ਜਗਤ ਗੁਰੂ ਨਾਨਕ ਦੇਵ
ਪੰਜਾਬ ਸਟੇਟ ਓਪਨ ਯੂਨੀਵਰਸਿਟੀ
ਪਟਿਆਲਾ

The Motto of Our University

(SEWA)

SKILL ENHANCEMENT

EMPLOYABILITY

WISDOM

ACCESSIBILITY

SELF-INSTRUCTIONAL STUDY MATERIAL FOR JGND PSOU

JAGAT GURU NANAK DEV
PUNJAB STATE OPEN UNIVERSITY, PATIALA

(Established by Act No. 19 of 2019 of the Legislature of State of Punjab)

MASTER OF ARTS (ECONOMICS)

SEMESTER- I

MAEC24101T: MICRO ECONOMICS I

Head Quarter: C/28, The Lower Mall, Patiala-147001
Website: www.psou.ac.in

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Website: www.psou.ac.in

The Study Material has been prepared exclusively under the guidance of Jagat Guru Nanak Dev Punjab State Open University, Patiala, as per the syllabi prepared by Committee of Experts and approved by the Academic Council.

COURSE COORDINATOR AND EDITOR:

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PREFACE

Jagat Guru Nanak Dev Punjab State Open University, Patiala was established in December 2019 by Act 19 of the Legislature of State of Punjab. It is the first and only Open University of the State, entrusted with the responsibility of making higher education accessible to all, especially to those sections of society who do not have the means, time or opportunity to pursue regular education.

In keeping with the nature of an Open University, this University provides a flexible education system to suit every need. The time given to complete a programme is double the duration of a regular mode programme. Well-designed study material has been prepared in consultation with experts in their respective fields.

The University offers programmes which have been designed to provide relevant, skill-based and employability-enhancing education. The study material provided in this booklet is self-instructional, with self-assessment exercises, and recommendations for further readings. The syllabus has been divided in sections, and provided as units for simplification.

The University has a network of 110 Learner Support Centres/Study Centres, to enable students to make use of reading facilities, and for curriculum-based counselling and practicals. We, at the University, welcome you to be a part of this institution of knowledge.

Dean Academic Affairs

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

MAEC24101T -MICRO ECONOMICS I

MAX. MARKS:100

EXTERNAL:70

NTERNAL:30

PASS:40%

CREDITS:6

OBJECTIVE:

This course acquaints the students with the basic principles of Microeconomics and economic activities. It will help the students to understand the subject by applying it to their day to day experiences.

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER:

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions each from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any 10 questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt any two questions each from the sections A, and B of the question paper, and any ten short answer questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

SECTION - A

Unit 1: Meaning, nature and scope of economics; Methodology of Economics. Role of Assumptions. Theory of Demand and Elasticity of Demand

Unit 2: Consumer Behaviour: Cardinal utility analysis; Indifference curve analysis

Unit 3: Production Function: Law of Variable Proportions and Returns to Scale

Unit 4: Concepts of Cost and Revenue: types, shapes of cost curves in short and long period; shapes of revenue curves in different market forms; relationship of AR, MR and Elasticity.

SECTION – B

Unit 5: Price and Output Determination of Firm and Industry under Perfect Competition

Unit 6: Imperfect Competition: Monopoly and Monopolistic Competition

Unit 7: Theories of Distribution: Marginal Productivity Theory and the Modern Theory

Unit 8: Theories of Rent and Profit: Ricardian and Modern Theories of Rent, Risk and Uncertainty theories of Profit

Suggested Readings:

1. A. Koutsoyiannis: Modern Microeconomics, Palgrave Macmilan.
2. N. Gregory Mankiw, Economics: Principles and Applications, India edition by South Western, a part of Cengage Learning, Cengage Learning India Private Limited, 4th edition, 2007.
3. Salvotore. D (2006) Theory and Problems of Microeconomic Theory. (3rd ed.) Tata McGraw-Hill Publishing Company Ltd.
4. Samuelson, Paul A and Nordhaus, William D: Economics, 18th Edition, Tata McGraw

   Hill Publishing Company Limited, New Delhi, 2006

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MASTER OF ARTS (ECONOMICS)

SEMESTER-I

MAEC24101T -MICRO ECONOMICS I

COURSE COORDINATOR AND EDITOR: DR. PINKY SRA

SECTION A

UNIT NO:	UNIT NAME
Unit 1	Meaning, nature and scope of economics; Theory of Demand and Elasticity of Demand
Unit 2	Consumer Behaviour: Cardinal utility analysis; Indifference curve analysis
Unit 3	Production Function: Law of Variable Proportions and Returns to Scale
Unit 4	Concepts of Cost and Revenue

SECTION B

UNIT NO:	UNIT NAME
Unit 5	Price and Output Determination of Firm and Industry under Perfect Competition
Unit 6	Imperfect Competition: Monopoly and Monopolistic Competition
Unit 7	Theories of Distribution
Unit 8	Theories of Rent and Profit

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

MICRO ECONOMICS I

UNIT 1: MEANING, NATURE AND SCOPE OF ECONOMICS, THEORY OF DEMAND AND ELASTICITY OF DEMAND

STRUCTURE

1.0 Learning Objectives

After reading this unit, learner will be able to:

- Describe the nature and scope of economics
- Identify the basic problems of the economy
- Determine the methodology of economics
- the role of assumptions in economic analysis.
- Interpret the economic models
- Describe the consumer's behaviour towards a particular commodity
- Identify factors determining demand for a commodity
- Interpret the shifts in demand curve and movement among demand curve
- Discuss the concepts of elasticity of demand
- Explain the measurements of price elasticity of demand

1.1 Introduction

Economics is the study of how individuals, businesses, governments, and societies make choices about allocating limited resources to satisfy their needs and wants. It examines the production, distribution, and consumption of goods and services, as well as the behaviors and interactions that influence these processes.

1.2 Meaning of Economics

Economics, according to Adam Smith (1976), the father of economics, is "an inquiry into the nature and causes of the wealth of a nation". In his well-known work, "The Wealth of Nations", he expresses these views. According to him, economics enquires the factors that influence a

country's wealth and growth. The subject matter of economics, according to this definition, is the production and expansion of wealth. Ricardo, on the other hand, moved the focus away from production of wealth to distribution of wealth.

According to him, “The produce of the earth-all that is derived from its surface by the united application of labour, machinery and capital is divided among three classes of the community, namely, the proprietor of the land, the owner of the stock of capital necessary for its cultivation and the labourers by whose industry it is cultivated”. Thus, Adam Smith and Ricardo definition of economics considered economics as ‘science of wealth’. However, according to Marshall, wealth is just a secondary consideration; the main focus of economic study is on man and his everyday activities. According to Robbins, “Economics is the science which studies human behaviour as a relationship between ends and scarce resources which have alternative uses."

Robbins’s definition of economics stats that economics is a science of choice. Although Robbin’s definition of economics is considered superior because of above mentioned three facts, it should not be termed as perfect. It is criticised on the ground that it does not cover the theory of income and employment determination as well as the theory of economic growth. Thus, all three essential subjects of economics, namely the distribution of national income and production, the determination of national income and employment and the theory of economic growth, must be included in a proper definition of economics. Prof. Samuelson defines economics as, “the study of how societies use scarce resources to provide valuable commodities and distribute them among different people”. Thus, according to this definition economics is the study of scarcity of resources and choice and distribution of national product among people of a society.

1.3 Nature and Scope of Economics

The nature of economics refers to its fundamental characteristics and how it is viewed as a field of study. Economics is both a science and an art, with different interpretations based on its application and methodology. Below are the key aspects of its nature:

Nature of Economics

A. As a Science

Economics is considered a science because it uses systematic methods to study human behavior related to resource allocation. It involves:

- Observation: Studying how people and institutions make decisions.

- Hypothesis Formation: Proposing theories or models to explain economic phenomena.
- Analysis and Testing: Using data, experiments, and models to validate theories.
- Laws and Principles: Formulating general economic principles, like the law of demand or supply.

Science refers to a systematised body of knowledge. It deals with the cause and effect relationship. The law of demand, for example, states that, all other factors being held constant, a decrease in price leads to a rise in demand and increase in price leads to decrease in demand. It can be understood from the law of demand that increase or decrease in price is the cause while the decrease or increase in demand is the effect of the same.

B. Economics as an Art

Art is an action and an art of application of scientific laws in practice. As a form of art, economics is useful in solving many of the economic issues that arise in the economy. Economics is considered as an art because in these different theories and laws are explained with the help of tables, graphs, statistics and equations. Besides this, assumptions are also used in economics which are helpful to describe the conditions under which theories, rules and relationships between economic variables can be applied.

Thus, from the above discussion we can say that economics is considered as a science (social science) as well as an art too.

C. Positive Science: It may be defined as a body of systematized knowledge concerning what it is, what was and what ought to be. Thus, positive science deals with economic problems related to the past, present and future. We are analysing economic conditions with the help of facts and figures. Positive statements have a few distinguishing features like:

- These statements highlight the nature and extent of economic problems.
- These are based on facts and figures related to the past, present or future.
- It is not necessary that these statements are based on truth. These may be true or false but are verifiable for truth.
- These do not reflect any value judgment or opinion of the economists.

Let us understand economics as positive science with the help of an example. If someone says that the population of India is more than China, it is a positive statement, but it is wrong as per

population statistics.

D. Normative Science: It is concerned with economists' opinion or value judgments to understand the economic problem. Different economists have different opinions on how to solve any economic problem. These opinions are often based on value judgments. It is concerned with the question of 'what ought to be'. As a result, when an economist suggests a solution to a problem in normative economics, they do it based on people's ethics and beliefs rather than scientific rules and principles. The normative statements also have some essential characteristics:

- These statements involve value judgment.
- These statements may create controversies and debates.
- Because these statements are based on opinions, it is impossible to verify the truth.
- These statements are related to 'what ought to be' as a solution to any economic issue.

For instance, if someone says that the government should spend more on health care. Then it is just an opinion or value judgment.

E. Static Economics: Examines economic activities at a specific point in time or assumes no changes in key variables.

F. Dynamic Economics: Studies changes over time and how economic variables evolve, such as growth trends or market shifts.

G. Science of Scarcity: Economics is fundamentally about managing scarce resources to maximize utility, reflecting its practical and theoretical significance.

Therefore, economics is both a theoretical discipline aimed at understanding human behavior and a practical field that guides decision-making in real-world contexts.

2) Scope of Economics

Economics, as a social science, encompasses a vast spectrum of human activities and societal concerns. It delves into the allocation of scarce resources to satisfy unlimited wants, encompassing everything from individual choices to global economic trends.

The Scope of Economics involves:

a) Microeconomics: The word micro comes from the Greek word mikros, which means "small". As a result, it focuses on the study of small individual units of the economy such as individual consumers, individual firms and small groups of individual units like various industries and

markets. To put it another way, microeconomics is the study of how individual consumers choose which goods and services they want to buy and how they share their limited income among those goods and services to maximise their overall welfare.

Focuses on individual economic agents like consumers, firms, and industries. It examines how they make decisions, interact with each other, and respond to market forces. Topics include:

- Consumer behavior and demand
- Production costs and supply
- Market structures (perfect competition, monopoly, oligopoly, monopolistic competition)
- Price determination and equilibrium
- Welfare economics (efficiency and equity)

b) Macroeconomics: The word macro comes from the Greek word macros, which means “large”. As a result, macroeconomics is concerned with the overall analysis of the economy. It studies the behaviour of the large aggregates such as total employment, the national product or income and the economy's overall price level Examines the overall performance and behavior of an economy. Therefore, it analyzes aggregate economic variables like national income, inflation, unemployment, economic growth, and government policies. This includes:

- Gross Domestic Product (GDP) and national income accounting
- Economic growth and development
- Business cycles and economic fluctuations
- Monetary and fiscal policy
- International trade and finance

c) Development Economics: Studies the economic development of countries, particularly those with low incomes. It explores factors that contribute to economic growth, poverty reduction, and improved living standards. Topics include:

- Economic growth theories
- Poverty and inequality
- Human development
- International aid and development assistance

d) Environmental Economics: It analyzes the economic impact of environmental issues and

seeks to find solutions that balance economic growth with environmental sustainability. Topics include:

- Natural resource economics
- Pollution control and environmental regulation
- Cost-benefit analysis of environmental policies
- Climate change economics

e) Behavioral Economics: Combines insights from psychology and economics to understand how cognitive biases and emotions influence economic decision-making. Topics include:

- Decision-making under uncertainty
- Risk aversion and risk-taking
- Social preferences and fairness
- The role of emotions in economic choices

Beyond these core areas, economics also intersects with other disciplines, such as:

- History: Economic history, historical analysis of economic systems
- Mathematics and Statistics: Econometrics, quantitative analysis of economic data
- Political Science: Economic policymaking, public finance, political economy
- Sociology: Economic inequality, social welfare, labor economics

The scope of economics is constantly evolving as new challenges and opportunities arise. Economists play a crucial role in analyzing economic problems, formulating policies, and advising policymakers to promote economic well-being and sustainable development.

Check Your Progress- I

Q.1 Define Robbin's definition of economics. How is it superior to Marshall's definition?

Ans:_____

Q2. Define Micro Economics.

Ans:_____

1.4 Basic Economic Concepts of Economics

- **Scarcity:** The existence of an economy is based on two fundamental facts. To begin with, human wants for goods and services are unlimited; nevertheless, resources to produce goods and services are scarce. As a result, the first economic lesson is scarcity. We can't satisfy all of our wants and desires by producing what we want because our wants are unlimited and resources are scarce. It means that one must decide how to utilize scarce resources in order to get maximize satisfaction.
- **Choice:** Because it is impossible to satisfy all the desires with limited resources, each society must decide a method for determining which desire is to be satisfied. The necessity for economising arises because we have limited productive resources at our disposal, such as land, raw materials, skilled labour, capital equipment, and so on. Because these resources are in limited supply, the goods they may produce are also limited. As a result, goods are scarce due to a scarcity of productive resources. We should make the most of what we have because our resources are limited in comparison to our desires.

In economics, it is thought that man is rational in his decision-making; that is, if a man has to pick between two options, he will always pick the one that will provide the greatest satisfaction as compared to other available choices. Similarly, if a firm had to choose between producing one product or another, it would choose the product with the highest profit margin. The scale of choice displays a list of desires ranked from most urgent to least urgent, with the most urgent want listed first, followed by the second most urgent and so on.

The problem of choice that results from unlimited wants on the one side and limited resources on the other. The study of economics teaches us how to use and allocate limited resources to obtain maximum possible satisfaction for the people.

There are many types of resources that assist us in producing goods and services. They are called factors of production. Economists divide factors of production into four categories.

- **Land**: It refers to all natural resources that are a free gift from nature. It includes not only agricultural soil, but also other natural resources like minerals, water, climate and forests.
- **Labour:** Both physical and mental skills that individuals can make available to produce goods and services are referred to as labour.
- **Capital:** It refers to man-made resources of production. This includes machinery, factory-

buildings, various tools and devices, roads, dams, transport buses and trucks etc.These are often referred to as capital goods because they help in the production of additional goods and services.

- **Entrepreneurship:** Entrepreneurship denotes a unique human capital that possesses entrepreneurial potential. In a free market economy, entrepreneurs play an important role. By combining other tools such as labour, land and capital, he initiates and organises the production process. Entrepreneurs make a variety of corporate policy decisions and are exposed to the risk of failure as a result of their actions.

