfect completion implies pure competition and has other perfections. It assumes perfect mobility of resources, of labour and capital in any economic adjustment: there is no cost of mobilization (transport) nor restraining habits, preferences and inertia. It also pre-supposes perfect knowledge on the part of buyers and sellers. The assumption of perfect knowledge on the part of buyers and sellers means, in the words of Prof. Frank H. Knight, “they are performed, and to perform them in the light of the consequences”. Even the conditions of pure competition are hard to find in the real world. As has already been stated, perfect completion is an ideal that is assumed. This is done to simplify analysis.

## A. CHECK YOUR PROGRESS

### Case Study

**Background:** Prairieville is a rural region known for its extensive wheat farming. Hundreds of small-scale farmers operate in the area, each producing similar grades of wheat using standard farming techniques. The wheat is sold in open markets, and the prices are determined daily based on global supply and demand.

No single farmer has any control over the market price. If the price of wheat drops, all farmers receive lower incomes, and if prices rise, they all benefit equally. Farmers can freely enter or exit the market depending on profitability. Over the years, some farmers have tried to differentiate their wheat or form cooperatives, but due to the homogenous nature of the product and market transparency, these efforts have largely failed to command higher prices.

The government does not intervene in pricing, but provides weather forecasts and agricultural education. Technological advances are shared equally, allowing all

farmers to remain competitive.

**Questions:**

1. Identify the features of perfect competition present in the Prairieville wheat market. List at least four and explain with reference to the case.
2. Why can no single farmer in Prairieville influence the price of wheat?
3. What happens in the long run if farmers in Prairieville continue to earn above-normal profits? Use perfect competition theory to explain.

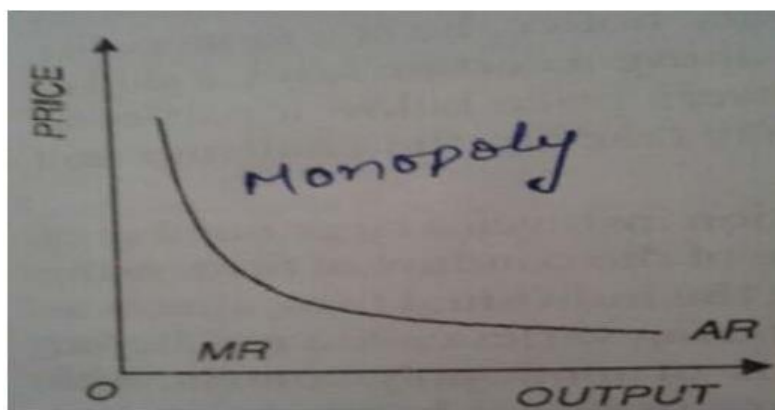
### **16.3 PURE MONOPOLY**

Monopoly is the opposite of perfect competition. In such a market, there is only one seller of the product, the sole controller of supply of the product in the market. The seller produces a commodity for which it is difficult to find a substitute. The firm constitutes the industry. The demand for output of this one firm is at once demand for the total industry; while under pure competition, the product of one seller is thought to be a perfect substitute for the product of another seller, the product of the monopoly firm is thought to have no close substitute at all. Since cross elasticity of demand between the monopolised good and its nearest substitute may be considered by buyers as highly unsatisfactory, the monopolist has a wide latitude of choice in his price policy. He is, to a large extent, a price-maker because he is not obliged to mind the policies and reactions of any rival.

A pure monopolist is one who can charge any price he likes by restricting his output. Whatever the price he decides to charge, total expenditure on his product done by

purchasers remains the same. In other words, the elasticity of demand for the product of the firm is unitary. The sales curve (figure 16.2) of his firm traces a rectangular hyperbola in this case, for all outputs marginal revenue curve is the X axis itself. The formula for this is:

$$MR = AR \frac{e-1}{e} = AR \frac{1-1}{1} = AR \times 0 = 0$$



**Figure 16.2: AR and MR under pure monopoly**

## **B. CHECK YOUR PROGRESS**

### **Fill in the Blanks**

A pure monopoly exists when there is only \_\_\_\_\_ seller in the market.

In a pure monopoly, the product or service has no close \_\_\_\_\_

A monopolist is a \_\_\_\_\_ maker, not a price taker.

One of the main barriers to entry in a monopoly is \_\_\_\_\_ control of a key resource.

Monopolies often result in \_\_\_\_\_ prices and \_\_\_\_\_ output compared to perfect competition.

Natural monopolies occur when a single firm can supply the entire market at a \_\_\_\_\_ cost than multiple firms.

<b>Answers:</b>	1. One	2. Substitutes	3. Price
	4. exclusive	5. higher; lower	6. lower

## 16.4 IMPERFECT COMPETITION

Pure competition and pure monopoly are two extreme organisations of the market, the first invol

Glossaryving a large number of sellers and the second only one seller. But generally, markets for products are neither purely competitive nor pure monopolies. In fact, there are many intermediate sets of market organisations. All these sets of market structures are labeled 'imperfect competition'. Imperfect competition consists of many market categories ranging from two sellers to a large number of buyers and sellers. In it many sub-categories of market situation have been identified and analysed.

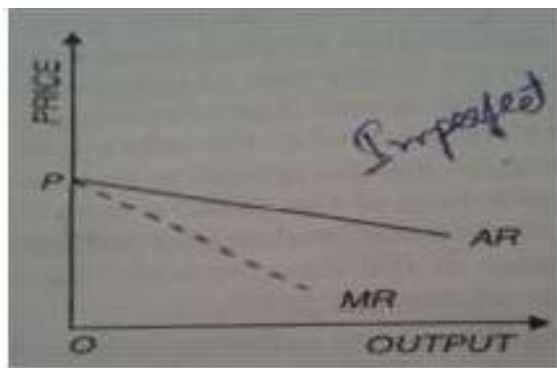
### 16.4.1 MONOPOLISTIC COMPETITION

Monopolistic competition is the nearest to pure competition. It involves many sellers and buyers- both of these small and unorganised. But the fundamental departure from pure competition is that the product is differentiated. There is a difference, but not very material, between the product of one and of another. The products are close, although not exact substitutes; there is a high cross- elasticity of demand between the products. Differences

in a given family of similar products are numerous. There may be differences in quality, style, colour, size, packing, container, trade names, brand, type of service, location of the store, credit terms and many other considerations that may give rise to a spirit of attachment of buyers to particular sellers. All the firms producing the closely related competing goods compose one industry.

Under this category of market organisation, the seller has a position that can be called monopolistic. He is a competitor in so far as he has rivals having products very much similar to and substitutable for his own. While fixing his own price he has taken into consideration the reactions of his rivals. But he is, to some extent, a monopolist also, in so far as some buyers have a preference for his variety of the good as against other varieties. The seller has some discretion in setting the price of his product.

Thus, in so far as monopolistic competition involves a large number of sellers and quite close substitutes, the outcome of the conduct of firms in the market is a price level which the individual firm is facing, almost as in pure competition. But to the extent the differing varieties are not perfect substitutes, individual firms constitute pockets of monopoly control, with prices varying from one another. The difference in prices between any two firms depends upon the proximity of their products. The average revenue curve faced by any individual firm is quite, though not perfectly elastic; it is gently sloping. So is marginal revenue curve. The curves AR and MR are shown in Figure 16.3 (below).

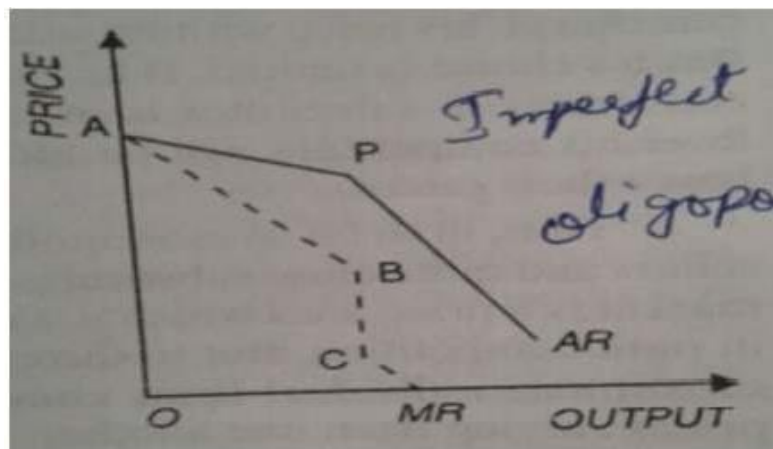


**Figure 16.3 : AR and MR under Monopolistic Competition**

### 16.4.2 OLIGOPOLY

Oligopoly is that market situation in which the market for a commodity is dominated by a few firms each of which is producing and selling considerable proportion of the total output sold in the market. When the firms are only two, the market structure is called duopoly. It is just a special case of oligopoly. Each firm is so large relative to the size of the market price. Changes by it in the output sold or price charged do not go unnoticed by its rivals. Therefore, in shaping its price policy each firm must take into consideration the reactions of the few owner producers and also his possible reactions to their reactions. No one producer can initiate a move without provoking retaliation. There is, as a result, a unique inter-relationship among the few sellers with respect to their price or output policies. This inter-relationship is the outstanding characteristic of the oligopolistic market structure.

Oligopoly maybe pure or differentiated according to whether sellers use labels, trademarks etc. or not. A suggested form of sales curve of the firm in oligopoly is a 'kinked demand curve, shown in figure 16.4. This sales curve is kinked. The average revenue curve has a kink at the point P where the demand curve for the product of the firm suddenly becomes quite inelastic if it lowers its price and goes elastic if it raises the price.



**Figure 16.4: AR and MR when average revenue curve has a kink under O.**

**Oligopoly**



### **C. CHECK YOUR PROGRESS**

#### **Choose the Correct Option**

**1.** Which of the following is a key feature of monopolistic competition?

- |                                    |                            |
|------------------------------------|----------------------------|
| A. One seller dominates the market | B. Homogeneous product     |
| C. Few sellers                     | D. Product differentiation |

**Answer: D. Product differentiation**

**2.** In monopolistic competition, firms compete on the basis of:

- |                                |                          |
|--------------------------------|--------------------------|
| A. Price only                  | B. Quantity only         |
| C. Price and non-price factors | D. Government regulation |

**Answer: C. Price and non-price factors**

**3.** In the long run, firms in monopolistic competition earn:

- |                        |                     |
|------------------------|---------------------|
| A. Supernormal profits | B. Losses only      |
| C. Normal profits      | D. Negative profits |

**Answer: C. Normal profits**

**4.** An example of monopolistic competition is:

- |                          |                      |
|--------------------------|----------------------|
| A. Electricity companies | B. Soft drink brands |
| C. Wheat farming         | D. Railway networks  |

**Answer: B. Soft drink brands**

**5.** The kinked demand curve theory is used to explain:

- |                                |                         |
|--------------------------------|-------------------------|
| A. Excess capacity             | B. Price discrimination |
| C. Price rigidity in oligopoly | D. Market failure       |

**Answer: C. Price rigidity in oligopoly**

**3.** In an oligopoly, firms are:

- |                                      |                           |
|--------------------------------------|---------------------------|
| A. Price takers                      | B. Price followers only   |
| C. Interdependent in decision-making | D. Completely independent |

**Answer: C. Interdependent in decision-making**

### **16.5 LET US SUM UP**

The shape and nature of revenue functions (sales curves) is different under different market conditions. Three broad sets of market conditions are commonly recognised as; perfect competition, monopoly and imperfect competition.

The model of a market that was a pet of the classical and the neoclassical was perfect competition. Such a market is an imaginary ideal one. A perfectly competitive market incorporates in it certain ideal conditions such as: large number of small unrecognized sellers, large number of small unrecognized buyers, homogenous product, and free entry and Exit of firms. The outstanding feature of pure competition is reflected in the fact that the individual firm has no price policy.

Monopoly is the opposite of perfect competition. In such a market, there is only one seller of the product, the sole controller of supply of the product in the market. The seller produces a commodity for which it is difficult to find a substitute. A pure monopolist is one who can charge any price he likes by restricting his output. Whatever the price he decides to charge, total expenditure on his product done by purchasers remains the same.

Pure competition and pure monopoly are two extreme organisations of the market, the first involving a large number of sellers and the second only one seller. But generally, markets for products are neither purely competitive nor pure monopolies. Imperfect competition consists of many market categories ranging from two sellers to a large number of buyers and sellers. In it many sub-categories of market situation have been identified and analysed. These sub- categories are:

**Monopolistic Competition-** Monopolistic competition is the nearest to pure competition. It involves many sellers and buyers- both of these small and unorganized. But the fundamental departure from pure competition is that the product is differentiated. There is a difference, but not very material, between the product of one and of another.

**Oligopoly-** Oligopoly is that market situation in which the market for a commodity is dominated by few firms each of which is producing and selling considerable proportion of the total output sold in the market. When the firms are only two, the market structure is called duopoly. It is just a special case of oligopoly. Oligopoly may be pure or differentiated according to whether sellers use labels, trademarks etc. or not. A suggested form of sales curve of the firm in oligopoly is a 'kinked demand curve'.

## 16.6 SELF ASSESSMENT QUESTIONS

1. Define market. Explain briefly four basis on which different markets are defined?

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2. What are the characteristics of a perfectly competitive market? What is the relevance of the characteristic that there are "large number of sellers" in this context?

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3. Distinguish between perfect competition and pure competition?

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## 16.7 LESSON END EXERCISE

1. Explain the main characteristics of monopolistic competition. Discuss how this market structure differs from perfect competition and monopoly, using suitable examples.
2. How do firms in monopolistic competition use non-price competition to gain market share? Provide real-world examples to support your answer.

3. Why do firms in monopolistic competition earn only normal profits in the long run? Explain the role of free entry and exit in reaching this equilibrium.

### **16.8 SUGGESTED READINGS**

- Economic Theory, Chopra P.N., Kalyani Publishers, New Delhi.
- Managerial Economics, Mehta, P.L., S. Chand, Delhi.
- Micro Economics, Mithani, D.M., Himalaya Publishing House, New Delhi.

**PRICE-OUTPUT DECISIONS UNDER  
PERFECT COMPETITION**

**STRUCTURE**

- 17.0 Learning Objectives and Outcomes
- 17.1 Introduction
- 17.2 Perfect Competition
  - 17.2.1 Meaning
  - 17.2.2 Conditions
  - 17.2.3 Difference between Pure and Perfect competition
- 17.3 Price Determination Under Perfect Competition
  - 17.3.1 Time element in the determination of price
- 17.4 Determination of Short Period Price
- 17.5 Determination of Long Period Price
- 17.6 Let Us Sum Up
- 17.7 Self-Assessment Questions
- 17.8 Suggested Reading

## **17.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

The objectives of this chapter are:

- To define perfect and pure competition.
- To describe the conditions necessary for perfect competition.
- To determine price and output under perfect competition.

### **Learning Outcomes**

After studying this chapter, students will be able to:

- Define the concepts of perfect competition and pure competition accurately.
- Identify and explain the essential conditions required for a perfectly competitive market to exist.
- Analyze how price and output are determined in both the short run and long run under perfect competition.
- Distinguish perfect competition from other market structures based on characteristics such as number of firms, type of product, entry barriers, and price control.
- Apply theoretical models of perfect competition to real-world market scenarios.

## **17.1 INTRODUCTION**

Generally, by the term 'market' we mean a place where goods are sold and bought. But in economics, by market we mean a commodity whose buyers and sellers are in direct competition with one another. Prof. J.C. Edwards said, "A market is that mechanism by which buyers and sellers are brought together. It is not necessarily a fixed place." Market is classified on the basis of competition among the buyers and sellers. Perfect competition is a very important form of market. It is of great theoretical importance.

## 17.2 PERFECT COMPETITION

Perfect Competition is a form of market in which there is a large number of buyers and sellers. They sell homogeneous goods. Firm produces only a small portion of the total output produced by the whole industry. An industry is a group of different firms producing the same product. A single firm cannot affect the price by its individual efforts. Price is fixed by the industry. Firm is only a price taker and not a price-maker. It can sell the desired output only at the price-fixed by the industry. In such a market, price of the commodity is the same at every place. There is also free entry and exit of the firms. Both the buyers and sellers have perfect information about the prevailing price in the market. Thus, perfect competition is the name given to a market in which buyers and sellers compete with one 'another in the purchase and sale of a commodity'. No one of them has any individual influence over the price of the commodity.