1.5 Basic Economic Problems of an Economy

As mentioned in the previous pages, a lack of resources in relation to human wants leads to various basic problems, concerns and questions that an economy must address if it is to achieve its goals. The basic economic problems are also called central problems of the economy. Many of these issues include societal decision-making. As a result, economic theory must respond to five basic questions. These are explained as follow:

a) The Problem of Allocation of Resources

The first and foremost basic problem confronting an economy is “what to produce" so as to satisfy the wants of the people. The problem of what goods are to be produced and in what quantities arises directly from the scarcity of resources. If the resources were unlimited, the problem of what goods are to be produced would not have arisen because in that case we should have been able to produce all goods we wanted and also in the desired quantities. But because resources are in fact scarce relative to human wants, an economy must choose among various goods and services. If the society decides to produce a particular good in a larger quantity, it will then have to withdraw some resources from the production of other goods and devote them to the production of the goods which are to be produced more.

b) Choice of a Production Method

It is related to the question ‘how to produce’ which means what technique or method will be used by society to produce goods. Here the problem is how to determine optimum combination of inputs i.e., labour and capital- so that production of goods and services is maximised. This problem too arises due to the scarcity of resources. Any quantity of labour and capital could be combined to produce a product if inputs (labour and capital) were available in unlimited amounts. Resources,

on the other hand, are not available in unlimited quantities. As a result, selecting a technology that makes the most efficient use of resources becomes a necessity.

c) The Problem of Distribution of National Product

This problem is related to the sharing of the national product. It means among the members of the society how the national product is to be distributed. Since the productive resources and the output obtained through these resources are scarce, we are unable to satisfy all the wants of all the people of a society. As a result, it should be decided by the society who should obtain how much from the total production of goods and services. Who gets how much of the national production in a free-market economy is determined by the people's money income? The higher a person's money income, the more items he or she would be able to purchase from the market. As a result, people with higher incomes receive a larger share of the economy's production than those with lower incomes. More will be the equal distribution of income higher will be the possibility of equal distribution of national product.

It is important to keep in mind that an individual can earn money income in two ways. Firstly, it can be obtained by work, i.e., by selling its labour services. Income received through wages and salaries included under this. Secondly, property such as land, factories and other sources of capital can also make money income. Rent, interest and profits are all examples of income from property. In a free market economy, variations in ownership of property lead to differences in income from property.

d) The Problem of Economic Efficiency

This is related to the problem of efficiency or welfare maximisation. Since the resources of an economy are limited, there will be no wastage of these resources. Now, the question which emerged is whether the production and distribution decisions made by an economy are efficient. If the productive resources are utilised in such a way that there will be no sacrifice of one good for producing more of another good, then we can say that production is efficient. For this, we have to do the cost benefit analysis when we are making any change. Thus, when there is a shifting of resources from one use to another use will take place in an economy then it will also involve some cost. If the involvement of cost is more than the benefits received from it then it is not worthwhile to shift the resources. Since resources are limited, it is preferable to use them as effectively as possible.

e) The Problem of Economic Growth

If all the scarce resources of an economy are used for current consumption (for producing consumer goods) only then there will be no provision of resources for capital goods, therefore, the productive capacity of the economy will not increase in future. As a result, the living standard or income of the people will remain stagnant. To encourage economic growth, a part of resources should be allocated to the production of capital goods and for promotion of research and development activities that will bring technical advancement. The provision for capital accumulation and technological advancement, on the other hand, implies some sacrifice of current consumption. As a result, a society must decide how much saving and investment it can make for future economic progress.

From above, it is clear that when an economy's productive capacity is increasing, increasingly more goods and services will be produced, resulting in an increase in people's living standards.

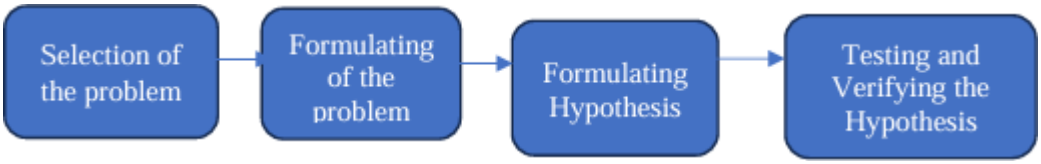
Thus, we can say that it is only the scarcity of economic resources that lurks behind all of the above fundamental questions. These five questions are merely a breakdown of the basic economizing problem of scarce resources and unlimited wants. Also, the interrelation of these questions is apparent, so they demand simultaneous treatment and we cannot treat them independently.

1.6 Methodology of Economics

Our findings must be logical, accurate and reliable based on appropriate methods of analysis to develop economics as an objective and impartial subject of research. We will discuss two methods in this section, namely the Deductive and Inductive methods.

1.6.1 Deductive Method

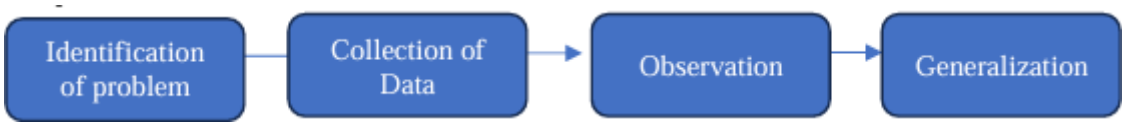
This approach was primarily used by classical economists. It is also known as a priori, hypothetical or an abstract approach of economic analysis. It is a method of reaching conclusions based on specified general axioms. In this method, we can derive conclusions from a collection of facts by applying logic, which establishes the relationship between causes and effects of a specific action. To be precise, deduction can be described as reasoning from general premises to specific conclusions. Premises are those statements which are assumed to be true and applicable to a particular issue. It is generally believed that right decisions will result from proper reasoning.



1.6.2 Inductive Method

The method of reasoning from a part to the whole, from particulars to generals, or from the entity to the universal is known as induction. It's "an ascending operation," according to Bacon, in which facts are gathered, sorted, and then general conclusions are drawn.

In economics, the inductive approach was used by the German Historical School, which aimed to improve economics entirely through historical study. The historical or inductive approach assumes that the economist is essentially an economic historian who must first collect data, draw generalisations and then test the conclusions by using them to subsequent events. It means, we are using statistical methods to find out the actual solution to any economic issue. Since we draw the conclusions only after considering the changing circumstances in detail from all angles, this approach is called concrete, logical and functional.



it can be said that these two methods are not contradictory to each however, to get appropriate results these two can be used as supplementary to each other. Economists use these methods singly or in combination when analysing problems, depending on the type of the problem to be analysed. As a result, inductive and deductive methods are equally important for economic analysis. Thus, a combination of both the methods will lead to true progress in economic enquiries.

Check Your Progress-II

Q.1 Scarcity is the mother of all economic problems. Discuss it.

Ans:_____

_____

Q.1 Distinguish between Deductive and Inductive methods.

Ans:_____

1.7 Economic Models

A model is a simplistic version of a theory. In other words, a model is a part of theory that represents a cause and effect relationship in a specific economic phenomenon. Words, diagrams, and mathematical equations are often used to express these concepts. The terms model and theory are often used interchangeably since both are designed to describe the relationship between variables. It is formal statement of a theory, commonly represented as a series of equations or graphs. When economic models merely define a general relationship between variables without specifying the exact relationship, they are said to be "general." A general model of demand, for example, is one that states that as the price of a good increase, the quantity demanded decreases. Quantitative models are those that explain a quantitative relationship between variables. Models are created by economists to analyse and forecast economic events. Economists have developed mathematical methods to analyse and forecast the behaviour of an individual consumer, producer or the economy as a whole. A model is made up of several assumptions that are used to draw conclusions or consequences.

There are two points to keep in mind about the analytical economic model. Firstly, a model should always abstract from reality. Secondly, an empirical economic model is made up of a collection of equations or graphs that depict the cause-and-effect relationship. There are two important attributes of the economic model.

a) Assumption of Model

b) Number of Equations and Graph

a) Assumptions of a Model

An economic model is often dependent on certain assumptions that do not accurately represent real-world economic conditions. While the assumptions used to construct a model must be related to the type of situation being analysed and explained, they do not have to be an exact replica of the real-world situation. Only the most important aspects of the modern economic world are represented in a model.

We should avoid oversimplifying so that the model we build does not provide a skewed representation of the real-world phenomena. As a result, economic models should be built in such

a manner that only irrelevant and insignificant considerations and factors are ignored

b) Equations or Graphs and Economic Models

An economic model is usually made of a series of equations or graphs that express the relationship between variables related to the problem under investigation. Each equation tries to explain the behaviour of a single variable, attempting to create a cause and effect relationship for that variable. Economic models are created for the purpose of analysis and prediction. Analysis implies how adequately we can explain the behaviour of an economic unit, consumers or producers. A model's usefulness may be determined by its explanatory or predictive power, the realism of its assumptions or the scope of its applicability. The critical characteristics of a valid and satisfactory model, according to Paul Samuelson, are realism of assumptions and analytical power of the model to describe the behaviour of economic agents, consumers or producers.

It should be remembered that economists generally believe that the most important attribute of a model is its purpose, that is, whether the model maker wishes to use it to forecast the effect of a change in a variable or to analyse and describe the particular behaviour of an economic agent.

Check Your Progress-III

Q1. What are economic models? Why do economists build economic models?

Ans:_____

_____

Q2. Write a note on the importance of assumptions in economic analysis?

Ans:_____

_____

1.8 Theory of Demand

The theory of demand explores the relationship between the quantity of a good or service that consumers are willing and able to purchase and its price. It's a fundamental concept in economics that helps us understand market dynamics and consumer behavior.

Meaning of Demand

The demand for a good is the amount of it that a consumer can purchase at various given prices during a period of time. In economics, demand plays a vital role. Consumers' demand for goods and services is the driving force behind all economic activities. Producers tend to invest

in production lines where demand for the output is not only high but also consistent so that they will make more profit.

According to Ferguson, "Demand refers to the quantities of a commodity that the consumers are able and willing to buy at each possible price during a given period of time, other things being equal." In the context of Utility and Demand, goods are in demand because they satisfy people's wants. The amount of satisfaction derived by an individual from consuming a good is referred to as utility. It means the want-satisfying power of a commodity is called utility. The utility of a good is an essential determinant of a consumer's demand for it. A person's desire for a commodity is determined by the utility he intends to derive from it. Therefore, greater the expected utility derived from a commodity, greater the desire for it. Alcohol and cigarettes, for example, can be harmful to people, but they serve a purpose for those whose wants they satisfy.

Next, it is important to distinguish between the demand for a commodity and the quantity demanded. Demand refers to the quantities of a commodity that consumers plan to purchase at different prices of a commodity during a period of time whereas quantity demanded refers to the amount of a good or service that consumers plan to buy at a specific price. It should be carefully noted here that quantity demanded is not always the amount actually purchased by consumers. The quantity demanded is often greater than the quantity of the goods available, as a result, the quantity of the good actually purchased is less than the quantity demanded of it.

1.9 Demand Function

The demand function for a commodity describes the relationship between the quantity demanded of that commodity and the factors that affect it. Individual demand for a commodity is determined by its price, his income, the prices of related goods, his tastes and preferences and the amount of advertising expenditure made by the producer on that commodity. Thus, individual demand function for a commodity can be expressed as:

$Q_d = f(P_X, Y, P_r, T, A)$

Here, P_X= Own price of the commodity X, Y = Income of the consumer, P_r= Prices of related commodities, T = Tastes and preferences of the individual consumer, A= Advertising expenditure made by the producers on that commodity.

For several purposes in economics, it is useful to concentrate on the relationship between the quantity demanded of a commodity and its own price while keeping other factors such as the

consumer's income, the prices of other commodities and his tastes and preferences. With this, we can write an individual's demand function as follows.

$Q_d = f(P_x)$

This means that the quantity demanded for a good X is a function of its own price, when all other determinants are held constant. Therefore, there is an inverse relationship between price and quantity demanded of a commodity.

1.9.1 Demand Schedule

A demand schedule shows the various amounts of a good that a buyer is willing to purchase at various possible prices of that good at a given time. It can be studied as:

Individual Demand Schedule Market Demand Schedule

A. Individual Demand Schedule: An individual demand schedule is a table that shows the quantities of a given commodity that an individual consumer can purchase at all possible prices at a given time. The demand schedule of an individual consumer can be explained with the help of a table.

It will be seen from this demand schedule that as the price of a commodity rises, its quantity demanded will decline. When the price of a commodity is Rs. 10, the consumer purchases 50 units of the commodity and when price goes up to Rs. 50, the consumer has reduced the quantity demanded of the product i.e., 10 units.

Table 1 Individual Demand Schedule

Price (Rs.)	Quantity Demanded (Units)
10	50
20	40
30	30
40	20
50	10

B. Market Demand Schedule: For the determination of price of a commodity the information related to the size of total market demand for the commodity is very essential. Besides the factors which are affecting an individual's demand (price of a product, his income, prices of related commodities, and individual's taste and preferences), market demand for a commodity depends on an additional factor i.e., the number of consumers. However, the number

of consumers depends on the population of a region or city who consume that commodity. Thus, in every market there are a number of consumers of a commodity. The schedule which shows the quantity demanded by all the consumers of a commodity collectively at its different prices is called market demand schedule. Market demand schedule defined by Liebhafsky as, “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."

The market demand schedule of oranges can be shown with the help of a table 2. It describes that the market demand can be obtained by adding together the amounts of the commodity which individual consumers wish to buy at each price. Suppose, there are three consumers of a commodity in the market. Thus, at price Rs.5, individual A wishes to buy 100 units; individual B wishes to buy 75 units; individual C wishes to buy 25 units of the oranges. The total quantity of the oranges that the three individuals plan to buy at price Rs. 5 is therefore 100 + 75+25 = 200. Now as the price decreased to Rs. 1, individual A wishes to buy 800 units; individual B wishes to buy 450 units; and individual C wishes to buy 250 units of the oranges. Thus, the total quantity of the oranges that the three individuals plan to buy at price Rs. 1 is therefore 800+450+250 =1500. Thus, market demand of a commodity is the total demand of all the individuals towards a particular commodity.

Table 2 Market Demand Schedule of Oranges

Price(Rs.)	Demand of A	Demand of B	Demand of C	Market Demand (Units) A+B+C
5	100	75	25	200
4	200	150	50	400
3	400	200	100	700
2	550	300	150	1,000
1	800	450	250	1,500

1.9.2 Demand Curve

A demand curve is a graph that shows the relationship between various quantities demanded at various possible prices for a commodity. According to Leftwitch, "The demand curve represents the maximum quantities per unit of time that consumers will take at various prices". Like

demand schedule, demand curve also has two aspects: Individual Demand Curve and Market Demand Curve

A. Individual Demand Curve: An individual demand curve shows various quantities of a good demanded by an individual consumer at different prices. The individual demand schedule can be shown with the help of a figure. In figure 1, on X-axis quantity demanded and on Y-axis, the price has been shown. DD is the demand curve.