### 17.1.1 Meaning of Perfect Competition

Mrs. Joan Robinson defined perfect competition like this: "Perfect competition prevails when the demand for the output of each producer is perfectly elastic. This entails, first that the number of sellers is large so that the output of any one seller is a negligible small proportion of the total output of the commodity and second, that buyers are alike in respect of their choice in respect of rival sellers, so that the market is perfect". According to Bilas, "The perfect competition is characterized by the presence of many firms: they all sell identically same product. The seller is a price taker". Ferguson said, "Perfect competition describes a market in which there is a complete absence of direct competition among economic groups".

### 17.1.2 Necessary Conditions of perfect competition

Different definitions given by different economists point out the distinct features of perfect competition. There are some necessary conditions which must be satisfied if the market is to be perfectly competitive. These conditions are:

1. **Large number of small, unorganized firms-** The first condition which a perfectly competitive market must satisfy is concerned with the seller's side of the market. The market must have such a large number of sellers that no one seller is able to dominate the market. No single firm can influence the price of the commodity. The sellers will be the firms producing the product for sale in the market. These firms must be all relatively small as compared to the market as a whole. Their

individual outputs should be just a fraction of the total output in the market. That is why none of them is capable of influencing the market price by its individual efforts. Further, firms must not have any kind of association or union to arrive at an understanding with regard to price or sales.

2. **A large number of small, unorganised buyers-** On the buyers' side the perfectly competitive market must also satisfy this condition. There must be such a large number of buyers that no one buyer is able to influence the market price in any way. Each buyer should purchase just a fraction of the market supplies. Further, the buyers should not have any kind of union or organisation so that they compete for the market demand on an individual basis.
3. **Homogeneous products-** Another pre-requisite of perfect competition is that all the firms or sellers must sell completely identical or homogeneous goods. Their products must be considered to be identical by all the buyers in the market. There should not be any differentiation of products by sellers by way of quality, variety, colour, design, packing or other selling conditions of the product.
4. **Free entry and free exit for firms-** Under perfect competition, there is absolutely no restriction on entry of new firms in the industry or the exit of the firms from the industry which want to leave it. This condition must be satisfied especially for long period equilibrium of the industry.



If these four conditions are satisfied, the market is said to be purely competitive. In other words, a market characterized by the presence of these four features is called purely competitive. For a market to be perfect, some conditions of perfection of the market must also be fulfilled. These may be added to the four conditions given above.

5. **Perfect knowledge among buyers and sellers about market conditions-** Another pre-requisite of perfect competition is that both buyers and sellers must be having perfect knowledge about the conditions in which they are operating. Sellers must know the prices being quoted or charged by other sellers in the market from the buyers. Similarly, buyers, must know the prices being charged by different sellers. This condition is very necessary for a perfectly competitive market. Single price or same price of a single product can prevail only if the buyers are having perfect knowledge about the market price because if any seller tries to charge a price higher than the prevailing price, buyers will reject his product. They will purchase the product from some other seller. Thus, perfect knowledge leads to the prevalence of the same price of the commodity.
6. **Perfect mobility-** Another feature of perfect competition is that goods and services as well as resources are perfectly mobile between firms. Factors of production can freely move from one occupation to another and from one place to another. There is no barrier on their movement. No one has monopoly or control over the factors of production. Goods can be sold at a place where their prices are the highest. There should not be any kind of limitation on the mobility of resources.
7. **Absence of transport cost-** Another feature of perfect competition is that all the firms have equal access to the market. Price of the product is not affected by the cost of transportation of goods. In other words, we can say that the market price charged by different sellers does not differ due to location of different sellers in the market. No seller is near or distant to any group of buyers. Thus, there is complete absence of transport cost of the product from one part of the market to the other.
8. **Absence of selling cost-** Under conditions of perfect competition, there is no need of selling costs. Selling costs are the expenditures done to stimulate the sale of product or to change the shape of the demand curve. We know that under

perfect competition, goods are completely homogeneous. Price of the product is also the same for a single product. Firms have no control over the price of the product. When they cannot change the price and when their goods are completely similar, firms need not make any expenditure on publicity and advertisement.

Therefore, on the basis of above arguments, we can conclude that a perfectly competitive market is a model market in which there is only one price of the product for all the buyers and sellers. Nobody can influence the market price by his individual efforts.

### **A. CHECK YOUR PROGRESS**

#### **Choose the Correct Options**

1. Which of the following is a characteristic of a perfectly competitive market?

- A. Brand loyalty
- B. Few sellers dominate the market
- C. Product differentiation
- D. Homogeneous products

**Answer D. Homogeneous products**

2. In a perfectly competitive market, individual firms are:

- A. Price makers
- B. Price takers
- C. Monopolists
- D. Government-regulated

**Answer: B. Price takers**

3. In the wheat market case study, what determines the price of wheat?

- A. Government policy
- B. Local co-operatives

C. Global supply and demand

D. Individual farmer costs

**Answer: C. Global supply and demand**

4. Which of the following best explains why wheat is considered a homogeneous product?

A. It is sold at different prices by different farmers

B. All wheat has unique branding

C. It is standardized and indistinguishable between producers

D. It is genetically modified differently across regions

**Answer: C. It is standardized and indistinguishable between producers**

5. What happens in a perfectly competitive market if a firm charges above the market price?

A. It will sell more

B. It will sell the same quantity

C. It will not sell any product

D. It will attract loyal customers

**Answer: C. It will not sell any product**

6. Why can farmers easily enter or exit the wheat market?

A. High capital investment is required

B. There are few barriers to entry or exit

C. Long-term contracts are mandatory

D. Government restricts market movement

**Answer: B. There are few barriers to entry or exit**

### **17.1.3 Difference between Pure and Perfect competition**

Economists often distinguish between pure and perfect competition. There is only a difference of degree. If a market situation satisfies the four conditions of largeness of sellers and buyers, homogeneous goods and free entry and exit of firms, it is called pure competition. The concept of pure competition was mainly developed by Prof. Chamberlin. According to him, the following four conditions are necessary for a purely competitive market to exist: (1) large number of sellers and buyers, (2) identical products, (3) free entry and exit of firms, (4) absence of selling costs. Prof. Baumol writes, "An industry is said to be operating under conditions of pure competition when there are many firms, homogeneity of products, freedom of entry and exit and independent decision making".

Perfect competition includes some conditions of perfection in addition to the four conditions of purity. The perfection conditions are:

- Perfect knowledge among buyers and sellers about the market conditions,
- Perfect mobility among factors of production. It should be noted that pure competition is a more practical concept than perfect competition.

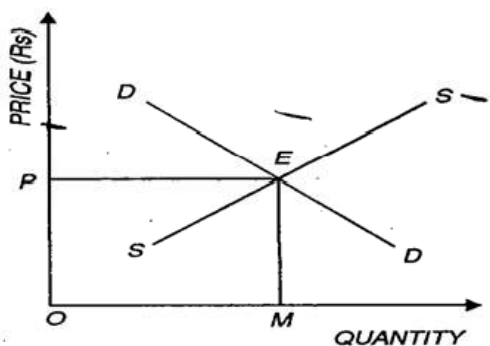
### **17.3 PRICE DETERMINATION UNDER PERFECT COMPETITION**

We know that there is a large number of firms under perfect competition. Firm is only a price-taker and not a price-maker. Price is determined by the industry. Industry is a group of firms producing identical goods. The equilibrium price is determined at a point where the demand for and supply of the total industry are equal to each other. The process of price determination is shown through a table given below:

**Table 17.1**  
**Price Determination under Perfect Competition**

Supply of output	Demand for output	Price (in Rs.)
20 units	100 units	10
40 units	80 units	20
60 units	60 units	30
80 units	40 units	40
100 units	20 units	50

The table given above shows how the price of a commodity is determined by the forces of demand and supply. When price of the commodity is Rs. 10, its supply is 20 units but demand is 100 units. Demand is more than the supply at this price. It will raise the price to Rs. 20. Still demand is more than its supply. It will further raise the price of the good. When price is increased to Rs. 30, demand for output is 60 units. Supply is also 60 units. In this way, Rs. 30 is a price which equates the demand for and supply of output. This is known as the equilibrium price. If price is increased further, say to Rs. 40, it extends the supply of goods to 80 units but demand is only 40. Greater supply than its demand will reduce the price to Rs. 30. Thus we conclude that under perfect competition, price is determined by the interaction of the forces of demand for demand and supply of goods. The same idea can be explained with the help of the figure 13.1.



**Figure 17.1 Price Determination in a Perfectly Competitive Market**

In Fig. 17.1, Quantity demanded and supplied are taken on X-axis. Price of the commodity is shown on Y-axis. DD and SS are the demand and supply curves respectively. E is the point where demand curve and supply curve intersect each other. In other words, E is the point of equilibrium. By drawing a perpendicular from the point of intersection to X-axis we get the equilibrium quantity demanded and supplied i.e. OM. Perpendicular drawn on Y-axis from point E shows the equilibrium price OP

### **17.3.1 Time Element in the Determination of Price**

Marshall propounded the theory that price of a commodity is determined by both demand and supply. Marshall gave much importance to the time element in the determination of price. Before Marshall, there was much controversy over whether it is demand or supply that is more important in determining price. Marshall resolved this controversy with the introduction of time element in the theory of value. In his view, which of the two is more important depends upon the time period under consideration. But he pointed out that in no case is value determined by any one of them alone. He also quoted the analogy of two blades of a pair of scissors in this connection.

The relative importance of supply or demand in the determination of price depends upon the time given to supply to adjust itself to demand. Marshall said, "As a general rule, the shorter the period which one considers, the greater must be the share of our attention which is given to the influence of demand on value; and the longer the period, the more important will be the influence of cost of production on value". Thus time has a big hand in determining the level of equilibrium price. Demand takes no time to increase. But supply can be increased only after some time. The time taken by the supply to adjust itself to demand depends upon production technology.

Marshall discussed three time periods in which price would be different. These time periods are divided on the basis of response of supply to a given change in demand. They are as under:

#### **1. Market Period**

Market period is also called very short period. It is a period in which only that can be supplied which has been already produced. Supply is fixed. No adjustment can take place in supply conditions. Market period is a time period which is too short to make an addition

to the existing stock of goods. In this period, goods cannot be produced more in response to an increased demand. In this period goods are of two types: (1) Perishable goods, (2) Non-perishable goods. The supply of perishable goods is perfectly inelastic. It means that whatever has been produced is to be sold, whatever the price maybe. The reason is that perishable goods perish if not sold. Second form of goods is non-perishable. These are the goods which can be stored for some time. That is why even in the market period, a seller can reduce the stock of goods already produced by storing them. The whole thing depends upon the cost of storing goods and future expectations regarding the price. But a seller cannot increase the supply of goods in this period. From this discussion, we come to know that the supply curve of perishable goods is perfectly inelastic. The supply curve of non-perishable goods has a positive slope at first but becomes perfectly inelastic after some price level.

## **2. Short Period**

Short period is the time span in which supply can be adjusted to a limited extent. If the demand for a good increases, its supply can be increased through overworking of plants. In this period, there are two types of factors of production, variable factors and the others are fixed factors of production. In this time period, production can be increased or decreased by changing the variable factors of production only. Fixed factors like machinery, plant, and factory etc. cannot be altered. So supply can be changed only by the existing plants. In this time period also, demand is more important than the supply. However, it does not mean that supply plays no role. Supply is an important factor too.

**3. Long Period-** Long period is the time which is long enough to make a complete adjustment of supply to a change in demand. It is the time period in which new plants can be installed and new firms can enter the market. Similarly, existing firms can leave the market. In the long run, all the factors of production can be changed. So there is no fixed factor of production in the long run. Thus, in the long run, supply becomes all the more elastic. Marshall attached much importance to the study of these time periods. Response of supply to a change in demand over a period of time is different in the different time periods. We can conclude that time element occupies an important place in Marshall's theory of value. It is certainly a significant contribution of Marshall to the theory of value.

## B. CHECK YOUR PROGRESS

### Case Study

**Background:** Green Basket is a popular vegetable stall in the city's wholesale market. It operates under a perfectly competitive market, where numerous sellers offer the same types of vegetables like tomatoes, potatoes, and onions. Because of the large number of sellers and homogeneous products, Green Basket cannot set its own prices and must accept the market-determined price. This week, an abundant harvest led to an increased supply of tomatoes, causing the market price to fall from ₹30 per kg to ₹20 per kg. Green Basket, like every other stall, had no option but to sell at ₹20. Since customers can buy the same quality tomatoes from any vendor, they were unwilling to pay a higher price. In an attempt to stand out, Green Basket began using eco-friendly packaging for its tomatoes. However, the strategy failed to attract more buyers or allow for a price increase, as consumers were only concerned with the lowest available price for identical goods. Based on above case, answer the following questions:

### Questions:

1. Why was Green Basket not able to sell tomatoes at a higher price, even with better packaging?
2. What caused the price of tomatoes to decrease in the market from ₹30 to ₹20 per kg?
3. Name and explain two features of perfect competition shown in the case of Green Basket.



## 17.4 DETERMINATION OF SHORT PERIOD PRICE

Short period is a time period which is in between the market period and long period. It is the period which is not enough to adjust to the changed demand through changes in the supply of the commodity. In the short period, there are two types of factors of production:

(1) Fixed factors, (2) Variable factors. Fixed factors are those factors the quantity and number of which cannot be changed due to the short span of time. Fixed factors are machinery, building etc. The variable factors are changeable factors of production. These factors can be altered in quantity to make changes in the supply of goods. In the short period, supply of goods can be changed only by varying the quantity of variable factors. That is why full adjustment between the changed demand and supply cannot take place. In this time period, supply can be changed by changing the output possible with the existing plant. New plants cannot be installed due to the short span of time.

In perfect competition, short-period price is determined by the short-period demand and short-period supply of the commodity produced by the industry. Demand for the commodity is the summation of demand schedules of all the consumers. It slopes downward from left to right. The supply curve of an industry is the summation of the outputs produced by all the firms of the industry. It has an upward slope. Price is determined by the interaction of the forces of demand and supply of the industry. This equilibrium price is given to all the firms in the industry. They can sell as much as desired on this given price. A firm is in equilibrium where its marginal cost curve cuts marginal revenue curve from below. Average revenue and marginal revenue are constant. They are a horizontal line. A firm can earn supernormal profits, normal profits, and losses depending upon its cost conditions. This idea can be explained with the help of the Figure 17.2.

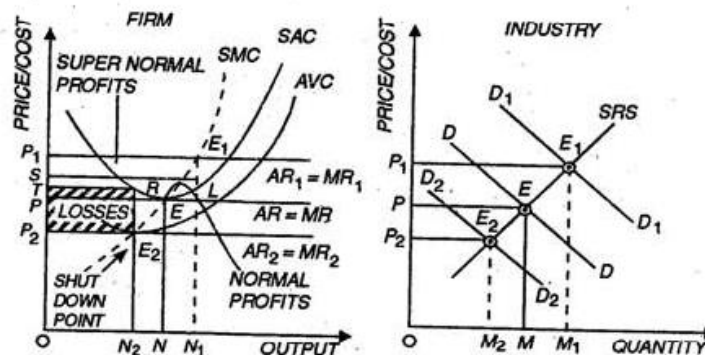


Figure 17.2: Short Period Price determination under Perfect Competition

The figure 17.2 given above shows the process of price determination in the short period. The right hand side of the diagram shows the equilibrium of the industry while the left hand side of the figure shows the case of a representative firm. We know that an industry is a group of firms producing identical goods. Here the assumption of identical cost conditions of all the firms is taken. Supply curve SRS for the industry shows levels of production which are the result of the summation of all the firms' outputs in the industry. SRS is the short run supply curve of the industry. DD is the initial demand curve. E is the point of intersection between SRS and DD. OP is the equilibrium price. OM is the demand and supply of the industry at OP price level. This price OP will be given to all the firms. The left hand side panel of the figure shows the equilibrium of the firm at this OP price. E is the point where short run marginal cost curve (SMC), average and marginal revenue -curves ( $AR = MR$ ) intersect each other. At OP price, the firm is earning normal profits since its SAC is equal to its average revenue.

Now suppose that the demand curve shifts upward to take the position  $D_1D_1$ . The new point of equilibrium is  $E_1$  where  $OP_1$  price is determined. Demand and supply of the commodity are also raised to  $OM_1$ . At the  $OP_1$  price level, firm's equilibrium point is  $E_1$  which has been determined by the intersection between SMC and MR. At this price level, the firm is earning supernormal profits equal to  $E_1LSP_1$ .

Next we suppose that the demand for the industry falls to  $D_2D_2$ . The point of intersection of the demand and the supply curves is  $E_2$ . This point of equilibrium gives  $OP_2$  as equilibrium price. At this price, the firm is undergoing losses equal to the area  $E_2RTP_2$ .

### **17.5 DETERMINATION OF LONG PERIOD PRICE**

Long period is a time period which is long enough to adjust industry supply fully to the changes in demand. In this time period employment of all the factors of production can be changed. New machines can be installed. We mean to say that all necessary changes can be made in the supply of the commodity in the long period. If the existing firms are earning supernormal profits, new firms will be attracted to enter the industry. It will increase the industry supply and thus price will fall. In this way, extra profits will be wiped out. Similarly, if the firms earn losses; some firms will quit the market. It will reduce the supply of output and price will increase. In this way, due to the free entry and exit of the firms in the long

run, all firms earn normal profits. Normal profits refer to the minimum profits which a producer must earn in order to stay in production. So normal profits are added to and thus part of the average cost of production. That is why, when price is equal to average cost of production, a firm is said to be earning normal profits. The price determined by the long period forces of demand and supply in a perfectly competitive industry is called normal price.

Normal price of a commodity is that price which has a tendency to prevail in the market in the long period when supply can be fully adjusted according to demand. According to Marshall, “Normal or natural value of a commodity is that which economic forces would tend to bring about in the long run”.

Normal price is not necessarily the same as the average cost of production. Normal price is the price which has the tendency to prevail in the market in the long period. On the contrary, cost is the actual average of the costs of production of goods. Thus, we can say that normal price is an expected price.

In the long period, since all factors are variable; there is no fixed cost of production. Average cost of production plays an important role in determining the long period price. An outstanding proposition in this regard is that the price under perfect competition in the long run is equal to the minimum long run average cost of production. At the level of equilibrium price, marginal cost and minimum long run average cost are equal to each other. Therefore, Normal price = LMC = Minimum Long Period Average Cost. This proposition can be explained with the help of a figure. The determination of normal price is explained with the help of Fig. 17.3

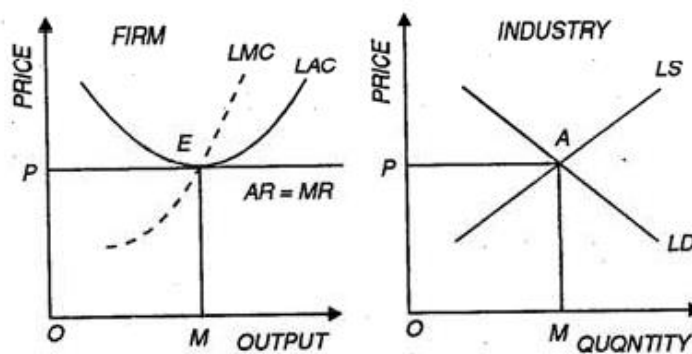


Fig. 17.3

## **C. CHECK YOUR PROGRESS**

### **Scenarios Based Questions**

#### **Scenario 1: Sudden Increase in Demand**

Due to a sudden festival, the demand for wheat increases sharply. However, the supply remains constant in the short period.

Q1: Why does the price of wheat rise in the short period under perfect competition?

What prevents firms from immediately increasing supply?

#### **Scenario 2: Abnormal Profits in the Short Run**

Because of the high price during the festival season, firms start earning abnormal profits.

Q2: In the long run, what is likely to happen to the number of firms in the wheat market?

How will this affect the price and profit level?

#### **Scenario 3: Entry of New Firms**

After seeing high profits in the previous season, new farmers enter the market and increase wheat supply.

Q3: Explain how the entry of new firms affects the market price in the long run.

Why does this lead to only normal profit?

## 17.6 LET US SUM UP

Perfect Competition is a form of market in which there is a large number of buyers and sellers. They sell homogeneous goods. Firm produces only a small portion of the total output produced by the whole industry. Firm is only a price taker and not a price-maker. Mrs. Joan Robinson defined perfect competition like this: "Perfect competition prevails when the demand for the output of each producer is perfectly elastic. This entails, first that the number of sellers is large so that the output of any one seller is a negligible small proportion of the total output of the commodity and second, that buyers are alike in respect of their choice in respect of rival sellers, so that the market is perfect".

Different definitions given by different economists point out the distinct features of perfect competition. These conditions are: Large number of small, unorganised firms, A large number of small, unorganised buyers, Homogeneous products, Free entry and free exit for firms, Perfect knowledge among buyers and sellers about market conditions, Perfect mobility, Absence of transport cost, Absence of selling cost.

Economists often distinguish between pure and perfect competition. If a market situation satisfies the four conditions of largeness of sellers and buyers, homogeneous goods and free entry and exit of firms, it is called pure competition. Perfect competition includes some conditions of perfection in addition to the four conditions of purity. Perfect knowledge among buyers and sellers about the market conditions, Perfect mobility among factors of production. It should be noted that pure competition is a more practical concept than perfect competition.

There are large number of firms under perfect competition. Firm is only a price-taker and not a price-maker. Price is determined by the industry. Industry is a group of firms producing identical goods. The equilibrium price is determined at a point where the demand for and supply of the total industry are equal to each other. Marshall propounded the theory that price of a commodity is determined by both demand and supply. Marshall gave much importance to the time element in the determination of price. Before Marshall, there was much controversy over whether it is demand or supply that is more important in determining price. Marshall resolved this controversy with the introduction of time element in the theory

of value. Marshall discussed three time periods in which price would be different. These time periods are; Market Period, Short Period, Long Period.

In perfect competition, short-period price is determined by the short-period demand and short-period supply of the commodity produced by the industry. Demand for the commodity is the summation of demand schedules of all the consumers. It slopes downward from left to right. The supply curve of an industry is the summation of the outputs produced by all the firms of the industry. It has an upward slope. Price is determined by the interaction of the forces of demand and supply of the industry. This equilibrium price is given to all the firms in the industry.

Long period is a time period which is long enough to adjust industry supply fully to the changes in demand. In this time period employment of all the factors of production can be changed. New machines can be installed. If the existing firms are earning supernormal profits, new firms will be attracted to enter the industry. It will increase the industry supply and thus price will fall. In this way, due to the free entry and exit of the firms in the long run, all firms earn normal profits. In the long period, since all factors are variable; there is no fixed cost of production. Average cost of production plays an important role in determining the long period price. An outstanding proposition in this regard is that the price under perfect competition in the long run is equal to the minimum long run average cost of production.

## 17.6 GLOSSARY

**Price Taker:** A firm that accepts the market-determined price and cannot influence it due to the high level of competition.

**Market Price:** The price that is determined by the interaction of total market demand and total market supply.

**Perfectly Elastic Demand Curve:** A horizontal demand curve showing that a firm can sell any quantity at the market price, but none above it.

**Equilibrium Price:** The price at which the quantity demanded equals the quantity supplied in the market.

**Market Equilibrium:** A situation where the market demand and supply balance each other, and there is no tendency for price to change.

**Firm's Demand Curve:** In perfect competition, it is perfectly elastic because

the firm sells a homogeneous product at market price.

**Homogeneous Product:** A product that is identical across different sellers; consumers see no difference in quality or features.

**Free Entry and Exit:** A characteristic of perfect competition that allows firms to freely enter or exit the market in the long run.

**Determinants of Price:** Factors such as overall demand and supply in the market that collectively decide the market price.

### 17.7 SELFASSESSMENT QUESTIONS

1. Does price never change under perfect competition, given the fact that a firm under perfect competition is a price taker?
2. Why is the demand curve facing a firm under perfect competition is Perfectly elastic?
3. What is equilibrium price? How it is determined?



## 17.8 LESSON END EXERCISE

### Section A: Fill in the Blanks

1. A firm under perfect competition is a \_\_\_\_\_ because it cannot influence the market price.
2. The demand curve faced by a perfectly competitive firm is \_\_\_\_\_ elastic.
3. Equilibrium price is determined when \_\_\_\_\_ equals \_\_\_\_\_ in the market.
4. Under perfect competition, products are \_\_\_\_\_ across all sellers.
5. In the short run, firms may earn \_\_\_\_\_ profits, but in the long run, only \_\_\_\_\_ profits are possible.

### Section B: Match the Columns

#### Column A

1. Perfectly elastic demand curve individual firm
2. Equilibrium price  
Quantity supplied
3. Price taker
4. Market price  
demand and supply
5. Homogeneous product  
firms

#### Column B

- A. Price remains constant for
- B. Quantity demanded =
- C. Horizontal demand curve
- D. Set by total market
- E. Identical product across

## 17.9 SUGGESTED READINGS

- Advanced Economic Theory. Micro Economic Analysis, 2012, Ahuja, H.L., S. Chand and Company Ltd, New Delhi.
- Principles of Economics, Mishra and Puri, 2007, Himalaya Publishing House, New Delhi.

<b>B.Com. Semester-I</b>	<b>Unit-</b>
<b>IV</b>	
<b>C. No. BCG-103</b>	<b>LESSON No.</b>
<b>18</b>	

## PRICE-OUTPUT DETERMINATION UNDER MONOPOLISTIC COMPETITION

### STRUCTURE

- 18.0 Learning Objectives and Outcomes
- 18.1 Introduction
- 18.2 Monopolistic Competition
  - 18.2.1 Definition
  - 18.2.2 Features
- 18.3 Nature of Demand Schedule
  - 18.3.1 Problems of Equilibrium of the Firm and Group
- 18.4 Determination of Price and Output
  - 18.4.1 In the Short Period
- 18.5 Long Period Price Output Determination
  - 18.5.1 Assumptions
  - 18.5.2 Subjective and Objective Demand Curves
  - 18.5.3 Long Run Equilibrium of the Group
- 18.6 Let Us Sum Up
- 18.7 Glossary
- 18.8 Self-Assessment Questions
- 18.9 Lesson End Exercise
- 18.10 Suggested Readings

## **18.0 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

The objectives of this chapter are:

- To define and characterised monopolistic competition.
- To explain the concept of equilibrium of firm and group.
- To determine short and long run price and output.

### **Learning Outcomes**

After studying this chapter, learners will be able to:

- Define monopolistic competition and explain its key characteristics.
- Describe the equilibrium of a firm and a group under monopolistic competition.
- Determine price and output in the short run and long run.
- Illustrate the short-run and long-run equilibrium with the help of diagrams.
- Analyze the role of product differentiation and selling costs in monopolistic competition.

## **18.1 INTRODUCTION**

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. The major difference between these two market structures is that at least some degree of product differentiation is present in monopolistically competitive markets. As a result, firms have at least some discretion in setting prices. 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.

## **18.2 MONOPOLISTIC COMPETITION**

One of the sub-divisions of imperfect competition is monopolistic competition. It is that sub-category of the many possible market situations under imperfect competition which is the nearest to pure competition. It has a large number of small unorganised sellers in the market and a large number of small unorganised buyers, but what differentiates it from pure competition is product differentiation by sellers. The products of different sellers is close but not complete substitutes. “Products are not homogeneous, as in perfect competition, but neither are they remote substitutes, as in monopoly. What this really means is that in monopolistic competition there are various 'monopolists' competing with each other. These competing monopolists do not produce identical goods. Neither do they produce goods which are completely different. Product differentiation means that products are different in some ways but not altogether so.”

### **18.2.1 Definition**

According to Joe S. Bain, “Monopolistic competition is found in the industry where there is a large number of small sellers, selling differentiated but close substitute products”.

H.H. Liebhafsky writes, “Monopolistic Competition has today come to mean a state of affairs in which there is a large number of sellers selling non-homogeneous or slightly differentiated products and in which freedom of entry exists.”

Leftwich describes monopolistic competition like this, “Monopolistic competition is a market situation in which there are many sellers of a particular product, but the product of each seller is in some way differentiated in the minds of consumers from the product of every other seller.”

### **18.2.3 Features**

The products of different sellers have a very high, though not infinite, cross elasticity of demand. It is this feature of product differentiation that introduces an impurity in the

otherwise pure competition. The main features of monopolistic competition are:

- (1) A Large number of Sellers- The number of sellers is sufficiently large that there is no feeling of mutual interdependence among them. Each firm acts independently without caring for any effect which its action may have upon those of its competitors.
- (2) Differentiated Products- There is large number of buyers who are offered differentiated products and consequently have preference for the products of particular sellers. Different sellers may use different methods for creating preference for their own products in the minds of buyers. Differentiation of a particular product may be linked with the conditions of his sale, the location of his shop, the courteous and smiling disposition of its salesman, or a reputation for fair dealing etc.
- (3) Unrestricted Entry- Entry into the industry is unrestricted. New firms are able to commence production of very close substitutes for the existing brands of the product even though they cannot make items which are exactly identical in the eyes of the purchasers of the existing brands.
- (4) Selling Costs- An important feature of monopolistic competition is that every firm tries to promote its own product among the consumers through different types of expenditures on advertisement. The advertisement expenditure may be done on different methods of appealing to the consumers to purchase its brand of the product. The effect of these advertisement expenditures or selling cost may be to attach particular consumers to particular brands. In this way firms with particular brands become monopolists of their brands in the market for their consumers. Sometimes it may create slight differences in price also.
- (5) Imperfect Knowledge- The existence of monopolistic competition depends upon imperfections in the knowledge of the buyers. Much of selling cost is simply meant to create imaginary superiority in the minds of consumers. The products may really be the same but consumers may come to know a particular brand name more than the others. This divides the whole market into sub-markets where individual firms have monopolistic

conditions.

- (6) Non-Price Competition- Another very important feature of monopolistic competition is the non-price competition through which firms in the market try to win over customers. There are definite methods of competing rivals other than in price. It may be a guarantee for repairs within a particular time, after sales service, a gift scheme with particular purchases, a discount not declared in the price list or transport free of cost.

### **A. CHECK YOUR PROGRESS**

#### **Write True or False for the Following Statements:**

1. Monopolistic competition involves many firms selling differentiated products.
2. The demand curve faced by a firm under monopolistic competition is perfectly elastic.
3. Firms in monopolistic competition have full control over market price.
4. In the short run, firms may earn supernormal profits under monopolistic competition.
5. Non-price competition is an important feature of monopolistic competition.
6. In the long run, firms in monopolistic competition earn only normal profits.
7. Firms produce at the minimum point of average cost curve in the long run.
8. Advertising is considered a form of selling cost in monopolistic competition.

#### **Answers:**

- |         |          |          |         |
|---------|----------|----------|---------|
| 1. True | 2. False | 3. False | 4. True |
| 5. True | 6. True  | 7. False | 8. True |

### 18.3 NATURE OF DEMAND SCHEDULE

**1. Less than perfectly-elastic.** The firm under monopolistic competition is one in a large number. No single firm, therefore, dominates the industry. Each firm produces a product which is a close substitute to, though not a perfect substitute of the products of his rivals. The elasticity of demand for the product of a firm is quite highly and differs from firm to firm. In a group of sellers, some have succeeded in creating strong consumers preferences for their products with the result that their elasticities of demand are somewhat less than those of the products of their rivals.

**2. A gently sloping demand curve.** The demand curve of a firm under monopolistic competition is the result of the environment in which the firm is set. The demand curve is the one whose points show high elasticities. But it is not a horizontal straight line as under perfect competition since various customers are attached to the products of particular sellers. Under these conditions every seller is somewhat a monopolist; he can raise his price above that generally prevailing in the market without losing all his customers, since some will prefer his product to those of his competitors and will be willing to pay a higher price for it. In the same way he faces quite hard competition; price reductions will not bring an infinite volume of business, since other buyers will be attached to the products of competing sellers. Thus at each price the firm can sell a definitely limited quantity and its demand curve is a gently sloping one from left down to the right.

**3. Individual nature of a firm's demand curve.** While the general nature of demand curve in monopolistic competition is that it slopes gently from left down to the right, it must be emphasized that every firm has its own particular sales curve that may differ in its elasticity at a particular price from that of other firms. The demand curve reflects consumer's tastes for its product, given their incomes and prices of the products of other firms. The greater the intensity of preference for its product, the lower will be the elasticity of demand.