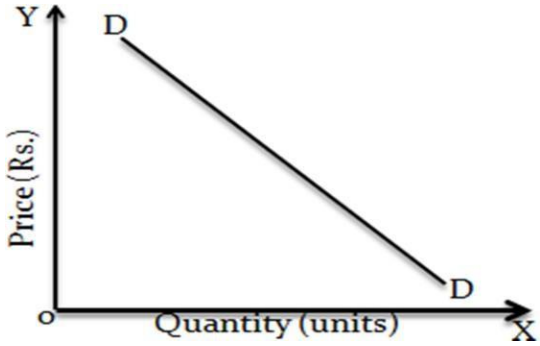


Figure 1

Each point on this demand curve shows the relationship between price and demand. The slope of the demand curve is downward sloping from left to right, which shows an inverse relationship between price and quantity demanded of the commodity.

B. Market Demand Curve: Market demand curve for the good can be obtained by joining all the points showing the amounts demanded of the good by all the individuals at various prices. If we assume that there are three individuals in the market for a good. Then the market demand curve can be a horizontal summation of demand curves of these three consumers. The market demand curve also slopes downward to the right. It is worth noting that when the price of a commodity falls, new consumers are more likely to join the market and will further increase the quantity demanded of the commodity.

The market demand curve can be shown with the help of a figure. In Fig. 2, quantity demanded of oranges has been shown on X-axis and price on Y-axis. Since the market demand curve is the horizontal summation of individual demand curves, italso slopes downwards.

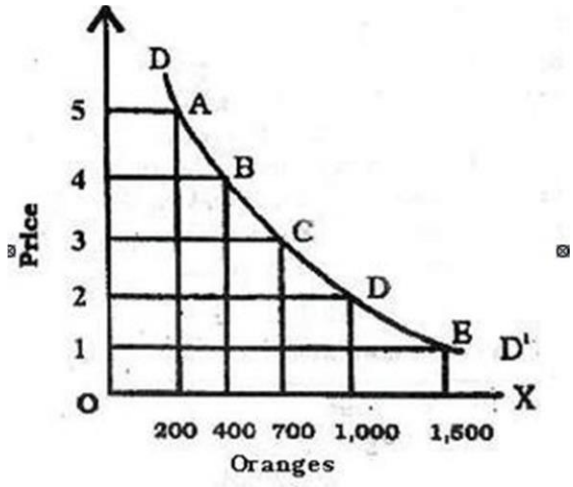


Figure 2

Check Your Progress-IV

Q.1 What is the meaning of term demand in economic? How it is different from desire and quantity demanded of a commodity?

Ans:_____

_____

Q2. Define Demand Function.

Ans:_____

_____

1.10 The Law of Demand

The law of demand is the most important law of economics theory which provides important information about demand. The functional relationship between price and quantity demanded is expressed by this law of demand. According to the law of demand, other things being equal, if the price of a good falls, the quantity demanded of it will increase, and if the price of the commodity increases, its quantity demanded will decrease. As a result, the law of demand states that there is an inverse relationship between price and quantity demanded, all other things being equal. Other things that are assumed to be constant are the income of the consumer, tastes and preferences of the consumer and the prices of related goods. If any change occurred in above mentioned factors, then the inverse relationship between price and quantity demand may

not hold good. The following demand function can be used to illustrate the law of demand:

$D_X=f(P_X, P_r, Y, T, E)$

Here, D_X= Demand for commodity-X, P_X= Own price of commodity-X, P = Price of related commodities, Y= Income of the consumer,

T =Tastes and preferences of the consumers and E = Expectation of the consumer.

According to Prof. Samuelson, "Law of demand states that people will buy more at lower prices and buy less at higher prices, ceteris paribus, or other things remaining the same. "According to Prof. Marshall, "The law of demand states that the amount demanded increases with a fall in price and diminishes when price increases, other things being equal."

1.10.1 Assumptions of Law of Demand

Law of demand holds good when "other things remain the same". It means factors influencing demand, other than the own price of the commodity are assumed to be constant.

No change in the price of related goods.

No change in the income of the consumer.

No change in the tastes and preferences of consumers.

The consumer does not expect any change in the price of the commodity in the near future.

According to the law of demand, there is an inverse relationship between a commodity's own price and its demand; however, this relationship is not proportional. It is important to note here that the law of demand

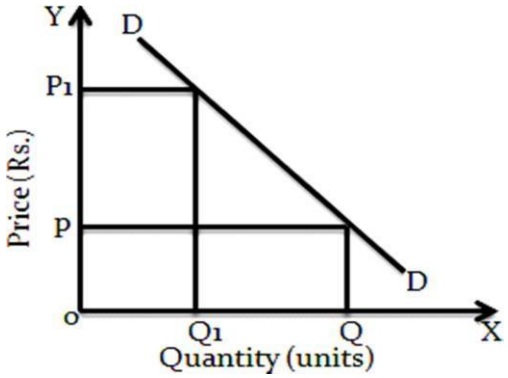


Figure 3

indicates only the direction of change in demand as a result of change in its own price. Inverse relationship between price and demand can be seen in the figure no. 3.

It is evident from the figure that on X-axis quantity demanded and on Y-axis price of the commodity has been taken. DD is the demand curve, which shows that there is an inverse relationship between price and demand. When the price of the commodity is OP, quantity demanded of the commodity is OQ. Now, as the price increased to OP1, quantity demanded has reduced to OQ1.

1.10.2 Why Does Demand Curve Slope Downward

The downward slope of the demand curve reflects the inverse relationship between price and quantity demanded. This means that as the price of a good decreases, the quantity demanded for those good increases, and vice versa.

Here are the key factors contributing to the downward slope:

1. **Law of Diminishing Marginal Utility**: As consumers consume more units of a good, the additional satisfaction (marginal utility) they derive from each additional unit tends to decrease. To maintain a certain level of satisfaction, consumers are willing to pay less for additional units.
2. **Substitution Effect:** When the price of a good falls, it becomes relatively cheaper compared to its substitutes. Consumers may switch from more expensive substitutes to the now cheaper good, increasing its demand.
3. **Income Effect:** A decrease in price effectively increases consumers' purchasing power. With more disposable income, consumers can afford to buy more of the good, leading to an increase in demand.
4. **New Buyers:** A lower price may attract new consumers who were previously unable to afford the good. This influx of new buyers contributes to an increase in overall demand.

While the downward-sloping demand curve is generally observed, there are a few exceptions, such as Giffen goods and Veblen goods. However, these exceptions are relatively rare

1.10.3 Exceptions to the Law of Demand

It is generally believed that the law of demand is valid in most circumstances. The law of demand does, however, have several exceptions. It means that the market for certain goods grows when the price rises and contracts when the price falls. In the case of such goods, the demand curve slopes upwards from left to right.

1) **Future expectations:** When people expect that the price of a good will increase in the

future, they will buy more of it, even at a higher price, in order to avoid a future price increase. This type of situation can be seen during wartime, particularly in case of basic necessities.

2) **Veblen Goods:** These are luxury goods that people buy to show off their wealth. As the price of a Veblen good increases, its demand also increases because it becomes a status symbol.

   For example, Designer handbags, luxury cars.

3) **Giffen goods:** These are inferior goods that people buy more of when their price rises. When the price of an inferior good rises, consumers switch to a superior substitute. However, for Giffen goods, the income effect outweighs the substitution effect.

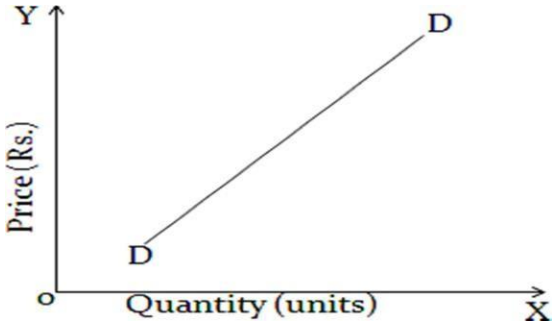
   For example, Low-quality staple foods like potatoes. If the price of potatoes rises significantly, consumers may reduce their consumption of other, more expensive foods and buy more potatoes instead.

4) **Necessities:** For essential goods like food, medicine, and housing, demand may remain relatively stable, even if prices increase. Consumers may be willing to pay higher prices to maintain their basic needs.

5) **Ignorance or Misinformation:** If consumers are unaware of a price increase or are misinformed about the quality of a product, they may continue to buy it at a higher price.

6) **Fashion:** When something goes out of fashion, demand for it does not increase, even though the price decreases. In the opposite case, as a product's popularity grows, people will buy more of it, even though its price rises as in figure 4. The rule of demand is broken in each of these situations.

Figure 4



However, these exceptions do not invalidate the law of demand, which applies to the number of goods sold in the market. Though certain individuals do not behave in accordance with this law in some circumstances, it is noteworthy here that the law of demand operates in general.

1.11 Factors Determining Demand

Although stating the law of demand, we now come to the 'other things' that are assumed to remain constant. As a result, it is not necessary that only price will bring change in demand for a commodity. Changes in other factors, as discussed below, may have the same effect:

1. **Price of a Commodity:** The price of the commodity is the most important factor influencing the quantity demanded of that commodity. Normally, a rise in price is followed by a decrease in demand, and a decrease in price is followed by an increase in demand. The law of demand describes the functional relationship between price and demand.
2. **Change in Income:** This shift has a significant impact on demand because when a consumer's income rises, so does his willingness to pay and he can buy more goods than before. Changes in the distribution of income in favour of the poorer sections of the society increase their purchasing power, and their demand for commodities in general, and for necessities of life in particular, is bound to rise as a result.
3. **Change in Tastes and Fashion:** Demand is also affected by changes in tastes and fashions. The growing popularity of cotton clothing has decreased demand for synthetics. Tea's popularity has dwindled as coffee has grown in popularity.
4. **Change in Size and Composition of Population:** Increases in a country's population have a significant impact on demand because the greater the amount of mouths to feed, the greater the quantity of a commodity required. Not only the size of demand, but also the composition of demand, is influenced by the population's age structure.
5. **Prices of Substitutes:** A commodity's demand is often influenced by the availability and price of substitutes. People would use a substitute for a good that is available at a lower price if the price of the former rises. This would decrease demand for the former commodity while increasing demand for the substitute. For instance, people will start drinking coffee if the price of tea increases the demand for coffee. A decrease in the price of tea, on the other hand, may reduce coffee demand.
6. **Technical Progress:** Technical advancement allows for the production of a wider range of products, which reduces the demand for out-of-date products. The invention of television, for example, lowered the demand for radios.
7. **Expectation about Future Price:** If there is a general feeling among people that prices in

future will go up, there will be a greater demand for goods and everyone will buy more than his normal requirement. If prices in future are expected to go down, people will try to postpone their purchases and wait for the fall in prices. This will reduce the present demand for goods to a considerable extent.

8. **Change in Season:** The demand for some goods can fluctuate as the season changes. In the winter, for example, demand for woolen clothes increases. Similarly, during the summer, cold beverages are in high demand.

Check Your Progress -V

Q1. Why the demand curve is downward sloping?

Ans_____

_____

Q2. What are the factors which are determining the demand for a commodity?

Ans_____

_____

1.12 Movement along a Demand Curve and Shifts in Demand Curve

Movement along a Demand Curve Extension and contraction in demand of a commodity is caused by change in its own price

(i) Extension of Demand: The term "extension of demand" refers to an increase in quantity demanded as a result of a decrease in the commodity's own price when all other factors remain constant. Extension in demand can be explained with the help of a figure no 5. It is evident from the figure that when price is OP1 demand is OQ_1. Now a decline in price from OP_1 to OP will lead to an increase in quantity demanded from OQ_1 to OQ. This is called extension in demand.

(ii) Contraction of Demand: Contraction of demand refers to a decrease in quantity demanded as a result of an increase in the commodity's own price when all other factors remain constant. In figure 5, when price is OP, quantity demanded of the commodity is OQ. Now there is an increase in price from OP to OP_1, as a result, quantity demanded of the commodity will decrease from OQ to OQ_1. This is known as contraction in demand.

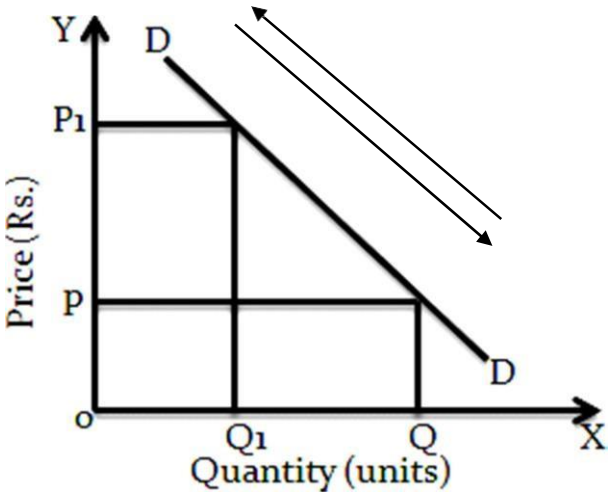


Figure 5

As we studied that demand of a commodity depends upon its price and some other factors like prices of related commodities, consumer's income and their tastes and preferences etc. When demand increases due to fall in price or decreases due to rise in price, this is called extension and contraction of demand respectively. There is a shift in the entire demand curve as demand changes due to factors other than price.

B. Shifts in Demand Curve

(i) Increase in Demand: The demand for a commodity is influenced by the consumers' incomes, as well as their tastes and preferences for the commodity. As a result, any change in these variables would result in a shift in the demand curve. For illustration, if consumers' incomes rise as a result of increase in wages and salaries, they would demand more of a good at each price. A rise in demand means that more of a good is being demanded at the same price, or the same quantity of the good is being demanded at a higher price. We are now on a new demand curve that is to the right of the old demand curve.

Causes of Increase in Demand

Following are the reasons for the same:

a. When the income of the consumer increases.

b. When the price of substitute goods rises.

c. When the price of the complementary goods decreases.

d. When tastes and preferences of the consumers shift in favor of the commodity.

e. Expectation of rise in price in the near future.

f. Increase in population.

(ii) Decrease in Demand: If the factors influencing demand change in a negative way, demand will fall, causing a shift in the demand curve to the left. For instance, if consumers' income declines as a result of increase in taxes, they would demand less of a commodity. A reduction in demand means that less units of a good are demanded at the same price, while more units are demanded at a lower price. We're on a new demand curve that's to the left of the old demand curve.

Causes of Decrease in Demand

Due to the following reasons the demand decreases or demand curve shifts backward

a. When the income of the consumer declines.

b. When the price of the substitute goods decreases.

c. When the price of complementary goods rises.

d. When tastes and preferences of the consumers shift against the commodity. It may be due to change in fashion or change in climate.

e. Expectation of fall in price in the near future.

f. Decrease in population.

Increase in demand and decrease in demand can be shown with the help of a figure 6. It will be seen from the figure 6 that at price OP, OQ quantity of a good is demanded. Curve D1D1 indicates an increase in demand because at the same price quantity demanded has increased from OQ to OQ1. Curve D2D2 indicates decrease in demand because at the same price quantity demanded of the commodity has decreased from OQ to OQ2.