**4. Changeability of the Sales Curve.** An important contribution and achievement of Professor Chamberlin was that he did not assume the demand curve for product of the firm as simply a given datum to which the firm has to adjust its price and output. He held that

under monopolistic competition, sales curve is capable of manipulation by variation in the product and by advertisement for sales promotion.

### **18.3.1 Problems of Equilibrium of the Firm and Group**

- (1) **Three types of Adjustment-** Professor Chamberlin has classified all the adjustments that a firm can make under three headings. They are price, product and selling effort. In its attempt to maximise profits, the firm can review its price policy or policy on the quality of its product, or it can review its policy on advertising or other sales effort. The three types of adjustments of policies can be made independently or at the same time.
- (2) **Non-use of 'marginal revenue' and 'marginal cost' approach-** It must be pointed out at this juncture that it is Professor Chamberlin who drew the economists' attention to the non-price competition (product variation and advertisement) which is a common feature of the actual, monopolistic markets. For the first time, an analysis of product variation and selling costs was introduced in the literature of economics by him in his classic Theory of Monopolistic Competition. Most of the economists, trained in the classical marginalist tradition, found his analysis awkward in that he had not used marginal cost and marginal revenue curves in it. We shall, therefore, use Chamberlin's exposition, as far as possible.
- (3) **Primarily a short-period analysis of the firm-** Another comment on Professor Chamberlin's analysis is also necessary. His theory looked at from the viewpoint of the neatness of perfect competition theory of the firm is somewhat lopsided albeit more rigorous. It is primarily a short-run theory of the firm; long period analysis is introduced only in a perfunctory way; equilibrium of the industry is possible only in an informal way. This is owing to the diversity of assumptions that can be made about costs and revenues of individual firms from changing their products and advertisement expenditures.
- (4) **Difficulty of identifying the industry-** There are many difficulties of graphic representation of ideas under monopolistic competition. It is



difficult to identify the industry itself. Firms produce different products which are not complete substitute for each other. As such it is not possible to identify the industry and it is still more difficult to draw a supply curve for the industry. In fact, we cannot talk of a price for the various firms producing differentiated products. Among various firms there are some whose products are nearer substitutes than those of others. Tubes of tooth paste differ from cans of tooth powder. Bottles of liquid dentifrice are still different. All of these are put to the same use. Yet we cannot find a common denominator for all of them and put them on the same axis in the industry diagram.

To avoid this difficulty, Professor Chamberlin has introduced the concept of a “group” in place of an “industry”. A group is a cluster of firms producing products having a high cross elasticity of demand, being very near substitutes; it is a combination of firms producing products that compete highly, yet imperfectly, among them. Examples given by Chamberlin are: a number of automobile manufacturers, producers of pots and pans, of magazine publishers, or retail shoe dealers. In the long period, the number of firms in a group may increase on account of the entry of new firms with competing brands of the product. He has discussed equilibrium of the firm and of the group in all the three cases of price, product and, advertisement-expenditure variations.

## **B. CHECK YOUR PROGRESS**

### **Multiple Choice Questions:**

1. Under monopolistic competition, the demand curve faced by a firm is:
  - A. Horizontal
  - B. Vertical
  - C. Downward sloping
  - D. Upward sloping
  
2. Downward-sloping demand curve implies that:
  - A. Price remains constant as output increases
  - B. More output can be sold only at lower prices
  - C. Less output is sold at lower prices
  - D. Price and quantity are unrelated

3. The firm's demand curve in monopolistic competition is also called:
- A. Marginal cost curve
  - B. Average cost curve
  - C. Average revenue curve
  - D. Total revenue curve
4. The demand curve under monopolistic competition is more elastic than in:
- A. Monopoly
  - B. Perfect competition
  - C. Oligopoly
  - D. None of these
5. The elasticity of demand under monopolistic competition depends on:
- A. Price of raw materials
  - B. Number of close substitutes
  - C. Government policy
  - D. Level of employment
6. When a firm lowers the price under monopolistic competition, its total revenue:
- A. Always decreases
  - B. Always increases
  - C. May increase or decrease
  - D. Remains constant
7. The demand curve of a firm under monopolistic competition is:
- A. Perfectly elastic
  - B. Kinked
  - C. Relatively elastic
  - D. Perfectly inelastic

**Answers:**

**1. C    2. B    3. C    4. A    5. B    6. C    7. C**

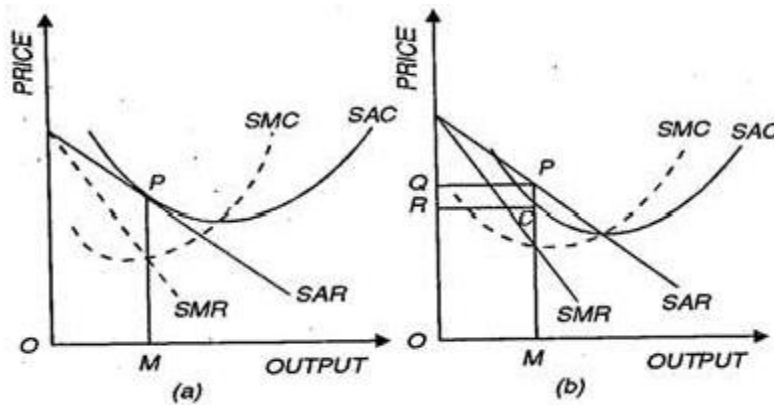
## 18.4 DETERMINATION OF PRICE AND OUTPUT

The direct effect of the monopolistic nature of competition is that every firm has some monopoly power, some initiative in price setting. If we assume away product variation and selling cost, the analysis of price determination by a firm reduces to that of price determination by a monopolist. The only difference that arises here is the change in demand conditions from short run to the long-run.

### 18.4.1 Short Period price output determination

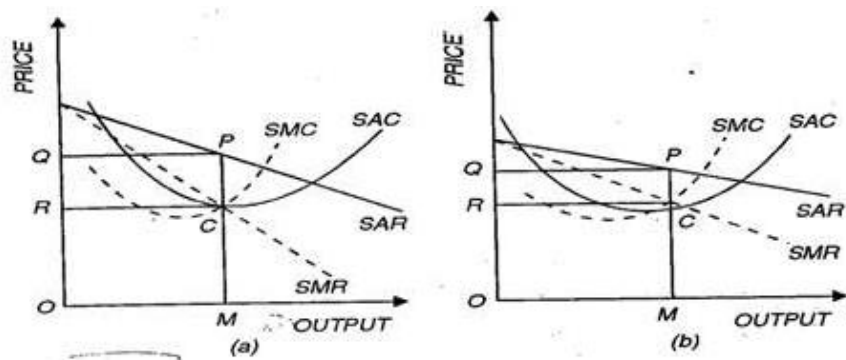
In the short period, the firm faces a demand curve that slopes down from the left to the right, the elasticity of the demand for its product at various prices being dependent on the distinction its product has over and above those of other firms. Every firm has a particular demand curve of its own. Some firms may be having more elastic demand while others have less elastic demand. If two firms produce different varieties of the product, they will be having different cost conditions. Accordingly, equilibrium prices and outputs will also be different for these firms.

Figures 18.1 (a) and (b) and Figures 18.2 (a) and (b) show the equilibrium price-output determination for four different firms, (i) The firm with demand and cost conditions shown in Figure 18.1 (a) is a 'marginal firm' because it has the equilibrium output OM at price MP that gives it only normal profit. Price MP is just enough to cover its average costs. In case the demand for the brand falls, the firm will suffer losses and may leave the industry in the long-run. Since point P lies to the left of the minimum point of the short-run average cost, the firm is operating at sub-optimum capacity(ii) Figure 18.1(b) on the other hand, shows the firm working with excess capacity. But it is earning surplus (supernormal) profits shown by the area QPCR.



**Figure 18.1 (a & b): The Marginal Firm Working with Excess Capacity with Normal Profits and Super Normal Profits**

It is not necessary that every firm in the short-run need work at less than optimum capacity. If the demand and cost functions (curves) of the firms so warrant, the firm can work at or beyond its capacity also. Figure 18.2 (a) is designed to show the firm having supernormal profits yet working at its optimum capacity. The Output OM is such as is produced at the minimum average cost. Figure 18.2 (b) shows the equilibrium output of a firm working beyond its plant-capacity, for point C lies to the right of the minimum point of the average cost curve.



**Figure 18.2 (a & b): Firm with Supernormal Profits Working with Optimum and Beyond Optimum Capacity**

## 18.5 LONG PERIOD PRICE-OUTPUT DETERMINATION

Equilibrium price under monopolistic competition in the long period is difficult to discuss because of the differences in products, costs and revenues of the different firms in the industry. Firstly, Chamberlin observed that there are gaps in the chain of substitute 'products' of the constituent firms wide enough to allow us to demarcate distinctive 'groups' of firms with very near substitute 'products'. Existence of these gaps helps us to identify the group.

Equilibrium of the whole group can be discussed only with reference to a typical firm in it, for the changes that occur in the long period in the number of substitutes of the product of the firm have a direct impact on the firm's demand. It is not possible to draw the group's supply and demand curves.

Entry or exit of the firms in the group affects cost of production of every existing firm in it.

### 18.5.1 Assumptions

To clear the difficulties of varying costs and product differences, chamberlin makes the two assumptions.

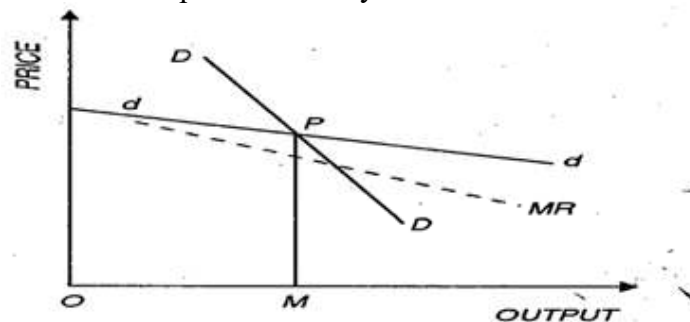
- i. The uniformity assumption. The firms in the group have identical cost "curves that do not change with the expansion or contraction of the group. This has been referred to as the "uniformity assumption". The demand for the products of various firms in the group is uniform throughout the group; this means that consumer's preferences be evenly distributed among different varieties and that differences between them be not such as to give rise to differences in cost.
- ii. The symmetry assumption according to which an individual firm's action regarding price and output adjustment will have a negligible effect upon his numerous competitors so that the individual firm need not worry about retaliation from other firms. Explaining the meaning of symmetry assumption, Stigler has written, 'A price cut, for instance, which increases the sales of the firm who made it draws inappreciable amounts (of customers) from the markets of each of his many competitors, achieving a considerable result for the one who cut, but without incursions upon the market of any single competitor sufficient to cause him to do anything he would not have done any way.'

In the long run every firm within a group must get only normal profits.

### 18.5.2 Subjective and Objective Demand Curves

Professor Chamberlin made use of two demand curves in monopolistic competition. The first is the "proportional demand curve" showing the amounts demanded of the firm's 'product at different prices when all its competitors follow exactly its price changes'. It tells us the share of the firm in the total demand for the 'product' variety at different price levels. The second demand curve is the ceteris paribus demand curve. It is the assumed demand curve for the product of the firm if its price changes are not noticed and matched by its rivals in the group. Figure 18.1 shows the two demand curves intersecting at the current price level MP. If the entrepreneur contemplates a price reduction from the price level MP, he would expect a substantial expansion in sales. First, sales to his existing customers will expand. Second, and more important, if rivals do not reduce their prices, he would capture some of the customers of each. Thus he can expect an appreciable expansion in his sales. On the other hand, the firm expects a substantial loss of sales if it increases its price and others do not follow. Thus, the firm's anticipated or expected demand curve is shown by the relatively elastic demand curve dd in Figure 18.1.

Anticipating highly elastic demand, each firm has an incentive to reduce price; and thus all firms in the group have this incentive. But if all prices are reduced at the same time, each firm will gain only that increment in sales which is attributable to the general price reduction. No one will be able to capture his rival's customers. Thus if the actions of one entrepreneur are matched by all other entrepreneurs in the product group, the individual firm's demand will be far less elastic. If all rivals follow a firm's price reduction, the firm's demand curve would be such as is shown by the curve in Figure 18.1. In other words, DD is the curve showing the consumers' quantities demanded from any one seller at various prices under the assumption that his rivals' prices are always identical with his.



**Figure 18.1: The two Demand Curves Under Monopolistic Competition**

It must be mentioned here that in perfect competition also we use two demand curves, one the negatively-sloped industry demand curve and the other, the horizontal demand curve facing an individual firm. In the analysis of monopoly, we find that the two curves-that of the industry and the firm's demand curves-are the same. We take it as the monopoly firm's sales curve.

### **C. CHECK YOUR PROGRESS**

#### **Case Study**

**Background:** Rainbow Bakers operates in a market where many firms sell similar, but not identical, bakery products. The firm has developed a unique flavor for its cupcakes, giving it a loyal customer base. In the short run, due to high demand during festivals, the firm charges a higher price and earns supernormal profits. However, as more bakeries begin offering similar cupcakes, the demand for Rainbow Bakers' products starts to fall slightly. The owner notices that to maintain sales, prices must be adjusted, and promotional costs increase.

In the long run, new firms continue to enter the market, offering similar taste and quality. Rainbow Bakers now finds it harder to raise prices without losing customers. Eventually, the firm reaches a point where it earns only normal profit and operates with some unused capacity.

#### **Answer the following questions:**

1. Based on the case, explain how Rainbow Bakers determines price and output in the short run.
2. What changes occur in the long run that affect Rainbow Bakers' pricing power and profits?
3. Why does Rainbow Bakers experience excess capacity in the long run under monopolistic competition?

### 18.5.3 Long Run Equilibrium of the 'Group'

Given the three assumptions of the existence of a group, identical costs and the absence of retaliation among firms, Chamberlin proceeded to analyse the equilibrium of the group of firms producing close substitutes. His explanation of the group equilibrium can be described more clearly through the marginal cost-marginal revenue diagram given below, although Chamberlin himself used only average cost and average revenue.

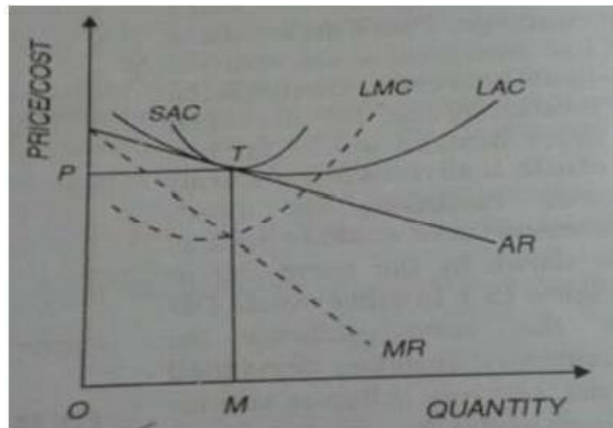
In figure 18.2, it is assumed that the firm representing the group has the long run average cost and the long run marginal cost curves which are U-shaped. These curves are common to all the firms. Moreover, these cost curves stay fixed even when the existing firms leave the group or new firms enter it.

The AR and MR curves are assumed to be straight lines for simplicity purposes. The AR is a gently-sloping line showing the highly elastic nature of the individual firm's demand. It is sloping downwards showing that the elasticity is not infinite. Likewise, the firm's MR curve is also gently sloping.

Equilibrium of the group implies that super-normal profits are wiped out through competition. When the group is in equilibrium, it will be found that the AR line is tangent to the LAC curve. This means that in the long period no firm in the group can earn super-normal profits and no firm suffers a loss. The normal profits are included in the LAC. We can explain the earning of normal profits through changes in the AR curve in the long period as firms enter or leave the group. Let us suppose that firms are earning super-normal profits within a particular group. Firms working in other groups having lower profits or losses will try to enter this super-normal profits-making group by producing a similar product. In the long run they will occupy some place in the group and take away customers from the existing firms. Increased competition within the group shall make the AR curve more and more elastic thereby reducing the per unit supernormal profits. The process of reduction



of super normal profits shall continue as long as new firms enter the group. The entry into the group will stop only when profits are reduced to normal. In terms of our diagram given below (figure 18.2), we can say that the entry into the group will stop only when the AR curve will have moved to a position so as to be tangent to the LAC. This is the tangency solution of monopolistic competition shown at the point T in the figure 18.2.



**Figure 18.2: Long Run Equilibrium of a Firm under Monopolistic Competition**

## 18.6 LET US SUM UP

One of the sub-divisions of imperfect competition is monopolistic competition. It is that sub-category of the many possible market situations under imperfect competition which is the nearest to pure competition. In monopolistic competition there are various 'monopolists' competing with each other. These competing monopolists do not produce identical goods. According to Joe S. Bain, "Monopolistic competition is found in the industry where there is a large number of small sellers, selling differentiated but close substitute products".

The main features of monopolistic competition are: A Large number of Sellers, Differentiated Products, Unrestricted Entry, Imperfect Knowledge, and Non-Price Competition. These features of monopolistic competition ensure that each seller acts independently, basing his policies upon his estimate of his demand and cost conditions, and taking the policies of other firms as given and unaffected by the policies which he follows. The individual seller

has a small part of the total market so that the price and output policies of one seller are not of concern to any other seller, and therefore do not evoke any retaliatory action from him. In other words, a monopolistically competitive firm follows an independent price policy. The independence in price policy is the result of the fact that when one particular seller lowers his price, the gain in customers he makes thereby is spread over a large number of sellers to whom the loss of their sales is not noticeable.

The direct effect of the monopolistic nature of competition is that every firm has some monopoly power, some initiative in price setting. The only difference that arises here is the change in demand conditions from short run to the long-run.

In the short period, the firm faces a demand curve that slopes down from the left to the right, the elasticity of the demand for its product at various prices being dependent on the distinction its product has over and above those of other firms. If two firms produce different varieties of the product, they will be having different cost conditions. Accordingly, equilibrium prices and outputs will also be different for these firms.

It is not necessary that every firm in the short-run need work at less than optimum capacity. If the demand and cost functions (curves) of the firms so warrant, the firm can work at or beyond its capacity also.

Equilibrium price under monopolistic competition in the long period is difficult to discuss because of the differences in products, costs and revenues of the different firms in the industry. Equilibrium of the whole group can be discussed only with reference to a typical firm in it, for the changes that occur in the long period in the number of substitutes of the product of the firm have a direct impact on the firm's demand. It is not possible to draw the group's supply and demand curves. In the long run every firm within a group must get only normal profits.

Professor Chamberlin made use of two demand curves in monopolistic competition. The first is the "proportional demand curve" showing the amounts demanded of the firm's 'product at different prices when all its competitors follow exactly its price changes'. The second demand curve is the ceteris paribus demand curve. It is the assumed demand curve for the product of the firm if its price changes are not noticed and matched by its rivals in the group.

The group equilibrium can be described more clearly through the marginal cost-marginal

revenue cost curves, although Chamberlin himself used only average cost and average revenue. Equilibrium of the group implies that super-normal profits are wiped out through competition. When the group is in equilibrium, it will be found that the AR line is tangent to the LAC curve.

## 18.7 GLOSSARY

- **Monopolistic Competition:** A market structure combining features of monopoly and perfect competition where many firms sell differentiated products.
- **Non-Price Competition:** Competition among firms based on product features, service, branding, etc., rather than price.
- **Downward Sloping Demand Curve:** In monopolistic competition, a firm's demand curve slopes downward because each firm has some control over its price.
- **Firm's Equilibrium:** Achieved when marginal revenue equals marginal cost ( $MR = MC$ ), indicating profit maximization.
- **Group Equilibrium:** The long-run situation where all firms earn normal profits and produce at less than full capacity.
- **Short Run:** A time period in which some factors are fixed; firms may earn abnormal profits or losses.
- **Long Run:** A period when all factors are variable and firms can enter or exit the market, leading to normal profits.
- **Excess Capacity:** A condition where firms do not produce at the lowest point on their average cost curve, common in monopolistic competition.

- **Normal Profit:** The minimum level of profit required to keep a firm in business in the long run; no economic profit is earned.

## 18.8 SELF- ASSESSMENT QUESTIONS

1. What is the basic difference between perfect competition and monopolistic competition with regard to: 1) nature of the product sold in the market; 2) control over price?

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2. Compare demand curves under monopolistic competition and monopoly?

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3. To what extent firm under monopolistic market can influence the price of its product? On what factors does it depend?

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## 18.9 LESSON END EXERCISE

Q1. Define monopolistic competition. Explain its main features with suitable examples.

Q2. How is price and output determined under monopolistic competition in the

short run and long run? Use diagrams to explain.

#### **18.10 SUGGESTED READINGS**

- Advance Economic Theory, Ahuja, H.L., S. Chand & Sons, New Delhi.
- Economic Theory, Chopra P.N., Kalyani Publishers, New Delhi.
- Principles of Micro Economics, Misra & Puri, Himalaya Publishing House, New Delhi.

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**PRICE-OUTPUT DETERMINATION  
UNDER MONOPOLY**

**STRUCTURE**

- 19.0 Learning Objectives and Outcomes
- 19.1 Introduction
- 19.2 Meaning Of Monopoly
  - 19.2.1 Features
- 19.3 Price And Output Determination
  - 19.3.1 In Short period
  - 19.3.2 In Long Period
- 19.4 Let Us Sum Up
- 19.5 Glossary
- 19.6 Self-Assessment Questions
- 19.7 Lesson End Exercise
- 19.8 Suggested Readings

**19.0 LEARNING OBJECTIVES AND OUTCOMES**

## Learning Objectives

After reading this chapter, you will be able:

- To define monopoly structure of market
- To explain how price and output is determined under this market structure.

## Learning Outcomes

After completing this chapter, learners will be able to:

- Define the monopoly structure of a market.
- Describe the key features and assumptions of monopoly.
- Explain how price and output are determined under monopoly in the short run and long run.
- Illustrate monopoly equilibrium through diagrams.
- Compare monopoly with other market structures such as perfect and monopolistic competition.
- Assess the effects of monopoly on consumers and overall market efficiency.
- Identify real-life examples of monopoly and analyze their economic impact.

## 19.1 INTRODUCTION

Earlier we had studied the price determination under perfect competition. We also know that perfect competition does not exist in the real world. In this chapter, we will study the other extreme form of the market called monopoly. 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. For instance, a government can create a monopoly over an industry that it wants to control, such as electricity. Another reason for the barriers against entry into a monopolistic industry is that oftentimes, one entity has the exclusive rights to a natural resource. For example, in Saudi Arabia the government has sole control over the oil industry. A monopoly may also form when a company has a copyright or patent that prevents others from entering the market. Pfizer, for instance, had a patent on Viagra.

## 19.2 MEANING OF MONOPOLY

The word 'monopoly' is a Latin word. It is composed of two words: (i) Mono, which means single, (ii) Poly, which means a seller. Thus, monopoly is a form of market organisation for a commodity in which there is only one seller of the commodity. There is no close substitute for the commodity sold by the only seller. The seller being the sole seller has full control over the supply of the commodity. The buyer can either purchase the commodity from the seller who is the only supplier of commodity or go without it. Thus if the buyer is to purchase the commodity, he can purchase it only from that seller. The seller dictates the price to consumers. A monopolist is thus a price-maker. He is not afraid of the actions of the rivals.

According to P.C. Doojey, "A monopolist's a market with one seller".

Leftwich observes, "Pure monopoly is a market situation in which a single firm sells a product for which there is no good substitute."

According to A.J. Braff, "under pure monopoly there is a single seller in the market. The monopolist's demand is the market demand. The monopolist is a price-maker. Pure monopoly suggests a no-substitute situation."

Therefore, monopoly is a market organisation in which there is only one seller of the product. The monopolist's product has no close substitute in the market. Further, there are strong barriers to entry into the industry. As a result, seller has full control over the supply of the commodity. Thus, he is the price-maker.

### 19.2.1 Features of Monopoly

The various features or conditions of a monopoly form of market are:

**1. One seller and large number of buyers.** Monopoly is said to exist when there is only one seller of a product. A monopolist may be the only person, a few partners or in the form of joint stock company. The existence of single seller of one product rules out or eliminates the difference between the firm and the industry. The monopolist is a firm as well as an industry. The demand for the monopolist is the market demand. In simple monopoly the number of buyers is assumed to be large. No one buyer can influence the price by his individual actions.

**2. No close substitute.** The second condition of monopoly is that there should not



be any close substitute of the product sold by the monopolist. If it is not so, the monopolist cannot charge a price according to his own desire. So he cannot be a price-maker. Prof. Boulding has remarked, "A pure monopolist, therefore, is a firm producing a product which has no effective substitutes among the products of any other firm". In other words, monopoly cannot exist when there is competition. For example, a firm producing Signal toothpaste cannot be said to be a monopolist firm since there are many other firms which produce close substitutes of this toothpaste such as Colgate, Pepsodent etc. So, a firm is a monopolist only if it is the only supplier of the product having no other close substitute of its products.

**3. Restriction on the entry of new firms.** In a monopoly type of market, there is a strict barrier on the entry of new firms. Monopolist faces no competition. According to J.S. Bains, "Single firm monopoly occurs when one seller sells a product for which there is no close competitor or rival."

**4. Informative selling costs.** In monopoly, selling costs are incurred in the beginning. This is done to give information to the buyer about the product.

**5. Nature of demand curve.** In monopoly, there is only one firm producing a product. The aggregate demand of all buyers of the product of a monopolist is his demand. We also know that the demand curve of an individual slopes downward from left to right. Since the demand curve of a monopolist is the summation of the demand curves of all the buyers of the product sold by the monopolist, the demand curve of a monopolist slopes downward: it means that a monopolist can sell more of his output only at a lower price. On the contrary, if he raises the price of his product, his sales will be reduced.

The downward-sloping demand curve tells us that average revenue or price goes on falling as sales are increased. When average revenue (AR) slopes downward, marginal revenue (MR) always lies below AR. In other words, MR curve of a monopolist also slopes downward from left to right and it lies below the AR curve. This follows from the relationship between AR and MR.

## **A. CHECK YOUR PROGRESS**

### **Fill in the Blanks**

1. Monopoly is a market structure where there is only \_\_\_\_\_ seller.
2. In a monopoly, the product has no close \_\_\_\_\_.
3. A monopolist is a \_\_\_\_\_ maker.
4. In monopoly, there are strong \_\_\_\_\_ to the entry of new firms.
5. The demand curve faced by a monopolist is \_\_\_\_\_ sloping.
6. A monopolist can earn \_\_\_\_\_ profits in both the short run and long run.
7. Under monopoly, consumer \_\_\_\_\_ is often limited.
8. Monopoly may involve \_\_\_\_\_ discrimination, where different prices are charged to different consumers.

### **Answers:**

- |             |                |           |             |
|-------------|----------------|-----------|-------------|
| 1. one      | 2. substitutes | 3. price  | 4. barriers |
| 5. downward | 6. abnormal    | 7. choice | 8. price    |

## **19.3 PRICE AND OUTPUT DETERMINATION**

Monopoly price-output determination can be studied under two different time periods: (i) Short period, (ii) Long period.

### **19.3.1 Short Period Price-Output Determination**

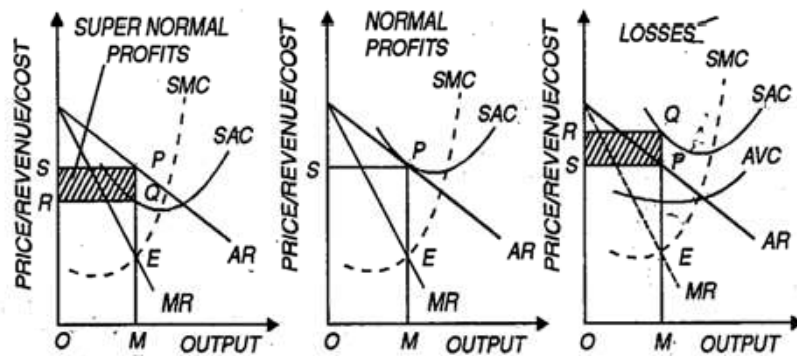
Short period is a time period in which there are two types of factors of production. The fixed factors and the others are the variable factors. In the short period, production can be changed only by changing the variable factors of production. Fixed factors of production cannot be changed. In other words, in the short period supply can be changed but only to some extent. In this period volume of production can be changed but capacity of the plant

cannot be changed. We can increase the supply only with the help of existing machines and plants. New factories and plant-equipment cannot be installed.

The aim of a monopolist is also to earn maximum profits or suffer minimum losses if he is compelled to do so. Monopolist, being single seller of his product, can fix his price equal to, above or less than the short period average cost of the product. Thus he can earn normal profits, supernormal profits or losses even in the short period. This depends upon the nature and extent of the demand for his product. In order to earn maximum profits or suffer minimum losses, a monopolist compares his marginal revenue (MR) and marginal

cost (MC). If marginal revenue exceeds the marginal cost of a product, the producer or monopolist can minimise his profit by increasing his production. On the contrary, if MC exceeds MR at a particular level of output, the monopolist can increase his losses by reducing his production. So the monopolist is said to be in equilibrium when his MC curve cuts the MR curve. In other words, the correct point of price-output determination for a monopolist is that where marginal revenue is equal to marginal cost.

In the short-period, a monopolist firm can earn supernormal profits, normal profits or supernormal losses. In case of losses, price must be covering at least the average variable costs. Otherwise the firm will stop production. The maximum loss can be equal to fixed costs. The three cases of monopoly equilibrium can be shown through the figures drawn below (Fig. 19.1).



**Figure 19.1 Price and Output Determination in the Short Period under Monopoly**

In figure (a) a monopolist is in equilibrium at point E. His equilibrium output is OM. In this

situation, he is earning supernormal profits shown by the shaded area PQRS since the AR exceeds SAC which is equal to QM.

In the figure (b), E is the point of equilibrium where  $MR = MC$ . OM is the equilibrium output. Price PM is equal to the SAC. The firm is earning normal profits, since normal profits are included in SAC.

In figure (c), the firm is shown earning losses. Minimisation of losses is achieved by the equality between MR and MC at point E, OM is the equilibrium output. Price is fixed at

PM. Monopolist firm is earning losses shown by the shaded area PQRS since SAC exceeds price. At this price (PM) the firm will continue production since price is higher than AFC.

This is how a monopolist firm can earn supernormal profits, normal profits or even losses in the short period.

## **B. CHECK YOUR PROGRESS**

### **Case Study**

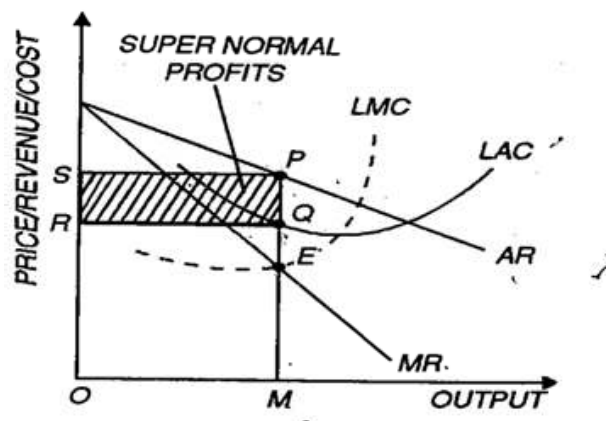
**Background:** "City Pure Water Ltd." is the only company supplying purified bottled water in a remote desert town. Due to high setup costs and limited access to natural water sources, no other firm can enter the market. City Pure faces a downward sloping demand curve, and the cost of producing each bottle remains fixed in the short run. To maximize profit, City Pure produces 10,000 bottles where its Marginal Revenue (MR) equals Marginal Cost (MC). At this output, the price on the demand curve is ₹25 per bottle. The Average Cost (AC) is ₹20 per bottle at this output level.

**Answer the following questions:**

1. Why is City Pure considered a monopolist in this market?
2. At the equilibrium output, is City Pure earning abnormal profit, normal profit, or loss? Explain.
3. Why is the demand curve facing a monopolist downward sloping?