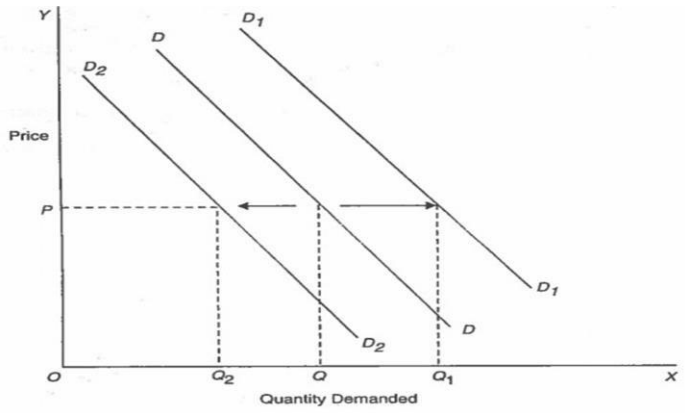


Figure 6

1.13 Elasticity of Demand

In the preceding pages, we have studied that when the price of a good falls, the quantity demanded rises and when the price rises, the quantity demanded decreases. This is referred to as the law of demand. Only the direction of change in quantity demanded of a product in response to a change in its price is indicated by this law of demand. Therefore, this law does not tell us by 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.

J.S. Mill and Cournot were the early economists who referred to elasticity of demand in economics. But this concept was developed by Dr. Marshall in his famous book "Principles of Economics". Elasticity of demand refers to the degree of responsiveness of quantity demanded of a commodity to a change in its price. There are three concepts of elasticity of demand: price elasticity, cross elasticity and income elasticity. The degree of responsiveness of the quantity demanded of a commodity to a change in its price is referred to as price elasticity of demand. The degree of responsiveness of a good's demand to a shift in the price of a related good, which may be a replacement or complementary to it, is referred to as cross elasticity of demand. The sensitivity of quantity demanded of a commodity to a shift in consumers' income is referred to as income elasticity of demand.

1.13.1 Types of Elasticity

There are three concepts of elasticity i.e., income elasticity, cross elasticity and price elasticity.

1. Income Elasticity of Demand

When all other factors remain constant, such as the price of the given commodity, the prices of related goods and the consumer's taste etc. the percentage change in the quantity demanded of a thing caused by a given percentage change in the consumer's income is referred to as 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 can be measured by the following formula:

(% Change in Quantity Demanded) / (% Change in Income)

This formula measures the responsiveness of the quantity demanded of a good or service to a change in consumer income.

Interpretation:

- **YED > 0:** The good is a **normal good**. As income increases, demand for the good also increases.
- **YED > 1:** The good is a **luxury good**. A relatively small increase in income leads to a large increase in demand.
- **0 < YED < 1:** The good is a **necessity good**. An increase in income leads to a proportionally smaller increase in demand.

Income elasticity varies in accordance with the nature of commodities. The income elasticity is positive for all normal goods, because with increase in income of the consumer, his demand for normal goods will increase. On the other hand, income elasticity is negative for inferior goods or Giffen goods. In the case of inferior goods, when income of the consumer will increase then quantity demanded of these goods will decline and when income of the consumer will decrease then quantity demanded of these goods will increase.

2. Cross Elasticity of Demand

Changes in price and quantity demanded of two related goods have a mutual relationship. Therefore, when the price of one good change the demand for the related good will also change. For instance, tea and coffee are two related goods. Thus, when the price of tea changes the demand for coffee will also change.

In simple words, cross elasticity of demand is a measure of change in quantity demanded of good-Y, as a result of change in the price of good-X. According to Ferguson, "The cross elasticity of demand is the proportional change in the quantity of good-X demanded resulting from a given relative change in the price of the related good-Y."

It can be measured as:

= (% Change in Quantity Demanded of X) / (% Change in Price of Y)

This formula measures the responsiveness of the quantity demanded of one good (X) to a change in the price of another good (Y).

Interpretation:

- **XED > 0:** The two goods are **substitutes**. An increase in the price of good Y leads to an increase in the demand for good X.

- **XED < 0:** The two goods are **complements**. An increase in the price of good Y leads to a decrease in the demand for good X.
- **XED = 0:** The two goods are **independent**. A change in the price of good Y has no effect on the demand for good X.

Understanding cross-price elasticity helps businesses identify potential substitutes and complements for their products and make informed decisions about pricing and product strategies.

It is important to note here that when two goods are substitutes for each other, cross-elasticity of demand among them is positive like tea and coffee. Because increase in the price of tea, increases the demand for coffee. However, the cross-elasticity of demand for complementary goods like bread and butter is negative, because increase in the price of one decreases the demand of another.

3. Price Elasticity of Demand

Price elasticity of demand indicates the degree of responsiveness of quantity demanded of a commodity to the change in its price, other factors such as consumers' income, prices of related commodities that determine demand are held constant. It is defined as the ratio of the percentage change in quantity demanded of a commodity to a given percentage change in price. It is expressed by minus (-) sign like:

= (% Change in Quantity Demanded) / (% Change in Price)

This formula measures the responsiveness of the quantity demanded of a good or service to a change in its price.

- **If PED > 1**, demand is considered **elastic**. This means that a small change in price leads to a relatively large change in quantity demanded.
- **If PED < 1**, demand is considered **inelastic**. This means that a change in price has a relatively small effect on the quantity demanded.
- **If PED = 1**, demand is considered **unit elastic**. This means that a change in price leads to an equal proportional change in quantity demanded.

It is important to mention here that fall in price is indicated by minus (-) sign and due to multiplication, the negative signs turned to be positive.

According to Prof. Marshall, "Elasticity of demand may be defined as the percentage change in the quantity demanded divided by the percentage change in the price."

1.13.2 Degrees of Price Elasticity of Demand

When it comes to the change in quantity demanded as a result of change in price, goods differ. In certain cases, this response is insignificant, while in others, it is considerable. As a result, demand elasticity ranges from 0 to infinity. However, the five most well-known categories are mentioned below.

1. Perfectly Elastic Demand Curve: The demand for a commodity is said to be perfectly elastic, if at the same price, buyers can purchase as much as they can, while at a slightly higher price, they will buy none at all. It means demand is infinite at the prevailing price. The demand curve in this case is parallel to the X-axis as shown in figure.7

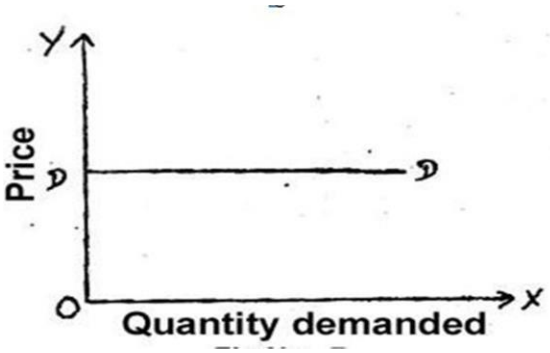


Figure 7

2. Perfectly Inelastic Demand: The quantity demanded is said to be perfectly inelastic when a significant increase or decrease in price is not accompanied by any change in the quantity demanded. The demand for insulin by the diabetic patient is the perfect example of perfectly inelastic demand. As shown in fig. no. 8, the demand curve in this case is a vertical straight line parallel to the Y-axis. Elasticity of demand in this case is zero.

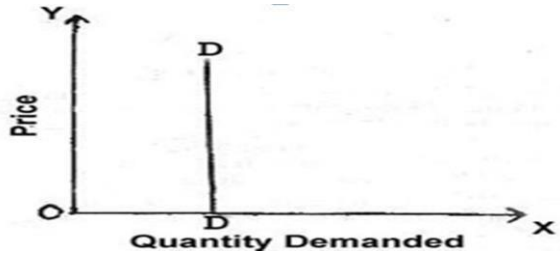


Figure 8

3. Unitary Elastic Demand: The elasticity of demand is said to be equal to unity when the percentage change in quantity demanded equals the percentage change in price. The elasticity of demand is equal to unity if the price of a good doubles and the quantity demanded is reduced to half of what it was previously demanded. Elasticity of demand in this case is one. This is depicted in figure 9.

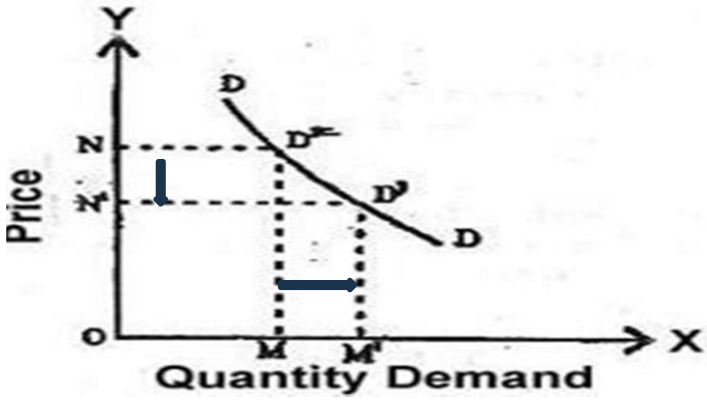


Figure 9

4. Greater than Unitary Elastic Demand: The elasticity of demand is greater than one when the percentage change in quantity demanded is greater than the percentage change in price. It is important to note that when change in quantity demanded is more in response to change in own price of the commodity then total expenditure on the commodity increases and vice-versa. For example, in the case of color televisions and air conditioners a significant increase in demand has been seen in response to a modest price reduction. This is depicted in figure 10.

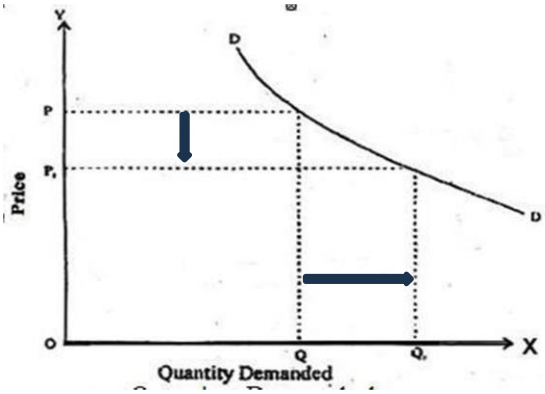


Figure 10

5. Less than Unitary Elastic Demand: The elasticity of demand is less than unity when the

percentage change in quantity demanded is less than the percentage change in price. This case is prevalent in the majority of necessities of life, such as salt, wheat, rice and sugar. In this case total expenditure on the commodity decreases when price falls and increases when price increases. This is depicted in figure 11.

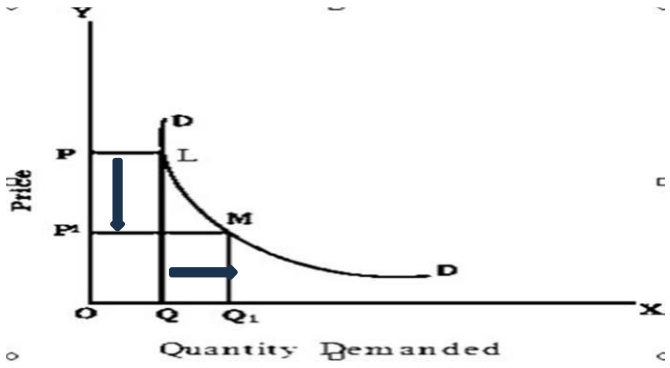


Figure 11

Check Your Progress -VI

Q1. Explain in detail the increase in demand and decrease in demand.

Ans_____

_____

Q2. What is meant by price elasticity of demand? What are different degrees of elasticity of demand?

Ans_____

_____

1.13.3 Measurement of Price Elasticity of Demand

Elasticity of demand can be measured in various ways.

1. Total Outlay or Total Expenditure Method

The Total Expenditure Method, also known as the Total Outlay Method, is a straightforward approach to determining the price elasticity of demand. It focuses on the relationship between price changes and total expenditure on a product.

Total Expenditure: This is calculated by multiplying the price of a good by the quantity demanded.

Price Change and Total Expenditure relationship is as:

The relationship between price elasticity and total expenditure can also be explained with the help

of the following table.

- Price Elastic Demand (PED > 1): When the price of a good decreases, the total expenditure on those good increases. Conversely, when the price increases, total expenditure decreases.
- Inelastic Demand (PED < 1): When the price of a good decreases, total expenditure decreases. When the price increases, total expenditure increases.
- Unit Elastic Demand (PED = 1): Total expenditure remains constant regardless of price changes.

Table 3 Relationship between Price Elasticity and Total Expenditure

Price Change	**sticity greater than one (Ed >1)**	**asticity less than one (Ed < 1)**	**asticity equal to one (Ed =1)**
Price falls	TE increases	TE decreases	No change in TE
Price rises	TE decreases	TE increases	No change in TE

We can understand the above mentioned relationship with the help of the following figure. Consider Figure. 12. In this, total outlay is shown on X-axis and price on Y-axis. At OP price, the total outlay is PM, when price falls from OP to OP^1 the total outlay increases from PM to P_1M_1, and elasticity of demand is more than unity. When the price decreases from OP^1 and OP^2 total outlay is P^2M^2 which is the same as P^1M^1. Therefore, elasticity of demand is equal to unity. Similarly, when the price of a commodity decreases from OP^2 to OP^3 total outlay decreases from P^2M^2 to P_3M_3. In this case, the elasticity of demand is less than unity.

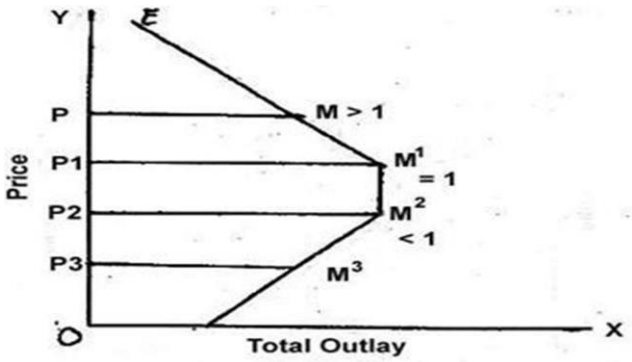


Figure 12

2. **Percentage Method**

This is the second method for calculating elasticity. According to this method elasticity of demand

is calculated as the proportional change in quantity demanded divided by the proportional change in price. According to Prof. Marshall, if a given percentage fall or rise in

price results in an equal percentage rise or fall in the quantity demanded, the elasticity of demand is equal to unity or in other words, if 5% falls or rise in price results to 5 % rise or fall in the quantity demanded, elasticity of demand is equal to unity. As a result, elasticity is defined as the proportion of a change in quantity demanded to a change in price paid.

ed = Percentage change in quantity demanded/ Percentage change in price

3. Point Method

We are occasionally interested in measuring elasticity of demand at a particular point since the degree of elasticity of demand can vary on different parts of a demand curve.

Figure 13

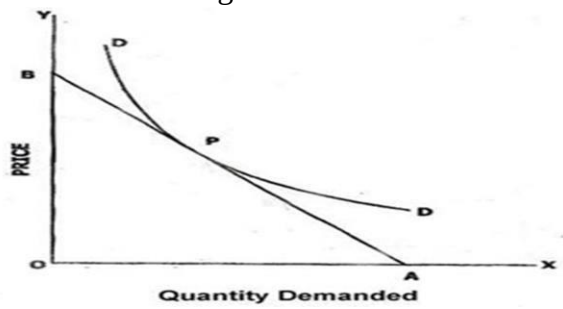


Figure 12 illustrates how to calculate elasticity of demand at a particular point on a demand curve. If P is any point on a demand curve DD. At P, a tangent is drawn to this curve, which touches the X-axis at A and Y-axis at B. The ratio PA/PB represents the elasticity of demand at P. Because PA is longer than PB, the demand elasticity at P is greater than one. The following formula is used to calculate demand elasticity at a given point:

ed = Lower Segment/ Upper Segment

It is worth mentioning here that if there is an infinitely small change in price and quantity demanded, the percentage method to calculate demand elasticity at a given point on the demand curve can be used; however, if the changes are considerable, this formula will be of little use.