### 19.3.2 Long Period Price-Output Determination

Long period is a time period which is long enough to fully adjust the supply to the demand of a product. In this period, all factors of production are variable. Volume as well as capacity of production can be changed. The Monopolist firm in the long run is also in equilibrium at a point where his marginal revenue is equal to its marginal cost. In the short period, we observed that a firm can earn profits as well as losses. But in the long period, a monopolist firm strives and plans to earn only profits. Firm can make all necessary changes in its costs when there are strict barriers on the entry of new firms. Monopolist firm can fully exploit exclusive the situation. The long period equilibrium or price-output determination of a monopolist firm can be shown through a figure 19.2.



**Figure 19.2: Price and Output determination under Monopoly in the Long period**

Under the given market conditions, price  $P_M$  is fixed by the equality between MR and LMC at point E.  $OM$  is the output determined in the equilibrium state. Firm is earning supernormal profits equal to PQRS since its AC exceeds AR by PQ. It is earning profits even in the long period. This is due to the monopoly power of the firm. This is why the long

period supernormal profits are sometimes called 'monopoly profits'.

### **C. CHECK YOUR PROGRESS**

#### **Case Study**

Background: "HydroTech Power Ltd." is the only firm operating a hydroelectric power plant in a hilly region. Due to legal restrictions, high capital requirements, and government licensing, no other firm can enter the market. Over the long period, HydroTech is able to adjust all its inputs and expand capacity as needed. After several years of operation, HydroTech reaches an output level of 50,000 units of electricity per month where Marginal Revenue (MR) equals Long Run Marginal Cost (LMC). At this output level, the price determined from the demand curve is ₹6 per unit, and the Long Run Average Cost (LRAC) is ₹4 per unit.

#### **Answer the following questions:**

Why can HydroTech adjust its production capacity in the long period?

Is HydroTech earning abnormal profit in the long period? Justify your answer.

What prevents new firms from entering the market and competing with HydroTech?

## **19.4 LET US SUM UP**

The word 'monopoly' is a Latin word. It is composed of two words: (i) Mono, which means single, (ii) Poly, which means seller. Thus, monopoly is a form of market organisation for a commodity in which there is only one seller of the commodity. There is no close substitute for the commodity sold by the only seller. According to A.J. Braff, "under pure monopoly there is a single seller in the market. The monopolist's demand is the market demand. The monopolist is a price-maker. Pure monopoly suggests a no-substitute

situation."

The various features or conditions of a monopoly form of market are, One seller and large number of buyers., No close substitute, Restriction on the entry of new firms, Informative selling costs, and Nature of demand curve.

Price-Output determination under can be studied under two different time periods: (i) Short period, (ii) Long period.

Short period is a time period in which there are two types of factors of production. The fixed factors and the others are the variable factors. In the short period, production can be changed only by changing the variable factors of production. In the short period supply can be changed but only to some extent. In this period volume of production can be changed but capacity of the plant cannot be changed. The aim of a monopolist is also to earn maximum profits or suffer minimum losses.

Monopolist, being single seller of his product, can fix his price equal to, above or less than the short period average cost of the product. Thus he can earn normal profits, supernormal profits or losses even in the short period. This depends upon the nature and extent of the demand for his product. In other words, the correct point of price-output determination for a monopolist is that where marginal revenue is equal to marginal cost.

Long period is a time period which is long enough to fully adjust the supply to the demand of a product. In this period, all factors of production are variable. Volume as well as capacity of production can be changed. The Monopolist firm in the long run is also in equilibrium at a point where his marginal revenue is equal to its marginal cost. In the long period, a monopolist firm strives and plans to earn only profits.

To sum up, the existence of a monopoly in the long run depends upon the condition that there is no entry into the market of a monopolist of any rival. Thus, for a profitable monopoly to survive there must be barriers to entry. Sometimes the barriers or impediments to entry are created at the time the monopoly is established. For example, the firm may be given the sole franchise or charter of law. In other cases, the barriers are created by the monopolist through threats and coercion. If a monopolist has a cost advantage over its rivals, then it can do pre-emptive price cutting to deter rivals from entering the market.

## 19.5 GLOSSARY

- **Monopoly:** A market structure in which a single seller dominates the market with no close substitutes for the product offered.
- **Monopolist:** The single seller or firm that controls the entire supply and pricing decisions in a monopoly market.
- **Barriers to Entry:** Restrictions that prevent new firms from entering the monopoly market, such as legal licenses, high start-up costs, or exclusive ownership of resources.
- **Price Maker:** A firm that has the power to set the price of its product due to lack of competition, typical of a monopolist.
- **No Close Substitutes:** A condition in monopoly where the product offered is unique and consumers do not have alternative options.
- **Marginal Revenue (MR):** The additional revenue earned by selling one more unit of output.
- **Marginal Cost (MC):** The additional cost incurred in producing one more unit of output.



## **19.6 SELF-ASSESSMENT QUESTIONS**

1. How monopolies are formed?  

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2. Explain the relationship between average revenue, marginal revenue and price elasticity of demand under the conditions of monopoly?  

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3. How are price and output determined under monopoly? Show that under monopoly price is higher and output is smaller than under perfect competition?  

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## **19.7 LESSON END EXERCISE**

1. What is a monopoly? Explain its main features with suitable examples.
2. How does a monopolist determine price and output in the short and long period? Explain with diagrams.

## **19.8 SUGGESTED READINGS**

- Advanced Economic Theory. Micro Economic Analysis, Ahuja, H.L., 2012, S. Chand and Company Ltd, New Delhi.
- Principles of Economics, Mishra and Puri, 2007, Himalaya Publishing House, New Delhi.
- Economic Theory, Chopra, P.N., 2005, Kalyani Publishers New Delhi.

**PRICE-OUTPUT DETERMINATION  
UNDER OLIGOPOLY**

**STRUCTURE**

20.0 Learning Objectives and Outcomes

20.1 Introduction

20.2 Oligopoly

20.2.1 Meaning and Definition

20.2.2 Characteristics

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20.3 Models of Duopoly

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## **20.1 LEARNING OBJECTIVES AND OUTCOMES**

### **Learning Objectives**

The specific objectives of this chapter are:

- To Define Oligopoly.
- To Explain causes and features of oligopoly.
- To Describe different models of oligopoly.

### **Learning Outcomes**

After completing this chapter, the learner will be able to:

- Define the concept of oligopoly and recognize its key characteristics.
- Explain the main causes behind the formation of oligopolistic markets.
- Identify and describe the distinctive features of oligopoly, such as interdependence and few sellers.
- Distinguish between oligopoly and other market structures like monopoly and monopolistic competition.

## **20.1 INTRODUCTION**

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. This "competition among the few involves a wide variety of price and non price methods of inter firm rivalry, as determined by the institutional characteristics of a particular market setting. Although fewness in the number of competitors gives rise to a potential for excess profits, above-normal rates of return are far from guaranteed. Competition among the few can sometimes be vigorous. Examples of the oligopoly market structure include such industries as: bottled and canned soft drinks, brokerage services, investment banking, long distance telephone service, pharmaceuticals, ready-to-eat cereals, tobacco, and so on.

## **20.2 OLIGOPOLY**

### **20.2.1 Meaning and Definition**

Oligopoly the market situation with a few sellers competing with each other is a market structure that is widely found in present day industry. Oligopoly is that form of imperfect competition in which there are only a few firms in the industry producing either an homogeneous product or producing products which are close but not perfect substitutes for one another; the number of firms is more than one but is not so large that any one seller be in a position to take decisions regarding his price, output, product and selling effort

without taking any note of the reactions which his rivals may have to his actions. In case there are only two sellers in the market, it may be called Duopoly, but this is also a special form of oligopoly because from the point of view of price theory the nature of problem is the same whether there are two or a few sellers.

The actual market situations bear more resemblance to oligopoly than to either monopoly or monopolistic competition. Generally, in industries we find more than one firm but not so many as to warrant the assumption that the actions of one of them are of no concern to others. Thus oligopoly is commonly found in the real world, it has not been so far possible to build up a satisfactory, integrated and general theory of oligopoly behaviour. A satisfactory oligopoly theory would consist of a few related generalisations commanding substantial agreement and capable of application to policy.

### **20.2.2 Characteristics of Oligopoly**

Building up a theory of oligopoly presents certain problems that are characteristic of this type of market structure. Certain features are peculiar to this form of the market that complicate its analysis. These characteristics of the oligopoly markets from which difficulties arise are:

- 1. Varying Institutional Arrangements-** The industries exhibiting oligopolistic organisation differ widely in their institutional arrangements for different firms. In practice, there may be as many varieties of arrangement as the number of industries. "The theory of oligopoly has been aptly described as a ticket of admission to institutional economies." As William Fellner has also pointed out, there is a strong tendency towards some kind of understanding or collusion among the few firms under oligopoly. There may be tacit or gentleman's agreement among them to follow particular policies; firms may decide to follow a dominant or a low-cost leader firm; or they may act independently in other spheres taking an established price as given. Empirical investigations have led economists to recognise that each oligopolistic industry is to some extent unique. The institutional arrangement of the oligopolistic industry will depend on many factors.

First, the stage of development of the industry will to some extent, determine entrepreneur's knowledge of market conditions, "the probable reactions to be expected from rival enterprises and, in general, the intensity of competition.

Secondly, it depends upon the relative sizes of various firms in the industry and the motivation of those in control- whether they are ambitious to expand their shares of the market, or are content to let sleeping dogs lie.

Thirdly, the existence or lack of price leadership has also to be taken into account. If there are facilities for the spread of knowledge of the market, it may act as an establishing element, reducing discrimination or price-cutting; corresponding to each management in the market, a model can be built.

2. **Oligopolistic Interdependence-** The most important feature that differentiates an oligopoly from monopolistic competition is the interdependence between various firms in their decision-making; if any one seller decides to cut his price or improve his product or embark on a tremendous advertising campaign, it leads to countermoves on the part of his competitors; thus, his individual actions do not go unnoticed by his rivals. Every firm under oligopoly knows that at least some of his rival's decisions depend on his own behaviour, and it must take this fact into account in his own decision-making.
3. **Oligopolistic Uncertainty-** A very serious analytical difficulty under oligopoly arises directly out of a firm's need to take account of its competitor's reaction patterns. When a firm's manager thinks about making a decision, he takes into account the likely response of his competitors to it, but he has to recognise that his competitor too, is likely to take this interdependence phenomenon into account. The firms, thus, attempt to outguess one another.
4. **Price Rigidity and Non-price Competition-** Oligopoly markets are characterised by rigid prices. Once a price comes to prevail, it continues for years as such in spite of changes in costs and demand. Firms tend to stick to the established price and limit their competitive efforts to non-price competition i.e., change in the design and advertising of the product. Maintaining quoted prices constant, firms try to improve their position in the market through various types of concessions to the customers, viz. free delivery through rail, guarantee for some time, repair facilities, some kind of gifts with the product etc. Stickiness of prices under oligopoly could not be understood and explained for a long time.

5. **Conflicting Attitudes of Firms-** Under oligopoly, firms do not always have a co-operative attitude towards each other, rather the attitudes are conflicting. At one time, the rival firms may realise the disadvantages of hostile competition and may have a desire to unite in a combine so as to maximise their joint profits, the tendency at such a time is towards collusion to serve their common interests. After some time, dissatisfaction of one firm or the other may lead to conflict and cut throat competition; firms may come down to fight each other to death. In oligopolistic industries, price stability prevails most of the time but price wars also occur. Firms may come into clash on the questions of distribution of profits and allocation of markets. Thus, two conflicting attitudes are at work under oligopoly- one of co-operation and united action and the other of conflict and antagonism.
6. **Existence of Non-profit Motives-** The marginalist economic theory built so far gives good results on the basis of the fundamental assumption that every firm strives to get maximum profits by equating its marginal costs with marginal revenue. This in turn requires that it is possible to calculate marginal cost and marginal revenue and that businessmen actually do so. Under oligopoly situations, it has been established through empirical surveys that entrepreneurs have many other motives than profit-maximisation such as security and sales maximization, risk minimization etc. It has not been possible so far to combine these non-profit aims with profit maximization and to find out the way the firm makes its price-output decision
7. **Indeterminate Solutions-** As oligopoly is characterised by price rigidity. Marginal profit-maximisation approach has tried to rationalise this peculiar oligopolist behaviour. Concept of the 'kinked demand curve' under oligopoly has been used to demonstrate the fact of price rigidity on the one hand and its reconcilability with the rules of thumb which businessmen employ in practice on the other. However, all this effort has not given any neat, analytically unassailable solutions: rather marginal analysis gives indeterminate solutions.

### **20.2.3 Causes**

#### **A. Historical Factors**

Exactly how do oligopolies come into being is an interesting study. Historically, oligopolies in industry have come into existence in two ways. First, the industry may have been atomistic in structure but in the course of time a few firms may have expanded either with the overall market for the industry or at the cost of other smaller firms into large firms. These large firms may have been motivated by the desire to keep a dominant part of the market with them. Secondly, the industry may have been controlled from the beginning by a few firms who had the power to keep potential competitors out. In the industrially advanced economies, oligopoly may have emerged in both these ways.

#### **B. Economies of Scale**

The most important factor encouraging oligopolistic control of the market is the economies of scale. As technological progress takes place, there is more scope for greater mechanization, division of labour and progressive reduction of costs. Naturally, larger firms are in a position to reduce costs much more than the small ones. As larger firms expand, small ones are driven out of the market. Examples of such oligopolies are steel industry, automobiles, cement, petroleum etc. It, however, needs to be borne in mind that oligopolies need not only be found in large industries: they are found in local markets also. In small towns, a few efficient business units may be all that are necessary to satisfy local demand, such as dealers of hardware and building material. The market being small, it can accommodate only a few firms.

#### **C. Superior Entrepreneurs**

Another factor responsible for the emergence of oligopoly is the existence of superior entrepreneurs who, motivated by the desire for large gains or power, prestige or leadership, follow aggressive policy of ruthless competition against weaker rivals to force them to either go out or merge with them.

#### **D. Patent Rights**

Another source of emergence of oligopoly is the patent rights and other exclusive franchise which a few firms may have acquired in the matter of production of some product.



#### **E. Control on Indispensable Resource**

Few firms may have come to possess control of some indispensable resource used in the manufacture of the product. This may have enabled the firms to secure a big advantage in cost over all other firms and to operate at a price at which other firms could not survive. As a result, other firms which had to buy this costly resource could not survive the competition and a few firms came to dominate the industry.

#### **F. Difficulties of Entry into the Industry**

At last oligopoly may come to exist because of difficulties of entry into the industry. One big difficulty in some industries is the large requirements of capital. Businessmen do not like to venture into those industries entry to which, even of one firm, is likely to depress prices to such an extent as to make it unprofitable for all. They may also be afraid of the price war that their entry may provoke from the established firms in the industry. Prospective entrants to an industry are also deterred by the difficulty of marketing new products or new brands in the presence of already well-established, well entrenched brands.

### **20.2.4 Types of Oligopoly Models**

Oligopoly can be classified on various bases. The main aim behind classification of oligopoly situations is to tackle the complexities and diversities of oligopoly by dividing the analysis of price and output determination in such markets into several segments. It is easier to build up separate models for different classes of oligopoly.

#### **I. Pure Versus Differentiated Oligopoly**

Oligopoly situations can be classified as pure and differentiated on the basis of absence or presence of differentiation. If the products of various firms are homogeneous, the term pure oligopoly is applied. This model is approximated in some of the capital-goods industries, such as cement production. Mutual interdependence will be greater when products are identical than when they are differentiated since any price change by one firm is certain to produce substantial effects upon the sales of competitors and cause them to change their prices.

On the other hand; in differentiated oligopoly, in which products are not homogeneous, price changes will have less direct effect upon competitors because of the practical isolation

of the market of each firm. The stronger the differentiation, the weaker will be the feeling of mutual inter-dependence. Differentiated oligopoly is characteristic of a very large portion of the economy including most consumer goods manufacturing industries, and retail trade in most areas. The degree of differentiation and strength of a feeling of mutual interdependence vary widely among industries however.

## **II. Collusive versus Competitive Oligopoly**

Oligopolistic market structures induce collusion among the firms in the industry, but at the same time collusive arrangements are difficult to maintain. There are at least three major incentives for oligopolist toward collusion. In the first place, by decreasing the amount of competition among the firms, it can enable them to act monopolistically and increase their profits thereby. In the second place, it can decrease oligopolistic uncertainty. If the firms act in concert, they can reduce the possibility of one firm taking action detrimental to the interests of the others. In the third place, collusion among the firms already working in an industry will facilitate blocking of entry of newcomers. These forces of collusion and co-operation, agreed or tacit, can be classified into different types so as to facilitate building representative models. If there is collusion, it may be perfect or imperfect oligopoly; if there is none, firms may follow their independent policies.