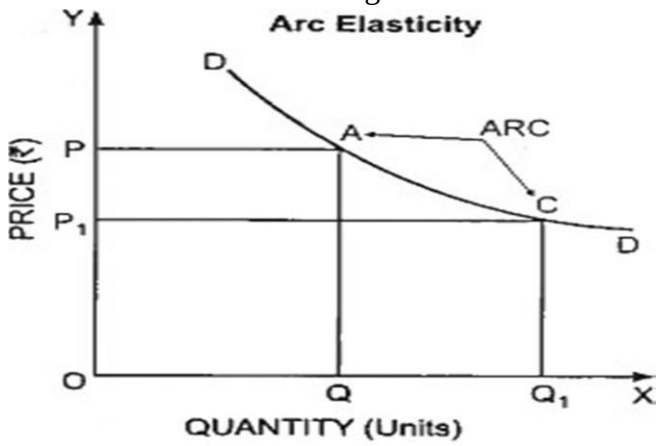
4. Arc Elasticity Method

When using the percentage method to determine price elasticity of demand, we must decide whether to use the initial price as the base for calculating percent change in price or the initial quantity as the base for calculating percent change in quantity demanded in response to a given percent change in price. To avoid this difficulty, we calculate the percentage change in price

or quantity demanded using the arc elasticity approach, which uses the midpoint of the initial and final price and quantity demanded respectively as the base. Thus, arc elasticity is the measurement of elasticity between two points on a demand curve. According to Watson, "Arc elasticity is the elasticity at the mid-point of an arc of a demand curve."

The portion of the demand curve DD shown in figure 14 between two points A and C is known as Arc. It will be seen from the figure that when price is OP, quantity demanded is OQ. When price falls to OP1, quantity demanded will be OQ1.

Figure 14



It should be emphasized that this method of measuring price elasticity of demand must be used for large price changes.

1.1.3.4 Factors Affecting Elasticity of Demand

We have studied from the above discussion that elasticity of demand is different for different goods. This is due to the following factors:

1. In general, demand for necessities of life (such as food, clothing, salt, kerosene and oil etc.) are inelastic, whereas demand for luxury products is elastic. This is due to the fact that the consumption of a certain minimum of these necessities is required for human survival. No one can live without these items, no matter how expensive they are. However, if the price of luxuries rises over a certain level, demand for them may be reduced. A necessity does not always imply a life-or-death situation. When a person becomes habituated to consuming a certain item, it becomes an indispensable part of his consumption pattern, and his demand for it becomes inelastic. For an addict, the elasticity of demand for alcohol is less than unity.
2. Elasticity of demand is also determined by the number of alternatives uses to which a given commodity can be put. A good's demand will be elastic if it has multiple uses. Coal, for

example, can be utilized in workshops, railways, factories and even in the home. If the price of coal declines, it will begin to be used in places where it was previously uneconomical to do so. It means goods which have specified use inelastic demand exists among their cases.

3. The goods in case of availability of substitutes are there, the elasticity of demand for such goods is elastic. If the price of coffee rises, for example, consumers would switch to tea, and coffee consumption will drop significantly.
4. Percentage of a consumer's income spent on the commodity also influenced the elasticity of demand. If a consumer spends only a small amount of his income on a particular commodity, a price change will have little effect on the quantity demanded. To put it another way, demand for such things is inelastic.
5. The possibility of the postponement of the use of a particular good also influenced the elasticity of demand. The demands for commodities, in case of which consumption can be postponed, have elastic demand. On the other hand, the demand for those commodities consumption of which cannot be postponed is inelastic.
6. Elasticity of demand is also determined by the level of price of the commodity. It is low when the price level of the commodity is low because with less price of the commodity the proportionate change in demand is insignificant.
7. Elasticity of demand is also affected by the income level of the consumer. If consumers have a high income, then they will not consider the price of the commodity. Therefore, in that case elasticity of demand is very low. On the other hand, if the income level of the consumers is low, then in that case elasticity of demand will be high.

Check Your Progress -VI

Q.1 How price elasticity of demand is measured?

Ans_____

Q.2 What are the determinants of price elasticity of demand?

Ans_____

1.14 Summary

In this unit, we learned that economic theory is concerned with the laws and principles that regulate the operation of an economy and its numerous components. The existence of an economy is based on two fundamental facts. To begin with, human desires for goods and services are unlimited and productive resources with which to produce those desires are limited. Therefore, an economist must decide how to best allocate a few resources in order to maximise the satisfaction of the members of society. There are two major branches of economics that are micro economics and macro economics. Micro economics deals with an individual unit of the economy, whereas macro economics deals with economy as a whole. It considers two aspects i.e., positive science and normative science. Positive science is a systematic knowledge relating to criteria of what it is and normative science is a systematized knowledge relating to criteria of what ought to be. Economics also consider two methods of methodology,

i.e. inductive method and deductive method. Inductive method is a system of reasoning from general conclusion to specific results and deductive method is a way of reasoning from specific facts to general conclusions.

The law of demand states that there is an inverse relationship between price and quantity demanded, all other things being equal. Other things that are assumed to be constant are the income of the consumer, tastes and preferences of the consumer and the prices of related goods etc. These aspects are considered important to determine the size of the market. Three types of elasticity of demand have been discussed in this context i.e., price elasticity of demand, income elasticity of demand and cross elasticity of demand. Under this, the different concepts of elasticity and its degrees which includes perfectly elastic, perfectly inelastic, unitary elastic, greater than unitary elastic and less than unitary elastic. Measurement of elasticity of demand with various ways like total expenditure method, percentage method, point method and arc method.

1.15 Questions for Practice

A. Short Answer Type Questions

Q1. What do you mean by economics?

Q2. Discuss the problems of allocation of resources?

Q3. Discuss the problems of choice of techniques?

Q4. Discuss the nature and scope of economics.

Q5. Distinguish between positive and normative economics.

Q6. Explain deductive methods.

Q7. Write a note on inductive methods?

Q8. Explain the role of assumptions in economic theory

Q9. What do you mean by demand in economics?

Q10. What are the main determinants of demand for a commodity?

Q11. With the help of a diagram explains the concepts of individual demand curve and market demand curve.

Q12. What do you understand by law of demand?

Q13. Why does demand curve slope downward?

Q14. Mention the exceptions to the law4o7f demand.

Q15. Distinguish between extension of demand and contraction of demand.

Q16. Distinguish between increase in demand and decrease in demand.

Q17. What do you mean by elasticity of demand?

Q18. Discuss the factors which affects the elasticity of demand.

Q19. What is arc elasticity of demand?

Q20. Discuss the concept of income elasticity of demand.

B. Long Answer Type Questions

Q1. Define economics. Explain in detail the nature and scope of economics. Q2. Discuss the five fundamental problems of any economy.

Q3. Explain inductive and deductive methods in economics. Also mention their merits and demerits.

Q4. What is meant by demand? Mention the factors which influence the demand for a commodity.

Q5. Distinguish between a demand curve and demand function. What are the factors that cause a shift in the demand curve?

Q6. Explain the law of demand. Why does the demand curve slope downwards to the right?

Q7. Critically evaluate the law of demand.

Q8. Explain 'Veblen Effect' and Giffen Paradox. Does the usual law of demand apply in their case?

Q9. Explain elasticity of demand. Mention the various factors which are affecting the elasticity of demand.

Q10. What is price elasticity of demand? Explain its degrees and measurements.

Q11. What is price elasticity of demand? Explain the arc and point method of measuring the elasticity of demand.

Q12. Write a note on following:

a. Price elasticity of demand

b. Income elasticity of demand

c. Cross elasticity of demand

1.16 Suggested Reading

- H. L. Ahuja, Principles of Microeconomics, S. Chand & Company Ltd. New Delhi
- D.N. Diwedi, Microeconomics, Theory[48]and Application, Vikas Publishing House, New Delhi.
- Perloff, J. M, Microeconomics, Theory and Application with Calculus, Pearson Addison Wesley.
- Koutsoyiannis, A, Modern Microeconomics, The Macmillan Press Ltd.
- Varian, H. R, Intermediate Microeconomics, W. W. Norton & Company, New York, London
- Gregory, N. M, Principles of Microeconomics, second edition.

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

MICRO ECONOMICS I

UNIT 2: CONSUMER BEHAVIOUR: CARDINAL UTILITY ANALYSIS AND INDIFFERENCE CURVE ANALYSIS

STRUCTURE

2.0 Learning Objectives

At the end of this unit, learner will be able to:

- Develop relation between total utility and marginal
- Differentiate between ordinal and cardinal utility analysis
- Determine the consumer's equilibrium with single commodity and two commodities under cardinal utility analysis.
- Derive the consumer's equilibrium under indifference curve analysis
- Explain the superiority of indifference curve analysis over cardinal utility analysis.

2.1 Introduction

The theory of consumer behaviour examines the relationship between quantity demanded of a commodity and its price by highlighting the reasons for the establishment of the relationship. A number of theories have been put forward by various economists to analyse consumer's demand for a commodity. The oldest theory of demand is the cardinal utility analysis which examines consumer's demand for a good and provides the law of demand which highlights that there is inverse relationship quantity demanded of a commodity and its price. As per the cardinal utility, it means the level of satisfaction of the consumer. As a result of the criticism of cardinal utility analysis, various theories have been established namely Indifference Curve Analysis, Samuelson's Revealed Preference Theory, and Hick's Logical Weak Ordering Theory. In this unit, cardinal utility analysis and indifference curve analysis have been explained.

2.2 Cardinal Utility Analysis

The cardinal utility analysis for explaining the concept of consumer behaviour has been favoured by classical economists namely Adam Smith, Gossen, Walras, Dupuit, Jevons, J.S. Mill as well as neo-classical economists i.e. Marshall and Pigou. According to this analysis, consumer purchases a certain good because of its utility. Utility can be measured in cardinal numbers i.e. 1, 2, 3, etc. Fisher has put forward the term 'Util' as a unit to measure utility. Basically, utility is that quality in a good with which our wants are fulfilled. According to Mrs. Joan Robinson, "Utility is the quality in commodities that makes individuals want to buy them." Utility is different from satisfaction. Utility is that quality of a good which fulfils the wants and satisfaction we get after the fulfilment of our wants. There are three concepts of utility i.e., initial utility, total utility and marginal utility. Initial utility is the utility derived

from the consumption of first unit of a good which is always positive. Total utility is the summation of the utilities derived from the consumption of various units of a good.

TUX = f(QX)

Table 1: Relation between Marginal Utility and Total Utility

Units of Apples	Total Utility (in utils)	Marginal Utility (Utils)
1	12	12
2	20	8
3	24	4
4	24	0
5	20	-4

where TUX = Total utility from good X and QX = Units of good X.Table 1: Relation between Marginal Utility and Total Utility

Marginal utility is the addition made to total utility by consuming one more unit of a commodity. The marginal utility can be measured as follows:

$$MU_n = TU_n - TU_{n-1}$$

where MU_n= Marginal utility of n^{th} unit, TU_n= Total utility of n units and TU_{n-1}= Total utility of (n-1) units. If the total utility from 10 mangoes is 200 and from 9 mangoes is 192, then the marginal utility of the 10^{th} mango is

$$MU_n = TU_n - TU_{n-1} = 200 - 192 = 8$$

Marginal utility is the rate of change of total utility due to a unit change in the quantity of a particular good. It measures the slope of total utility curve at a given point. Marginal utility can also be measured as follows:

$$MU = d(TU) / dQ$$

The relationship between total utility and marginal utility has been put forward by Jevons. Marginal utility can be positive, negative or zero. The marginal utility will be positive as total utility increases due to the consumption of additional units of good. The marginal utility will be zero when total utility is maximum. As total utility falls by consuming additional units of a good, then marginal utility will be negative. The table 1 shows the relation between marginal utility and total utility. As first apple is consumed total utility is 12 utils. Total utility increases to 20, when second apple is consumed. Total utility further increasesto24 by consuming third

apple. As fourth apple is consumed total utility remains at 24 utils

but declined to 20 utils, when fifth apple is consumed. Total utility goes on increasing as more and more units of a good are consumed but upto a limit. Marginal utility is positive and declining during the consumption of three apples when total utility is increasing. Marginal utility is zero during the consumption of fourth apple when total utility ismaximum. By consuming fifth apple, total utility starts declining and marginal utility becomes negative i.e 4.

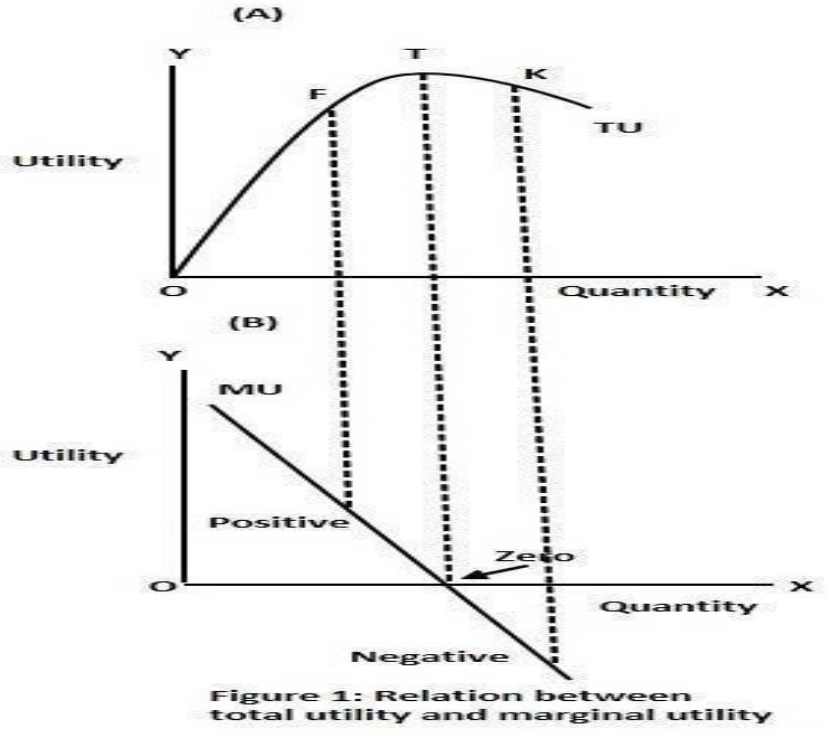


Figure 1: Relation between total utility and marginal utility

The figure 1 rt (A) shows total utility curve i.e. TU and part (B) shows marginal utility curve i.e. MU. In part (A)and part (B), units of good are shown on OX axis and utility on OY axis. At point F, where total utility is increasing, marginal utility is positive and declining. At point T, total utility is maximum and marginal .1 is zero. At point K, total utility is declining and marginalutility is negative.

2.2.1 Assumptions of Cardinal Utility Analysis

1) The consumer is rational as he wants to maximise his satisfaction from the givenincome.
2) Utility can be measured in cardinal number system i.e., 1,2,3…
3) Marginal utility derived from each good is independent. Utility of a given gooddepends upon the quantity of that good only. The utility derived from other goods

   does not affect utility of the given good.
4) The marginal utility of money remains constant.
5) The marginal utility derived from the consumption of successive units of acommodity

goes on diminishing.