This classification of collusive oligopoly, suggested by Fritz Machlup, will be followed in the oligopoly models. Three main types of models will be discussed: (a) Perfect collusion, where firms act in complete concert for the maximisation of joint profits; (b) Imperfect collusion, where firms do not have any explicit agreement but have a tacit understanding; and (c) Independent action on the part of firms.

### **A. CHECK YOUR PROGRESS**

#### **Case Study**

**Background:** The global smartphone industry is dominated by a few major players such as Apple, Samsung, and Xiaomi, with other smaller firms holding limited market shares. These companies are highly interdependent—when one firm introduces a new feature or lowers its price, others quickly respond to maintain their competitive position. Despite the potential to compete on price, firms often avoid

price wars and instead compete through non-price strategies such as branding, advertising, innovation, and ecosystem development. Occasionally, these companies also engage in informal understandings to maintain profitability, though formal cartels are illegal in most countries.

**Answer the following questions:**

1. Why is the smartphone industry considered an example of oligopoly?
2. What are some non-price competition strategies used by these firms?
3. How does interdependence among firms influence their pricing and marketing decisions?

### **20.3 MODELS OF DUOPOLY**

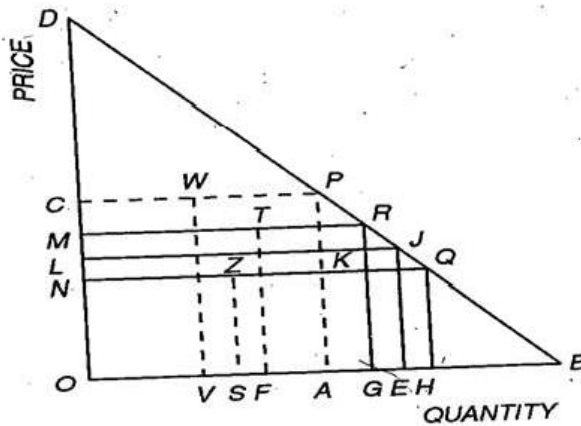
There are different models of oligopoly and in oligopoly more than two firms are found; as a result, the analysis will be multidimensional. The only way out to restrict it to two dimensions is to study the simplest analytical form of oligopoly which is duopoly. Therefore, we shall do well to choose as our starting point the study of the three classical duopoly models given by Cournot, Edgeworth and Chamberlin. These models employ highly simplified assumptions about interdependence of decision-making between the two firms. The first two models are drastically simplified by assuming that in deciding his price-output policy,

one duopolist does not take into consideration the possible reactions which his rival may have to his actions. This assumption of ignoring completely the mutual interdependence of the two rivals has been called by Fritz Machlup Zero Conjectural Variation. This assumption, of course, ignores the problem of oligopolistic interdependence which is at the heart of oligopoly problem. Chamberlin has not ignored the problem. Since the three models employ different assumptions about their behaviour they accordingly differ in their conclusions about price and output of the two firms.

### **20.3.1 The Cournot Model**

At the outset, we shall look at perhaps the oldest formal model of duopoly behaviour, a model suggested by the French economist, AA. Cournot in 1838. It is instructive to note here that in the Cournot model it is the rival's output which is assumed to remain the same as one duopolist plans a change in his output. Cournot began his analysis with the basic assumption that duopolist A believes that duopolist B will not change his (B's) quantity of output, irrespective of the actions of the duopolist A. Furthermore, the assumption is entirely symmetrical so that A and B may be interchanged in the statement above. To give form to his model, Cournot supposed that A and B are entrepreneurs who own identical mineral wells, located side-by-side. The mineral water coming from these springs can be bottled and sold without cost to the entrepreneurs. Thus, we have the simplest possible duopoly case. Since there are no costs of production at all, we have only to analyse the demand side of the market.

Assume that the straight-line DB in figure 20.1 is the market demand curve for the mineral water. Further, suppose that  $OA=AB$  is the maximum daily output of each spring. Thus if the total output of the two duopolist ( $OA+AB=OB$ ) is put on the market each day, the price will be exactly zero. We might also mention at this point that if the market were purely competitive, the long-run equilibrium price would be zero (because costs are zero, price must be zero to yield the no-profit equilibrium solution).



**Figure 20.1 The Cournot Duopoly Model**

Suppose the duopolist A is temporarily a monopolist: he goes into business first. A will accordingly bottle his entire possible output OA and sell it for the monopoly-profit-maximising price OC per bottle. His total profit is, therefore, OAPC, the maximum attainable. Now let B enter the market. He finds that A is producing OA units. Therefore, the best B can do, under the assumption that A will continue to produce OA units, is to regard the segment PB as his (B's) demand curve. He will accordingly produce AH ( $=1/2 AB$ ) units. Total supply is now  $OA + AH = OH$  units. This output will bring a price of ON per unit. Total profit decreases to OHQN, of which OAKN is B's profit.

Now that B has entered the market, A must reappraise his position. Under the assumption that B will continue to produce A units, the best that A can do is to produce  $1/2 (OB - AH) = OF$  units. He accordingly reduces his output from OA to OF units. Total supply is  $OF + AH = OG$  units, this amount fetching a price of OM per unit. Total profit now increases to OGRM, of which OFTM  $>$  OAKN is A's profit and FGRT  $>$  AHQK is B's profit.

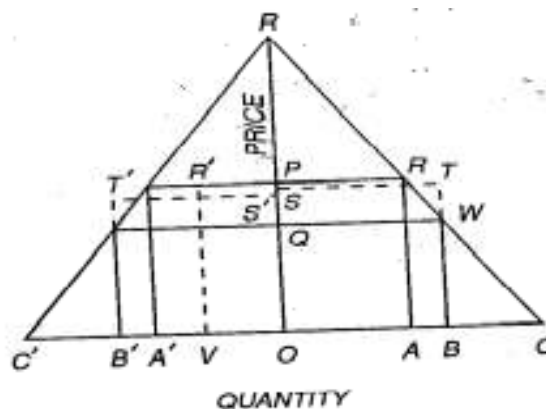
By reducing his output, B must revalue the situation. Continuing with the assumption that A will hold his output constant, the best that B can do is to produce  $1/2 (OB - OF) = 1/2 FB$ . Thus, B increases his output, presumably to A's surprise. Then A must again consider, producing one half of OB minus B's output. This process continues until a total of OE units are produced, selling for OL per unit. A produces OS units and B produces  $SE = OS$  units.

If A and B had formed a coalition, each could have produced  $1/2 Q/4 = VA$  units, thereby gaining the maximum possible profit  $OAPC$ . They could then have divided this equally, each obtaining  $OVWC$  in profit. As we can see, this coalition profit would be considerably greater than the actual equilibrium profit  $OSZN$  received by each. Consequently, by competing one with the other, price and profit are lower and output is greater than would have occurred if there had been a coalition (that is, monopoly situation). In other words, consumers are somewhat better off because of competition rather than coalition.

But consumers are worse off under competitive duopoly than they would be if the market were purely competitive. In the latter case output would be  $OB$  and price would be zero. In LET US SUM UP, Cournot duopoly equilibrium results in an output that is two-thirds of the possible (purely competitive) output and a price that is two-thirds of the most profitable (monopoly) price.

### 20.3.2 Edgeworth Model

F.Y. Edgeworth was not satisfied with Cournot's solution of the duopoly problem. He criticized Cournot's assumption that each entrepreneur and his rival will not adjust the price at all. Edgeworth preferred to work with the premise that the duopolists change their price. Entrepreneur A will probably assume that entrepreneur B will never change his (B's) price, irrespective of A's action. Edgeworth then used this assumption in Cournot's 'mineral wells' example to show that an equilibrium solution would not exist.



**Figure 20.2: The Edgeworth Duopoly Solution**

Figure 20.2 is constructed to explain Edgeworth's model. The market, by assumption, is evenly divided between the two duopolists.  $RC$  and  $RC'$  accordingly represent the demand lines for A and B respectively.  $OB$  and  $OB'$  are the maximum possible output of A and B respectively.  $OP$  is the 'monopoly' price that would be set if A and B formed a coalition and extracted the maximum possible profit. Similarly,  $OQ$  is the price obtainable if each duopolist sells his entire output. Suppose that somehow both producers decide to charge  $OP$  per unit, the output sales therefore amount to  $OA$  and  $OA'$  respectively. Now entrepreneur A (say) believes that B will retain the price  $OP$ , despite whatever he (A) does. A consequently recognises that by shading his price slightly below  $OP$ , he (A) can attract enough of B's customers to sell his entire output  $OB$ . This would certainly be more profitable to A. For example, if he reduced his price from  $OP$  to  $O5$ , his profit would increase from  $OARP$  to  $OBT5$ .

But when A does reduce his price to  $O5$ , B must then reconsider his price-output policy. A has attracted  $AB = A'$  units of sales from B, so that B's profit has fallen to  $OVRP$ . Now B also assumes that A will hold his price constant at  $O5$ . He therefore realises that if he reduces his price slightly below  $O5$ , say to  $O5'$ , he can attract enough of A's customers to sell his entire output  $OB'$ . When he does so, his (B's) profit increases from  $OVRP$  to  $OBT5'$ . At the same time, A's sales are considerably reduced and his (A's) profit declines. A then believes that if he shades his price slightly below  $O5'$ , he can sell his entire output  $OB$  by attracting customers from B, still believing that B will not change his price from  $O5'$ . Such a competitive move will again temporarily increase A's profit. But B then sees that a further price cut will enable him (B) to make a greater profit.

Thus, according to Edgeworth, A and B will competitively bid down price until it reaches the level  $OQ$ , at which point both A and B are selling the entire amount that they can produce. Now, one of the entrepreneurs, say entrepreneur A, again realizes that his rival B can supply no more than  $OB'$  units. At the price  $OQ$ , B sells his entire output. If B does not raise his price from  $OQ$ , A can raise his price to  $OP$  and sell  $OA$  units. A's profit would accordingly increase from  $OBWQ$  to  $OARP$ . Therefore, A makes the price increase, knowing that B cannot attract any of the  $OA$  units of sale because he cannot supply them.

Then B realises that if he increases his price to a point slightly below  $P$ , he can still sell  $OB'$  units, making a larger profit. So, he jumps his price. But A then believes that he can increase

his profit by reducing his price slightly below B's etc. So around and around we go and thus in the Edgeworth case we never stop. Price bounces back and forth between OP and OQ, never stopping for more than a moment. Consequently, the Edgeworth duopoly solution is one of perpetual disequilibrium, price constantly varying from the competitive to the monopolistic level.

### 20.3.3 Chamberlin

What was wrong with Cournot and Edgeworth solution? Obviously, the fault lay in the extremely naive assumption that neither entrepreneur recognizes their mutual interdependence, and the failure to allow A and B to change their responses. Chamberlin criticized the Cournot and Edgeworth cases on precisely this ground. To quote him directly, "None of the solutions yet given conforms perfectly to the hypothesis that each seller acts so as to render his profit a maximum. In order to do this, he will take account of his total influence on price, indirect as well as direct. When a move by one seller evidently forces the other to make a countermove, he is very stupidly refusing to look further than his nose if he proceeds on the assumption that it will not." A.H. Chamberlin then proceeded to suggest a solution in which both sellers recognise their mutual interdependence. Let each seller, then, in seeking to maximise his profit, reflect well, and look to the total consequences of his move. He must consider not, merely what his competitor is doing now, but also what he will be forced to do in the light of the change which he himself is contemplating".

Chamberlin's proposed solution can be shown in terms of either figure 20.1 or figure 20.2. In figure 20.1, the duopolist A originally produce OA units, selling for OC price each. Duopolist B enters the market and, just as in the Cournot solution, produces AH units, the price falling to ON per unit. This is where the difference enters. Under Chamberlin's competitive assumption, A no longer believes that B will produce AH units. Instead, A realises that B will competitively in an attempt to gain the greatest possible profit. A recognizes that the greatest profit obtainable is OAPC. He, therefore, immediately reduces his output to OV units. B is aware of this potentially dangerous competitive situation. He therefore, immediately reciprocates by producing VA units. Total output is thus OA and price is OC. A and B split the monopoly profit OAPC between themselves. Each is aware of the dangerous consequences of a further move. They consequently live together in harmony, possibly growing fat on their monopoly profit.



The same sort of thing would happen if the situation were as shown in fig 20.2 that price anywhere between (including) QQ and OP. Then A(say) would immediately increase his price to OP confident in his belief that B will follow suit. And B will do so because he realizes that the maximum permanent profit can thus be made. Once price is OP, furthermore neither duopolist has an incentive to change it because each realizes that the ultimate results would be far less desirable than the monopoly-profit situation.

Chamberlin's model, as we can see, involves a kind of solution. The entrepreneurs do not meet and plot their coalition. Indeed, they do not have to. Each is a reasonably intelligent fellow who looks to the future. And each duopolist, looking a little beyond his nose, sees that having monopoly profit is the best thing for him in the long run. Chamberlin's model, in short, always guarantees an equilibrium solution-in particular, the monopoly equilibrium. His model also embodies somewhat more sophisticated behaviour on the part of the rival entrepreneurs. As a matter of fact, many oligopolies doubtless reach this (monopoly) solution. But just as obviously, some do not. Thus, the Chamberlin model, while making a valuable contribution to oligopoly analysis, certainly is not a general description of oligopoly behaviour. As we observed right at the outset, it is not possible to build one generalized model of oligopoly market structure, but even then, it has been possible to neatly classify such situations and build up separate models for each such situation. It is to the consideration of these models that we can turn.

## **B. CHECK YOUR PROGRESS**

### **Fill in the Blanks**

1. The \_\_\_\_\_ model assumes that each firm decides its output assuming the output of the rival firm remains constant.
2. In the Bertrand model, firms compete on the basis of \_\_\_\_\_ instead of quantity.
3. The \_\_\_\_\_ model suggests that firms under duopoly simultaneously choose the quantity to produce.
4. Bertrand's model leads to a situation similar to \_\_\_\_\_ competition, where

price equals marginal cost.

5. In Cournot's model, equilibrium is reached when both firms' output decisions become \_\_\_\_\_.

6. The main assumption of Bertrand's model is that firms produce a \_\_\_\_\_ product.

7. In the Edgeworth duopoly model, firms compete on price but there is no unique \_\_\_\_\_ price.

**Answers:**

1. Cournot

2. Price

3. Cournot

4. Perfect

5. Stable

6. Homogeneous

7. Equilibrium

## 20.4 SWEEZY'S MODEL

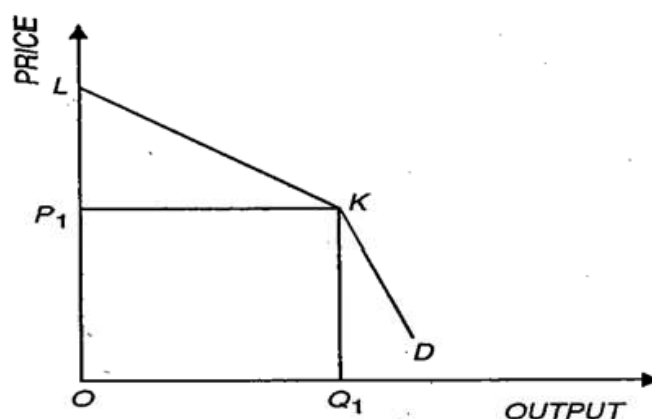
In 1939 a theory of non-collusive oligopoly was developed by Prof. Paul Sweezy in America. A similar theory was developed by Professors R.L. Halfarid C.J. Hitch in England. This is known as the kinked demand theory. The model seeks to explain how it that even when there is no collusion at all among oligopolists prices can nevertheless remain stable

The theory is based on two asymmetrical assumptions:

1. If an oligopolist cuts its price, its rivals will feel forced to follow suit and cut theirs, to prevent losing customers to the first firm
2. If an oligopolist raises its price, however, its rivals will not follow suit because, by keeping their prices the same, they will thereby gain customers from the first firm.