6) Commodities are divisible into small units.
7) Consumption of different units of a good must be during the same time period.
8) The quality and size of different units of a good must be uniform.
9) There should be no change in the fashion, mental condition of consumer and priceofthe good or its substitutes.

2.2.2 Laws of Cardinal Utility Analysis

There are two main laws of cardinal utility analysis related to consumer behaviour. These are:

a. Law of diminishing marginal utility
b. Law of equi-marginal utility

a) Law of Diminishing Marginal Utility

The various economists like Gossen, Bentham, Walras, Jevons, Menger and Marshall have made significant contribution in developing Law of diminishing marginal utility. This law is also called "Gossen's First Law". According to Marshall, "The additional benefit which a person derives from a given stock of a thing diminishes with every increase in the stock that he already has.

The law of diminishing marginal utility is based on the daily life experience of any consumer. The wants of human beings are unlimited but each particular want can be satisfied. The marginal utility derived from the consumption of additional units of a commodity goes on diminishing. A point comes when the consumer does not want to consume more units of a commodity as marginal utility derived from consumption of additional units of a commodity has become zero. This is the point at which consumer's want is fully satisfied. If consumer still consumes more units of a commodity, marginal utility will become negative. According to this law, we obtain less and less utility from the successive units of a commodity as we consume more and more of it. The law of diminishing marginal utility can be explained with the help of table 2.

Table 2: Law of Diminishing Marginal Utility

Cups of Tea	Marginal Utility
1	8
2	6
3	4

4	2
5	0
6	-2

The consumption of first cup of tea gives8 utils of marginal utility followed by 6, 4and 2 utils from second, third and fourth cup of tea, respectively. When fifth cup is consumed, marginal utility is zero which shows a point at which consumer demand is satisfied. If consumer

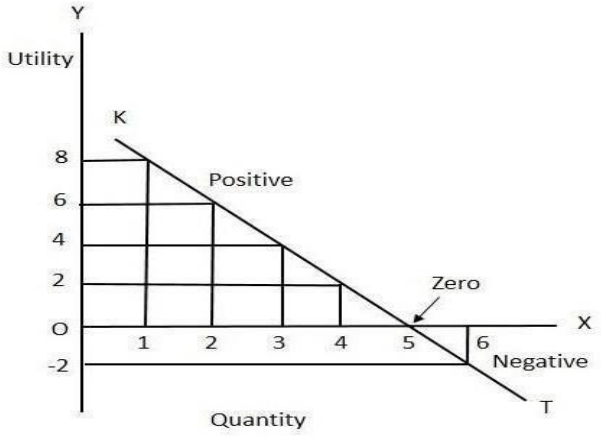


Figure 2: Diminishing Marginal Utility

consumes sixth unit of the commodity, marginal utility becomes negative i.e. -2. The law of diminishing marginal utility can be explained with the help of figure 2. The quantity i.e. cups of tea is measured on X axis and utility on Y axis. KT represents downward sloping marginal utility curve. The consumption of first cup of tea provides 8 utils of marginal utility. The second cup gives 6 utils, third cup provides 4 utils and fourth cup yields 2 utils of marginal utility. Marginal utility becomes zero with the consumption of fifth cup of tea and touches X axis. As sixth cup of tea is consumed marginal utility becomes -2 and marginal utility curve goes beyond the X axis.

There are several exceptions to the Law of Diminishing Marginal Utility. This includes rare and curious things, articles of distinction, poetry or good books, intoxicants, public goods and consumption of initial units of a commodity. The marginal utility derived from the consumption or collection of above-mentioned goods goes on increasing as their stock goes on

increasing. This law has significant theoretical as well as practical importance.

This law provides the base for the three consumption laws i.e., law of demand, law of equi-marginal utility and consumer surplus. As this law states that when marginal utility derived from additional units of a commodity becomes zero, then consumer shifts to the othercommodity so the producer has to produce different varieties of good. The difference betweenvalue-in-use and value-in-exchange has been explained with the help of law of diminishing marginal utility. The goods like water, air etc. have value-in-use and command low price. As these goods are available in large quantity and used on large scale, their marginal utility declines rapidly, consequently, their price also falls. The goods like diamond,gold etc. have value-in-exchange and command high price. As these goods are scarce in nature, their marginalutility declines slowly, consequently, their price remains high. This lawhelps consumers to attain maximum satisfaction. Consumer can purchase only that much quantity of a commoditywhere marginal utility is equal to the price of that commodity to get maximum satisfaction. Price determination of a commodity depends upon law of diminishing marginal utility. If sellerwants to sell more units of a good, he will have to decline the price of that good because moreunits derive less marginal utility. Hence, consumers will buy more at less prices and vice-versa.

The law of diminishing marginal utility has been criticised on several points. Cardinal measurement of utility is not possible. The various assumptions like constant marginal utility of money and no change in the fashion, mental condition of consumer and price of the goodor its substitutes are not realistic. Marginal utility can only be calculated in case of divisible commodities but in reality, most of the commodities are not divisible. Marginal utility derivedfrom each good is not independent rather marginal utility of a given good is affected by marginal utility derived from other goods.

b) Law of Equi-Marginal Utility

The second law of cardinal utility analysis is the law of equi-marginal utility. This law was first propounded by Gossen. Therefore, it is also called “Gossen’s Second Law.” Different economists have given different names to this law i.e. “Law of Maximum Satisfaction”, “Lawof Rational Consumer”, “Law of Substitution” and “Law of Economics”.

According to Marshall, “If a person has a thing which he can put to several uses, he will distribute it among these uses in such a way that it has same marginal utility in all. “Accordingto Prof. Lipsey,

"The household maximising utility will so allocate its expenditure between commodities that the last penny spent on each is equal." According to Prof. Samuelson, "A consumer gets maximum satisfaction when the ratio of marginal utilities of all commodities andtheir price is equal."

This law states that to get maximum utility from the expenditure of his limited income, the consumer purchases such amount of each commodity that the last unit of money spent oneach of them affords him the same marginal utility. According to this principal, the marginal utility of expenditure of the last unit of money spent on all of the commodities must be the same. Marginal utility of expenditure of a given commodity is the ratio of marginal utility ofa commodity and its price. In case of commodity A, marginal utility of expenditure can be measured as:

$$MU_E = MU_A / P_A$$

In case of commodity B, marginal utility of expenditure can be measured as:

$$MU_E = MU_B / P_B$$

Therefore, to get maximum satisfaction, consumer equilibrium will be reached when

$$MU_E = MU_A / P_A = MU_B / P_B$$

If price of both the commodities becomes equal then the above equation can be written as:

$$MU_E = MU_A = MU_B$$

where MU_E= marginal utility of expenditure, MU_A= marginal utility of commodity A, MU_B= marginal utility of commodity B, P_A= price of commodity A and P_B= price of commodity B.

Table 3: Law of Equi-Marginal Utility

Units of Goods	**Marginal Utilityof Apples (MU_A)**	**Marginal Utility of Bananas (MU_B)**	**MUA/PA PA=6**	**MUB/PB PB=4**
1	48	24	8	6
2	42	20	7	5
3	36	16	6	**4**
4	30	12	5	3
5	24	8	**4**	2
6	18	4	**3**	1

The table 3 explains the law of equi-marginal utility. The consumer has Rs. 42 to spend. It is assumed that price of commodity A is Rs. 6 and price of commodity B is Rs. 4. If consumerpurchases, 5 units of commodity A and 2 units of commodity B, marginal utility of expenditure will be equal to 4.

$$MU_E=MU_A/P_A=MU_B/P_B=4$$

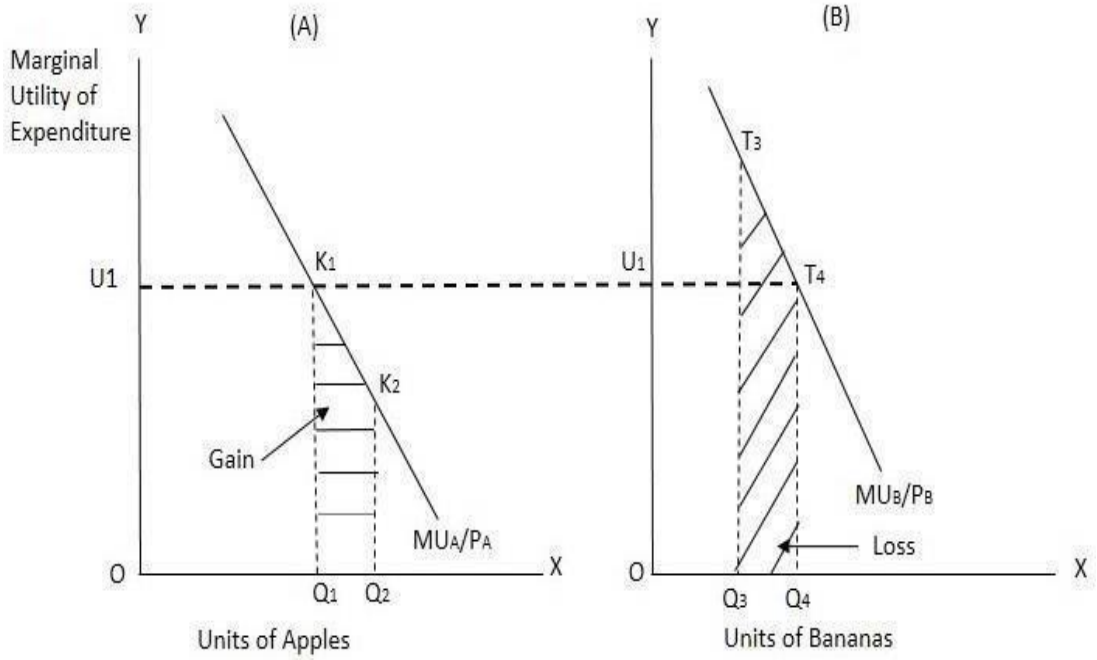


Figure 3: Law of Equi-Marginal Utility

The law of equi-marginal utility can be explained with the help of figure 3. The part A of the figure shows marginal utility of expenditure in case of apples and part B shows, marginalutility of expenditure in case of Bananas The units of commodities and marginal utility of expenditure have been measured on X axis and Y axis, respectively. The OQ_1 units of applesand OQ_4 units of bananas will be purchased by the consumer where $MU_E=U_1$. Here, $MU_E=MU_A/P_A=MU_B/P_B=U_1$, so, consumer will get maximum satisfaction. If consumer purchases more quantity of apples i.e., Q_1Q_2, he will decline quantity of banana by Q_3Q_4. He will gain $Q_1Q_2K_2K_1$ amount of utility by increase the quantity of apples and will lose $Q_3Q_4T_4T_3$ amount of utility. Loss of utility is more than the gain of utility. Hence, the rearrangement of the spending of consumer will result in net loss in utility. Now, it is clear that consumer's satisfaction is maximum when marginal utility of expenditure in case of all the goods is equal.The law of equi-marginal utility is very significant in the fields of consumption, production, exchange,

distribution and public finance. In case of consumption, consumer will get maximum satisfaction when last unit of money spent on different commodities gives him equal marginal utility. In the field of production, producer will get maximum profit when marginal productivity of each factor is equal.

During exchange, consumer will go on substituting commodities having less utility with commodities having more utility till marginal utility of all commodities become equal.

The distribution of national income among the various factors of production should be suchthat each factor must get its share equal to its marginal productivity in the long run. In fieldof public finance, taxes are levied in such a manner that marginal sacrifice of all the tax payers becomes equal.

2.2.3 Consumer's Equilibrium through Cardinal Utility Analysis

The consumer is said to be in equilibrium when he does not want to change his current expenditure as he is getting maximum satisfaction out of his limited income. Consumer's equilibrium through cardinal utilityanalysis can be attained under two different situations:

- Consumer's equilibrium with single commodity
- Consumer's equilibrium with two commodities

a) Consumer's Equilibrium with Single Commodity

The consumer is said to be in equilibrium if he does not want to purchase either more or lessquantity of apples when whole income of the consumer is spent on single commodity i.e. apples. In case of single commodity, consumer's equilibrium will be attained at a point where marginal utility of commodity is equal to its price.

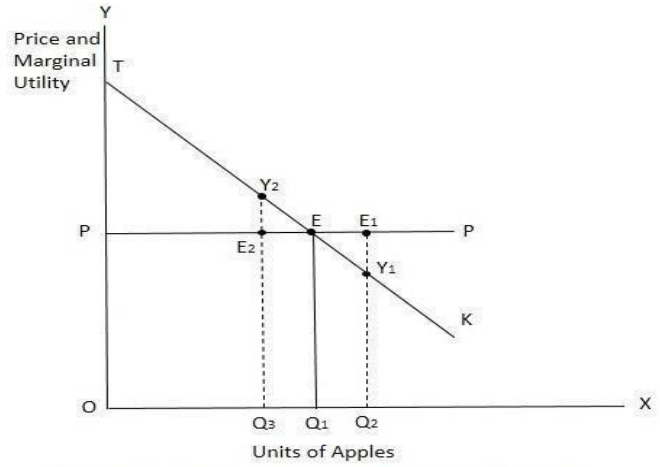


Figure 4: Consumer's Equilibrium with Single Commodity

The figure 4 explains consumer's equilibrium with single commodity in which units of apples are measured on X axis and price and marginal utility are measured on Y axis. TK isthe marginal utility curve of apples. If price is OP, the consumer will purchase OQ_1 quantityof apples as at this point marginal utility of apples is equal to its price. Thus, marginal utility OQ_1ET derived from OQ_1 units of apples is maximum. If consumer purchases one more unit of apple, the marginal utility Y_1Q_2 is less than its price OP. So, he will reduce thequantity of apples to OQ_1. If consumer purchases one less unit of apple, the marginal utility Y_2Q_3 is more than its price. Therefore, consumer will increase the quantity of apples to OQ_1.Hence, consumer does not purchase either more or less quantity of apples than OQ_1. At pointE, condition for equilibrium MU=Price is fulfilled and consumer is getting maximum

b) Consumer's Equilibrium with Two Commodities

If consumer spends his entire income on two commodities i.e. commodity A and commodityB, he will act according to law of equi-marginal utility. The consumer will go on substituting the commodity giving low marginal utility with commodity giving high marginal utility till the marginal utilities of both the commodities become equal assuming that prices of both the commodities are same. Beyond this point, consumer does not want to make any change in his purchases. Hence, consumer's equilibrium is attained. If prices of both the commodities are same, equilibrium condition can be written as:

$MU_A=MU_B$

Consumer's equilibrium with two commodities can be explained with the help of figure

5. Units of money spent are measured on X axis and price and marginal utility are measured on Y axis. TT and Kk are the marginal utility curves of commodity A and commodity B, respectively. Prices of boththe commodities i.e. OP_1 and $O'P_1$ are equal. At given prices, theequilibrium is attained where marginal utility of each commodity EM_2 is equal to its price i.e. $EM_2=OP_1=O'P_1$. At this point of equilibrium, consumer will spend OM_2 amount of money on commodity A and $O'M_2$ on commodity

B. Hence, total marginal utility $OM_2ET+O'M_2EK$ derived from both the commodities is the maximum. Any further change in the consumer spending will result in decline in the total utility. Suppose consumer will spend one more unit of money on commodity B and one lessunit on

commodity A. If consumer incurs OM_1 units of money on commodity A, it will resultin loss of utility by M_1M_2EL. If consumer spends $O'M_1$ units of money on commodity B, hewill gain utility by M_1M_2EG. The loss in utility is more than the gain in utility which resultsin net loss of utility by LGE. Therefore, once equilibrium is reached, consumer does not wantto change his spending as at the point of equilibrium, he gets maximum utility.

2.2.4 Criticism of Cardinal Utility Analysis

The cardinal utility analysis has been criticised on several grounds. These are as follows:

1) The concept of utility is subjective in nature as it relates to psychology of human beings. But the consumer's demand analysis is based on the fact that utility is objective.
2) The cardinal measurement of utility is not possible i.e. 1, 2, 3 etc. It is not possible forthe utility derived from different units of a commodity to be added or subtracted.
3) According to cardinal utility analysis, every commodity is independent in nature but inreality, utility of given commodity is dependent on the utility of other commodities.
4) The cardinal utility analysis is based on the concept of marginal utility but marginal utility can only be calculated in case of divisible goods. In real world, most of the commodities are non-divisible.
5) The marginal utility of money cannot be constant. If the amount of money with a person enhances, its marginal utility declines and if the amount of money declines, its marginalutility rises.
6) The various assumptions like no change in the fashion, mental condition of consumer and price of the goods or its substitutes are not realistic.
7) The cardinal utility analysis has failed to divide price effect into substitution effect andincome effect. This analysis does not explain that if demand changes with change in price, then how much demand changes with change in real income and how much withsubstitution of cheap commodity for the expensive commodity.
8) The cardinal utility analysis has failed to explain the Giffen Paradox. This analysis does not provide any explanation that why demand rises with increase in price and why demand decreases with decline in price, in case of giffen goods.

Check Your Progress- I

Q1. Define Law of diminishing marginal utility.

Ans_____

_____

Q2. Explain the Law of equi-marginal utility.

Ans_____

_____

2.3 Indifference Curve Analysis

The cardinal utility analysis is based on several assumptions which have been criticized by various economists. It is due to the shortcomings of cardinal utility analysis that ordinal utilityanalysis or indifference curve analysis was developed. According to ordinal utility analysis, utility can be ranked like first, second, third etc. based on preference of the consumer for various commodities. Indifference curve analysis was first of all developed by Edgeworth in 1881. Later on, this concept was developed by Pareto in 1906, W.E. Johnson in 1913 and Slustky in 1915. The significant contribution has been made by Hicks and Allen towards the development of this analysis. J.R. Hicks in his book, "Value and Capital" has provided detailedanalysis of ordinal utility in which he has explained behaviour of the consumer in scientific manner.

2.3.1 Assumptions of Indifference Curve Analysis

The indifference curve analysis is based on several assumptions. These are as follows:

1) The consumer is rational in nature as he wants to get maximum satisfaction out of his limited income.
2) Utility can be ranked in ordinal numbers like first, second, third etc. on the basis of preference of the consumer for various commodities.
3) This analysis is based on the assumption that marginal rate of substitution diminishes. Ifamount of any commodity increases with the consumer, then he will substitute that commodity with another at diminishing rate.
4) The consumer never reaches the level of satiety. He always wants more amount of a commodity to the lesser amount of it. For example, combination X includes 3 units of apples and 5 units of mangoes and combination Y includes 3 units of apples and 3 units of mangoes. The

combination X is better than Y as X includes more units of mangoes.

5) This analysis is based on the assumption of consistency which means if consumer prefers combination X to Y in a given time period, he will not prefer Y to X in another time period rather will prefer X to Y only.

6) According to the assumption of transitivity of this analysis, if consumer prefers combination X to combination Y and combination Y to combination Z, he will surely prefer combination X to combination Z. Similarly, if consumer is indifferent among combinations X and Y as well as combinations Y and Z, he will surely be indifferent among combinations X and Z.

7) In this analysis, scale of preference will be independent of the income of consumer as well as price of commodity in the market. Moreover, scale of preference of one consumerwill be independent of the scale of preference of another consumer.

8) Indifference curve analysis is based on the assumption of continuity. According to this assumption, indifference curve can provide various combinations of two commodities which gives equal level of satisfaction to the consumer and consumer is indifferent about these combinations.

2.3.2 Meaning of Indifference Curve

An indifference curve is the locus of all those points representing various combinations of two commodities giving same level of satisfaction to the consumer. If all the combinations on given indifference curve provide same level of satisfaction to the consumer, then he will be indifferent among the available combinations. According to Leftwitch, "A single indifference curve shows the different combinations of X and Y that yield equal satisfaction to the consumer." Indifference Schedule is a table representing the various combinations of two goodsthat will give equal level of satisfaction to the consumer.

Table 4: Indifference Schedule

Combinations	Mangoes	Apples	Marginal Rate of Substitution
V	1	20	-
W	2	14	6:1
X	3	9	5:1
Y	4	5	4:1

Z	5	2	3:1

Table 4 represents the indifferenceschedule in which five combinations of mangoes and Apples have been shown. The five combinations V, W, X, Y and Z yield equal level of consumer satisfaction. The combination Vincludes 1 mango and 20 Apples, combination W includes 2 mangoes and 14 Apples, combinationX includes 3 mangoes and 9 Apples, a n d combination Y includes 4 mangoes and 5 Apples and combination Z includes 5 mangoes and 2 Apples. Here, to get one more mango consumer issacrificing some units of kiwi to remain at the same level of satisfaction.

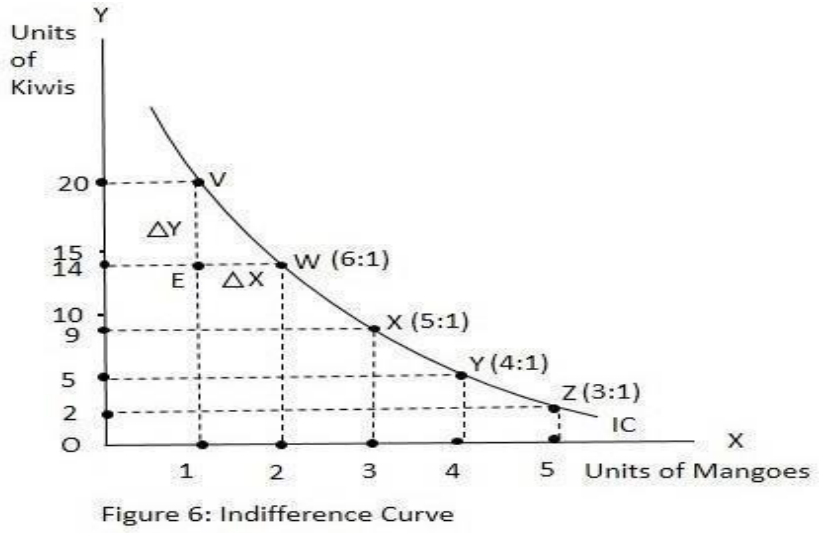


Figure 6: Indifference Curve

The figure 6 shows the indifference curve in which units of mangoes and units of Apples have been measured on X axis and Y axis, respectively. IC is the indifference curve. The five combinations i.e., V (1 mango and 20 Apples), W (2 mangoes and 14 Apples), X (3 mangoes and 9 Apples), Y (4 mangoes and 5 Apples) and Z (5 mangoes and 2 Apples) of mangoes and Apples yields same level of satisfaction to the consumer. By joining these combinations, indifferencecurve can be drawn. Indifference curve is downward sloping from left to right and convex to the origin.

2.3.3 Indifference Map

Indifference curve shows the various combinations which provide same level of satisfaction to the consumer. So, consumer will be indifferent among these combinations. If consumer wants to attain higher level of satisfaction, then the combination providing higher level of satisfaction than the available combinations will not lie on the same indifference curve rather it will lie on some higher indifference curve.

Similarly, if consumer wants to attain lower level of satisfaction, then the combination providing lower level of satisfaction than the available combinations will not lie on the same indifference curve rather it will lie on some lower indifference curve.

Therefore, there can be different indifference curves showing different levelof satisfaction. A set of indifference curves showing different levels of satisfaction obtainablefrom different schedules of indifference is called indifference map. Higher the indifference curve, higher will be the level of satisfaction. Lower the indifference curve, lower will be the level of satisfaction. The indifference map has been shown in figure 7.

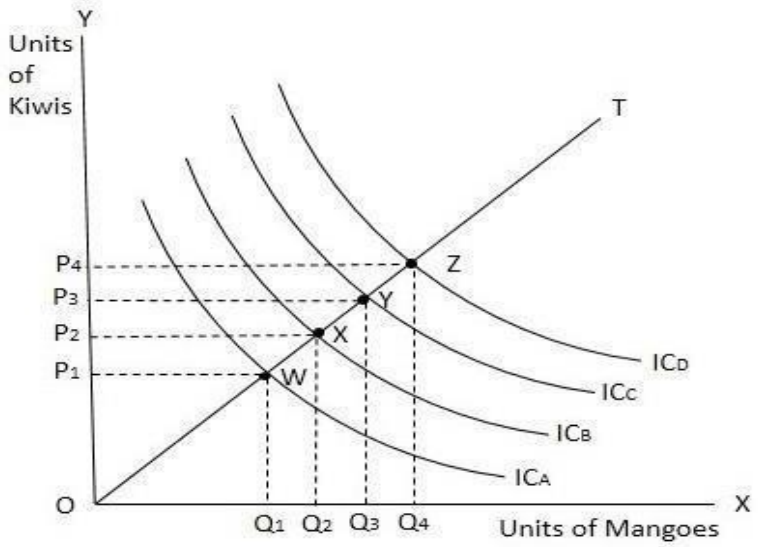


Figure 7: Indifference Map

In the figure, units of mangoes and units of Apples have been measured on X axis and Y axis, respectively. The various indifference curves IC_A, IC_B, IC_C and IC_D represent indifference map. A straight-line OT passes through theses indifference curves. Combinations W, X, Y andZ lie on indifference curves IC_A, IC_B, IC_C and IC_D, respectively. The combination W includes OQ_1 mangoes and OP_1 Apples as well as combination X includes OQ_2 mangoes and OP_2 Apples. As combination X includes more quantity of mangoes and Apples than combinationW, combination X will provide higher level of satisfaction to the consumer than W. The combination Y includes OQ_3 mangoes and OP_3 Apples as well as combination Z includes OQ_4 mangoes and OP_4 Apples. As combination Z includes more quantity of mangoes and Apples thancombination Y, combination Z will provide higher level of satisfaction to the consumer than Y. Hence, combination on the higher indifference curve gives higher level of satisfaction and combination

on the lower indifference curve provides lower level of satisfaction.

2.3.4 Marginal Rate of Substitution

The consumer can get same level of satisfaction from alternative combinations if the rise in satisfaction due to increased quantity of mangoes is offset by the decline in satisfaction due to reduced quantity of Apples. The marginal rate of substitution of X for Y is defined as the amountof Y the consumer is just willing to give up to get one more unit of X and maintain the same level of satisfaction. J.R. Hicks has defined marginal rate of substitution of X commodity for Y commodity as "the quantity of Y which would just compensate the consumer for the loss ofmarginal unit of X." The table 4 explains the concept of marginal rate of substitution. The combination V (1 mango and 20 Apples) provides same level of satisfaction as combination W (2 mangoes and 14 Apples) gives. The consumer has substituted 6 Apples with 1 mango. Hence, marginal rate of substitution of mangoes for Apples will be 6:1. There are 3 mangoes and 9 Apples in combination X. The consumer has substituted 5 Apples with1 mango to remain on the same level of satisfaction as that of combination W. Therefore, the marginal rate of substitution of mangoes for Apples will be 5:1. Similarly, marginal rate of substitution will be 4:1 and 3:1 for combinations Y and Z, respectively. Marginal rate of substitution of X for Y can be explained as the ratio of change in amount of Y to a change in amount of X.

$$MRS_{XY} = - \Delta Y/\Delta X$$

where MRS_{XY} = Marginal rate of substitution of X for Y, ΔY = Change in amount of Y and

ΔX = Change in amount of X

The marginal rate of substitution is negative because the amount of Y is declined to get a marginal unit of X. The slope of indifference curve is measured by marginal rate of substitution so indifference curve slopes downwards. The figure 6 shows two combinations V and W of mangoes and Apples on the given indifference curve IC. The consumer sacrifices VE amount ofApples to get the marginal amount EW of mangoes.

$$MRS_{XY} = VE/EW$$

The law of diminishing marginal rate of substitution has been developed by Prof. Lerner. According to this law, the consumer will be willing to forgo smaller and smaller units of Y in order to have successive additional units of X. According to Ferguson, "The law of diminishingmarginal rate of substitution states that as X is substituted for Y so as to leave the consumer onthe same

indifference curve, the marginal rate of substitution of X for Y diminishes." The table4 shows that consumer sacrifices 6 Apples to get second mango, 5 Apples to get third mango, 4 Apples to get fourth mango and 3 Apples to get fifth mango. This shows that marginal rate of substitution of mangoes for Applesgoes on diminishing. In figure 6, it has been shown that whenconsumer moves from combination V to W, he sacrifices 6 Apples to get one more mango wheremarginal rate of substitution of mangoes for Apples is 6:1. When consumer moves from combination W to X, he sacrifices 5 Apples to get one more mango where marginal rate of substitution of mangoes for Apples is 5:1. In case of two combinations i.e. Y and Z, the marginal rate of substitution of mangoes for Apples is 4:1 and 3:1, respectively.Therefore, as consumer increases the consumption of mangoes then for getting every additionalunit of mango he sacrifices less and less amount of Apples i.e. 6:1, 5:1, 4:1 and 3:1, respectively. This is called diminishing marginal rate of substitution. The marginal rate of substitution diminishes due to two reasons. Firstly, particular want of consumer can be satisfied. As consumer has more and more units of a given good, his want to get more of its quantity becomesless intensive. So, consumer wants to sacrifice fewer units of other good to get marginal unit of a given good. Secondly, goods are imperfect substitute of each other. The marginal rate of substitution of X for Y diminishes when the amount of X is increased as goods are imperfect substitute. If goods are perfect substitute for each other, these will be regarded as same. Any change in amount of one or the other good will be regarded as the changes in the quantity of same good. So, marginal rate of substitution will remain the same. Therefore, decline in marginal rate of substitution can be attributed to the commodities being imperfect substitutes of each other. The law of diminishing marginal rate of substitution is not applicable to perfectsubstitutes and perfect complimentary goods.

Check Your Progress- II

Q1. Define Indifference Curve?

Ans_____

_____

Q2. Explain Marginal Rate of Substitution.