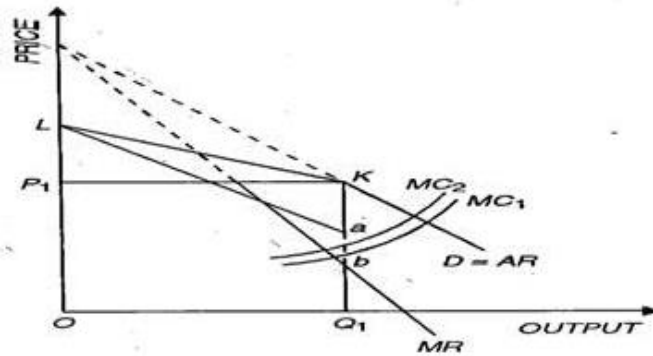
In these assumptions, each oligopolist will face a demand curve, that is kinked at the current price and output (Figure 20.3) given below. A rise in price will lead to a large fall in sales as customers switch to the new relatively lower-priced rivals. The firm will thus be reluctant to raise its price. Demand is relatively elastic above the kink. On the other hand, a lowering of the price will bring only a modest increase in sales, because rivals lower their prices too and therefore, customers do not switch. The firm will thus also be reluctant to lower its price. Demand is relatively inelastic below the kink.

This price stability can be shown by reasoning with the help of fig. 20.3. In the figure 20.3, the demand curve LKD is also the average revenue curve for the oligopolist. It has a kink at the SSML- Now if we draw the marginal revenue (MR) curve corresponding to this AR curve, it would be having the shape of Lab with a gap from a to b. The gap in the MR curve, a to b, lies exactly below K where the AR curve is kinked. From b onwards it is again a continuous curve.



**Figure 20.3: Kinked Demand Curve for a Firm under Oligopoly**

But how do we draw the MR curve? To see how this is done, imagine dividing the diagram into two parts either side of  $Q_1$ . At quantities less than  $Q_1$  (the left hand part of the diagram), the MR curve will correspond to the shallow part of the AR curve. At quantities greater than  $Q_1$  (the right-hand part), the MR curve will correspond to the steep part of the AR curve. To see how this part of the MR curve is constructed, imagine extending the steep part of the AR curve back to the vertical axis.



**Figure 20.4: Stable Price under Conditions of a Kinked Demand Curve**

We suppose that firm wants to maximise its profits. Therefore, it produces output  $Q_1$  because at this output  $MC = MR$  i.e.  $MC_1$  cuts the  $MR$  curve in the gap portion of the  $MR$ . If the costs of production go up and the marginal cost curve takes the position  $MC_2$ , even then the profit-maximizing price and output remain the same. The  $MC_2$  equals the  $MR$  at the output  $Q_1$ . Thus, the price will remain stable even with a considerable change in costs.

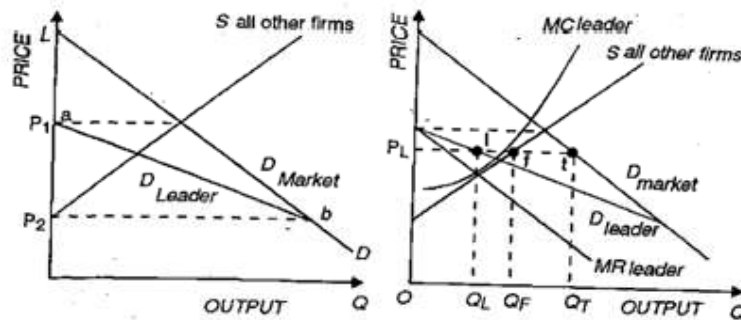
## 20.5 PRICE LEADERSHIP MODEL

One form of tacit collusion under oligopoly is where firms set the same price as an established leader. The leader may be the largest firm which dominates the industry. This is known as dominant firm price leadership. Alternatively, the price leader may simply be the one that has emerged over time as the most reliable one to follow; the one that is the best barometer of market conditions. This is known as barometric firm price leadership. Let us examine each of these two types of price leadership in turn.

How in theory does the leader set the price? The leader will maximise profits where its marginal revenue is equal to its marginal cost.

In Figure 20.5(a), the total market demand curve is shown as  $D$ . The supply curve of all followers is also shown as  $S$ . These firms, like perfectly competitive firms, accept the price as given, only in this case it is the price set by the leader, and thus their joint supply curve

is simply the sum of their MC curves-the same as under perfect competition.



**20.5(a) Division of the market between leader and followers**

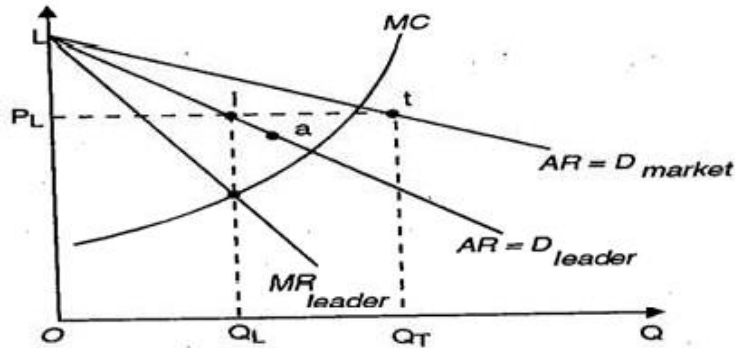
**20.5 (b) Determination of price and output**

The leader's demand curve can be seen as that portion of market demand which remains unfilled by the other firms. In other words, it is market demand minus other firms' supply. At  $P_1$  the whole of market demand is satisfied by the other firms, and so the demand for the leader is zero (point a). At price  $P_2$  the other firms' supply is zero, and so the leader faces the full market demand (Point b). The leader's demand curve thus connects points a and b.

The leader's profit will be maximised where its marginal cost equals its marginal revenue. This is shown in Figure 20.5(b). The diagram is the same as Figure 20.5(a) but with the addition of MC and MR curves for the leader firm. The leader's marginal cost equals its marginal revenue at an output of  $Q_L$ , (giving a point / on its demand curve). The leader thus sets a price of  $P_L$ , which the other firms then duly follow. They supply  $Q_F$  (i.e. at point/on their supply curve). Total market demand at  $P_L$  is  $Q_T$  (i.e. point t on the market demand curve), which must add up to the output of both leader and followers (i.e.  $Q_L + Q_F$ ).

In practice, however, it is very difficult for the leader to apply this theory. 'The leader's demand and MR curves depend on the followers supply curve-something the leader will find virtually impossible to estimate with any degree of accuracy. The leader will thus have to make a rough estimate of what its profit-maximising price and output will be and simply

choose that. That is the best it can do.



**Figure 20.5: A Price Leader Aiming to Maximise Profits for a Given Market Share**

A simpler model is where the leader assumes that it will maintain a constant Market Share (say, 50 per cent). This is illustrated in Figure 20.6, given below. It knows its current position on its demand curve say point (a). It then estimates how responsive its demand will be to industry-wide price changes and thus constructs its demand and MR curves on that basis.

It then chooses to produce  $Q_L$  at a price of  $P_L$  determined at point I on its demand curve (where  $MC = MR$ ). Other firms then follow that price. Total market demand will be  $Q_T$ , with followers supplying the absorption or the market not supplied by the leader, namely  $Q_T - Q_L$ .

There is one problem with this model, means the assumption that the followers will want to maintain a constant market share. It is possible that if the leader raises its price, the followers may want to supply more, given that the new price (= MR for a price-taking follower) may well be above their marginal cost. On the other hand, the followers may decide merely to maintain their market share for fear of invoking retaliation from the leader in the form of price cuts or an aggressive advertising campaign.

## C. CHECK YOUR PROGRESS

### Case Study

**Background:** The cement industry in India is characterized by the presence of a few large firms such as UltraTech Cement, Shree Cement, and ACC. Among them, UltraTech Cement holds a dominant position in terms of production capacity, distribution network, and market influence.

Market analysts have observed that whenever UltraTech changes its cement prices, other firms typically follow the same pricing trend shortly after. Despite having the capacity to set independent prices, these follower firms prefer aligning with UltraTech's pricing to maintain market stability and avoid price wars.

This behavior reflects the Price Leadership Model, in which one dominant firm sets the price and others follow, especially in industries with high interdependence and few competitors.

Answer the following questions:

1. What features of the cement industry indicate the presence of a price leadership model?
2. Why do firms like Shree Cement and ACC choose to follow UltraTech's pricing decisions?
3. How does the price leadership model help avoid price wars in an oligopolistic market?

## 20.6 COLLUSIVE OLIGOPOLY

Collusion among firms gives rise to cartels. Cartelization arises because firms want to eliminate uncertainty and improve profits by stabilising market shares, stabilising prices, reducing competition, putting excess capacity to work, or outlining spheres of interest and eliminating unnecessary promotional costs. Cartelisation or collusion is most successful when most, not all, of the following specific structural conditions are present in a market.

1. *Small number of sellers.* This makes it easier to reach and enforce an agreement.

2. ***Similar cost Conditions for all sellers-*** This makes for equitable profits.
3. ***Minimal or non-existent product differentiation.*** This makes it easier to agree upon a set of rules and eliminates the need for exceptions to the rules.
4. ***Inelastic demand.*** This enables the cartel to increase the price of the product without incurring a commensurate decrease in sales.
5. ***High barriers to entry.*** To avoid competition, new firms are deterred from entering the market.
6. ***Stability of the industry.*** This enables the cartel to frame and enforce rules.
7. ***Depressed economic conditions.*** In hard times, firms seek ways to avoid cut-throat competition, thus making cartelization more attractive.
8. ***Little or no excess capacity.*** This makes it easier for the cartel to allocate production quotas without creating a temptation to cheat.

The establishment of a price and the subsequent allocation of market shares to members of a cartel are similar to the allocation of production to multiple plants of a single firm; that is, the optimal allocation occurs when  $MCA = MCB = \dots = MCN = MR$  of the cartel, as



shown in figure 20.7.

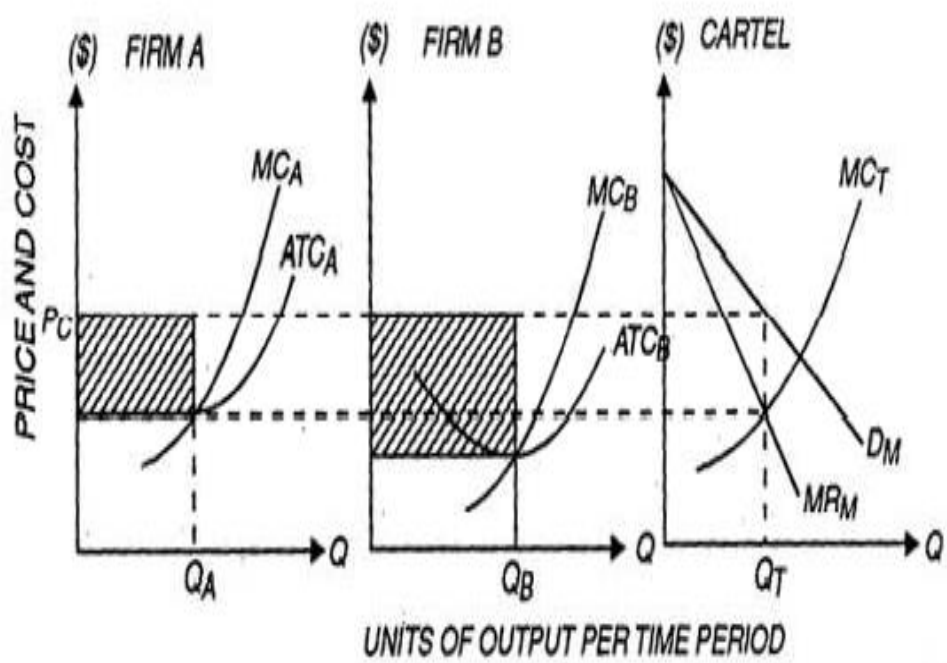


Figure 20.7: Market Allocation in a two- firm Cartel

The figure above shows a simple two-firm cartel. Firm A has the marginal cost curve MCA and firm B has the marginal cost curve MCB. The cartel's total production is the total produced by both firms. Hence the cartel's marginal cost curve, MCT, is just the horizontal summation of MCA + MCB. In the total market, which has the demand curve DM and the marginal revenue curve MRM, the intersection of MCT and MRM determines the cartel's profit-maximizing output of QT units at a price of Pc. Each firm may receive an allocated share of the profits by producing at the level at which the firm's marginal cost is equal to marginal revenue for the cartel at the cartel's profit-maximizing level. This results in the production of QA units by Firm A and QB units by Firm B. Since the cartel's price is always higher than the average total cost of the least efficient member, all firms in the cartel will make a profit, but the lower-cost (more efficient) firms will make more profit than the higher-cost (less efficient) firms.

## 20.7 LET US SUM UP

Oligopoly the market situation with a few sellers competing with each other is a market structure that is widely found in present day industry. Oligopoly is that form of imperfect competition in which there are only few firms in the industry producing either homogeneous product or producing products which are close but not perfect substitutes for one another. If there are only two sellers in the market, it may be called Duopoly.

Certain features are peculiar to this form of the market that complicate its analysis. These characteristics of the oligopoly markets from which difficulties arise are: Varying Institutional Arrangements, Oligopolistic Interdependence, Oligopolistic Uncertainty, Price Rigidity and Non-price Competition, Conflicting Attitudes of Firms, Existence of Non-profit Motives, and Indeterminate Solutions.

It is easier to build up separate models for different classes of oligopoly. These models of oligopoly are: Pure Versus Differentiated Oligopoly and Collusive versus Competitive Oligopoly.

The only way out to restrict it to two dimensions is to study the simplest analytical form of oligopoly which is duopoly. Therefore, we shall do well to choose as our starting point the study of the three classical duopoly models given by Cournot, Edgeworth and Chamberlin. These models employ highly simplified assumptions about interdependence of decision-making between the two firms.

In 1939 a theory of non-collusive oligopoly was developed by Prof. Paul Sweezy in America. A similar theory was developed by Professors R.L. Halfarid C.J. Hitch in England. This is known as the kinked demand theory.

One form of tacit collusion under oligopoly is where firms set the same price as an established leader. The leader may be the largest firm which dominates the industry. This is known as dominant firm price leadership. Alternatively, the price leader may simply be the one that has emerged over time as the most reliable one to follow; the one that is the best barometer of market conditions. This is known as barometric firm price leadership.

Collusion among firms give rise to cartels. Cartelisation arises because firms want to eliminate uncertainty and improve profits by Stabilising market shares, stabilising prices, reducing competition, putting excess capacity to work, or outlining spheres of interest and eliminating unnecessary promotional costs.

## 20.8 GLOSSARY

- **Oligopoly** – A market structure where a few firms dominate and are interdependent in decision-making.
- **Duopoly** – A special form of oligopoly where only two firms dominate the market.
- **Cournot Model** – Duopoly model where each firm assumes rival's output is fixed while choosing its own.
- **Edgeworth Model** – Duopoly model focused on price competition with capacity constraints, leading to price instability.
- **Chamberlin Model** – Assumes mutual interdependence, where firms recognize the effect of their actions on rivals.
- **Sweezy's Model** – Also known as the kinked demand curve model, explains why prices tend to remain stable in oligopoly.
- **Price Leadership Model** – One dominant firm sets the market price, and other firms follow to maintain stability.

- **Collusive Oligopoly** – Firms cooperate (formally or informally) to fix prices or output, reducing competition.

## 20.9 SELF-ASSESSMENT QUESTIONS

1. What is oligopoly? Explain the important features of oligopoly?

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2. Do you think price and output under oligopoly is indeterminate?

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3. There is no unique solution to the problem of determination of price and output under oligopoly. Discuss?

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## 20.10 LESSON END EXERCISE

1. How do firms in an oligopoly engage in non-price competition? Why is it preferred over price competition?
2. What is a cartel? Discuss how cartels operate in oligopoly markets along with their advantages and disadvantages.

3. Explain the Price Leadership Model. How does it function in determining price and output in an oligopolistic market?

#### **20.11 SUGGESTED READINGS**

- Advance Economic Theory, Ahuja, H.L., S. Chand & Sons, New Delhi.
- Economic Theory, Chopra P.N., Kalyani Publishers, New Delhi.
- Principles of Micro Economics, Misra & Puri, Himalaya Publishing House, New Delhi.

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