Ans_____

_____

2.3.5 Properties of Indifference Curve

The properties of indifference curve are as follows:

1) **An indifference Curve Slopes Downwards from Left to Right:** The various combinations which lie on the same indifference curve give same level of satisfaction. This is possible only if increase in amount of commodity A is accompanied by reduction in amount of commodity B because rise in satisfaction of commodity A is offset by decline in satisfaction of commodity B. If Indifference curve slopes downwards from left to right,all the combinations

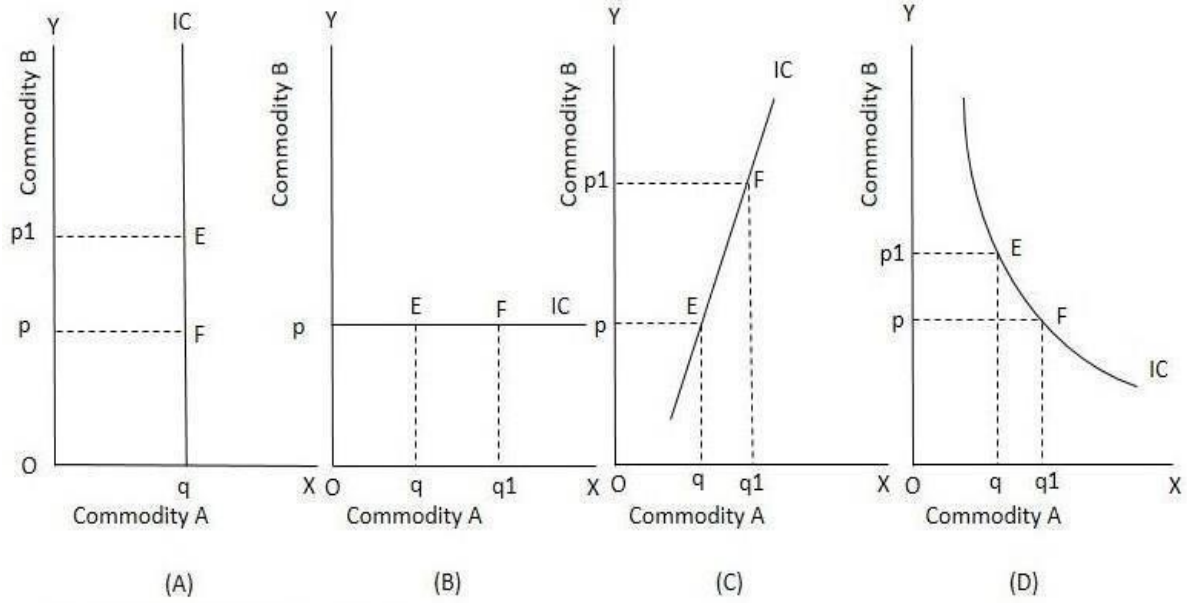


Figure 8: Slope of Indifference Curve

on this curve will give same level of satisfaction. If the shape of indifference curve is a horizontal straight line, vertical straight line and upward sloping curve thencompensating variations in satisfaction will not take place and consumer will not be indifferent among the various combinations lying on these curves.

In figure 8, slope of indifference curve has been analysed. In the various parts of this figure i.e. A, B, C and D, commodity A and commodity B have been measured on X axis and Y axis, respectively. In figure 8 (A), the two combinations E and F lie on the indifference curve IC. The combination E includes Oq of commodity A and Op1 of commodity B. The combination F includes Oq of commodity A and Op of commodity B. Both the combinations E and F includesame quantity of commodity A. The combination E includes more quantity of commodity B than combination F. So, combination E gives more satisfaction to the consumer and he cannotbe indifferent among combinations E and F. Hence, indifference curve cannot be a vertical straight line. In figure 8 (B),

the two combinations E and F lie on the indifference curve IC. The combination E includes Oq of commodity A and Op of commodity B. The combination Fincludes Oq1 of commodity A and Op of commodity B. Both the combinations E and F includesame quantity of commodity B. The combination F includes more quantity of commodity A than combination E. So, combination F gives more satisfaction to the consumer and he cannotbe indifferent among combinations E and F. Hence, indifference curve cannot be a horizontal straight line.

In figure 8 (C), the two combinations E and F lie on the indifference curve IC. The combination E includes Oq of commodity A and Op of commodity B. The combination F includes Oq1 of commodity A and Op1 of commodity B. The combination F includes more quantity of commodity A and B than combination E. So, combination F gives more satisfactionto the consumer and he cannot be indifferent among combinations E and F. Hence, indifferencecurve cannot be an upward sloping curve. In figure 8 (D), the two combinations E and F lie on the indifference curve IC. The combination E includes Oq of commodity A and Op1 of commodity B. The combination F includes Oq1 of commodity A and Op commodity B. The combination E includes more of commodity B and less of commodity A than combination F. Hence, gain in satisfaction of commodity B is offset by decline in satisfaction of commodity A. So, combinations E and F gives equal level of satisfaction to the consumer and he is indifferent among combinations E and F. Hence, indifference curve can only be a negatively sloping curve which slopes downward from left to right.

2) **An indifference is Convex to the Origin:** An Indifference curve is convex to the point of origin. This property of indifference curve is based on the law of diminishing marginal rate of substitution. According to law of diminishing marginal rate of substitution, indifferencecurve cannot be a straight line and concave to the origin rather it can only be convex to the origin. This property of indifference curve can be explained with the help of figure 9. In the various parts of this figure i.e. A, B and C, commodity A and commodity B have been measured on X axis and Y axis, respectively. In figure 9 (B), indifference curve IC is a straight line which shows that marginal rate of substitution of commodity A for commodity B is constant. It is because, to increase qq1 amount of commodity A, consumer is sacrificing pp1 amount of commodity B. Further, to increase q1q2 amount of commodity A, consumer is reducing p1p2 amount of commodity B. To increase the amount of commodity A, consumer issacrificing same amount of commodity B i.e. pp1=p1p2. This is possible only in case of perfectsubstitutes.

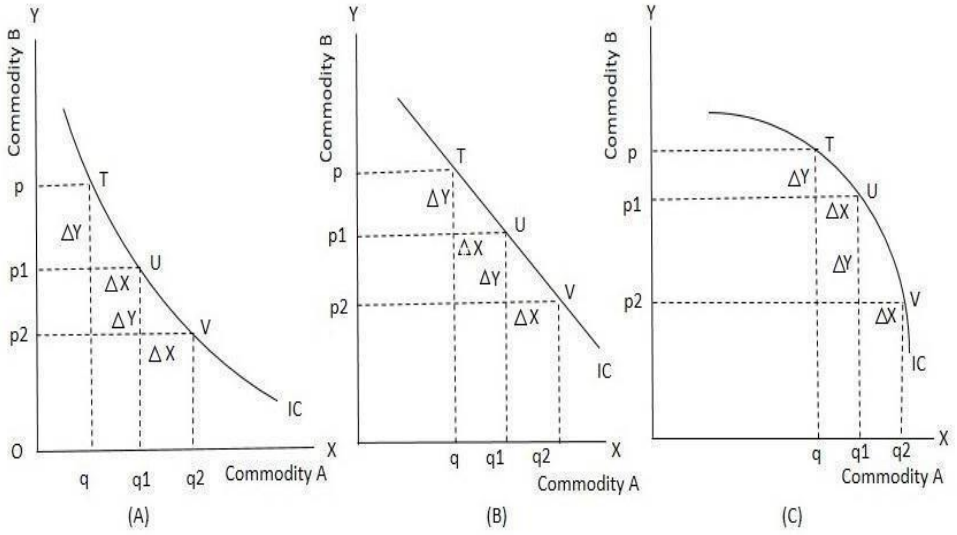


Figure 9: Shape of Indifference Curve

In figure 9 (C), indifference curve IC is concave to the origin which shows that marginal rate of substitution of commodity A for commodity B is increasing. It is because, to increase qq1 amount of commodity A, consumer is sacrificing pp1 amount of commodity B. Further, toincrease q1q2 amount of commodity A, consumer is reducing p1p2 amount of commodity B. To increase the amount of commodity A, consumer is sacrificing more amount of commodity B i.e. pp1 < p1p2. This shows that as the consumption of commodity A is increasing, its importance is also increasing which is not possible in reality. In figure 9 (A), indifference curveIC is convex to the origin which shows that marginal rate of substitution of commodity A for commodity B is diminishing. It is because, to increase qq1 amount of commodity A, consumer is sacrificing pp1 amount of commodity B. Further, to increase q1q2 amount of commodity A, consumer is reducing p1p2 amount of commodity B. To increase the amount of commodityA, consumer is sacrificing less amount of commodity B i.e. pp1>p1p2. This shows that as the consumption of commodity A is increasing, its importance is declining which perfectly fits thereal world. Hence, indifference curve is convex to the origin.

3) **Higher the Indifference Curve, Higher is the Level of Satisfaction and Vice-Versa:** In Indifference map, all the combinations on higher indifference curve will provide higher level of satisfaction than the combinations on the lower indifference curve. In figure 10, commodity A is measured on X axis and commodity B on Y axis. There are three combinations W, X and Y which lie on the different indifference curves ICT, ICS and ICR,

respectively. The combination W includes OQ_1 amount of commodity A and OP_1 amount of

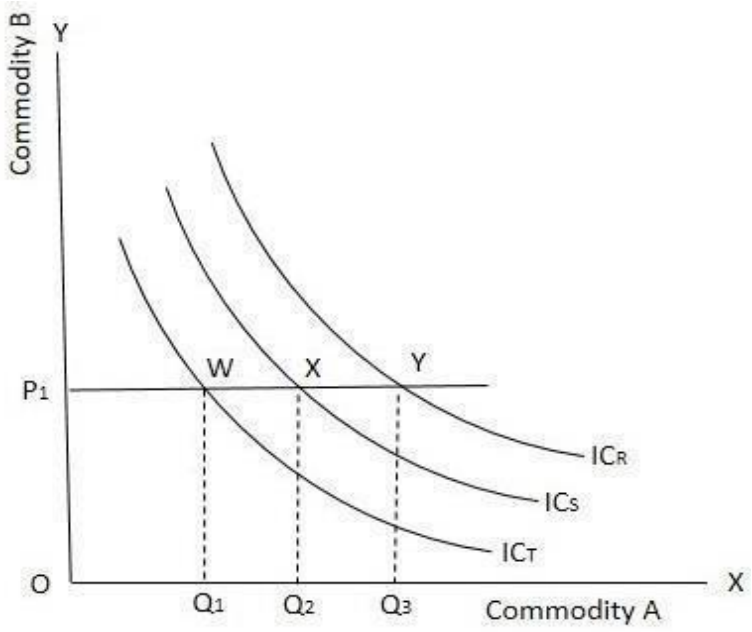


Figure 10: Indifference Map

commodity B, X includes OQ_2 amount of commodity A and OP_1 amount of commodity B and Y includes OQ_3 amount of commodity A and OP_1 amount of commodity B. All the combinations have same amount of commodity B. The combination Y has more amount of commodity A than X and combination X have morequantity of commodity A than W i.e. $OQ_3 > OQ_2 > OQ_1$. Hence, Combination Y gives more satisfaction than X and X gives more satisfaction than W. So, higher the indifference curve, higher will be the level of satisfaction and vice-versa.

4) **Indifference Curves Cannot Intersect Each Other:** Each indifference curve provides different level of satisfaction. So, they cannot intersect each other. This property can be explained with the help of figure 11 in which two indifference curves are intersecting each other. The commodity A is measured on X axis and commodity B on Y axis. The combinations W and P lie on IC_S indifference curve which shows that both gives same level of satisfaction i.e. W=P. The combinations W and Q lie on IC_T indifference curve which means both gives equal level of satisfaction i.e. W=Q. Hence, combinations P and Q gives same level of satisfaction i.e. P=Q. But it is not possible as P lies on higher indifference curve and Q lies on lower indifference curve. Therefore, indifference curvescannot intersect each other.

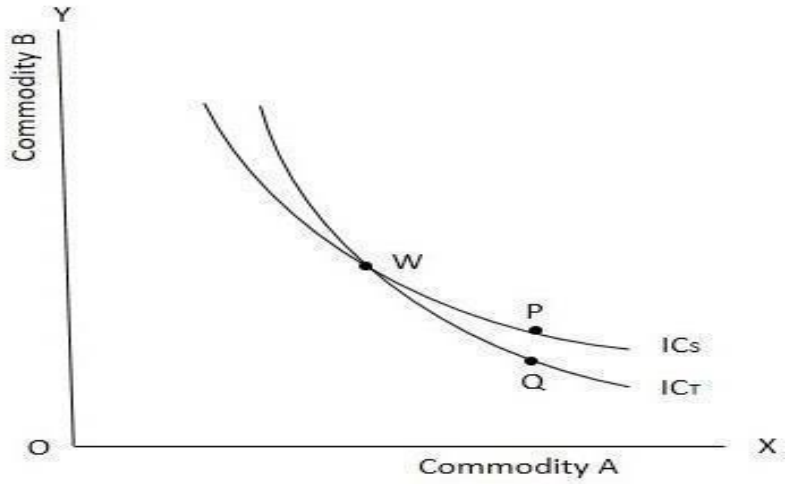


Figure 11: Indifference Curves

5) **Indifference Curve Can Neither Touch Horizontal Nor Vertical Axis:** An indifference curve can never touch X axis and Y axis. This property of indifference curve can be explained with the help of figure 12 in which commodity A is measured on X axis and commodity B on Y axis. The indifference curve ICT touches X axis at Q and at combination Q, consumer has OQ amount of commodity A and zero amount of commodity B which is not the proper combination. This shows that consumer is purchasing single commodity. So, indifference curve cannot touch X axis.

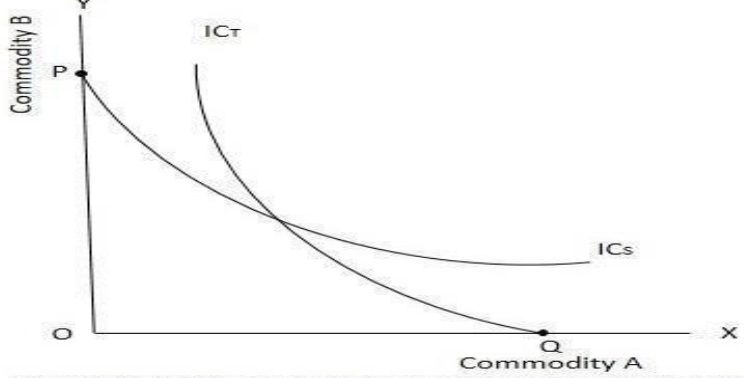


Figure 12: Indifference Curve never touches X axis and Y axis

The indifference curve ICS touches Y axis at P and at combination P, consumer has OP amountof commodity B and zero amount of commodity A which is not the proper combination. This shows that consumer is purchasing single commodity. So, indifference curve cannot touch Y axis. Hence, indifference curve can neither touch horizontal nor vertical axis.

6) **Indifference Curves May or May Not be Parallel:** It is not necessary that indifference curves are parallel to each other rather they may or may not be parallel to each other. This property of indifference curve depends upon marginal rate of substitution of two curves. If marginal rate

of substitution of different points on two curves declines at constant rate, then both the curves will be parallel to each other, otherwise, both will not be parallel.

7) Shapes of Indifference Curves in Case of Perfect Substitutes and Perfect Compliments:

In case of perfect substitutes, indifference curve will be a downward sloping straight line from left to right and in case of perfect substitutes, indifference curve will be a right-angled curve. In figure 13 (A), indifference curve IC is a straight line which shows that marginal rate of substitution of commodity A for commodity B is constant. It is because, to purchase first unit of commodity A, consumer is sacrificing one unit of commodity B. Further, to purchase second of commodity A, consumer is sacrificing one more unit of commodity B. To increase the amount of commodity A, consumer is

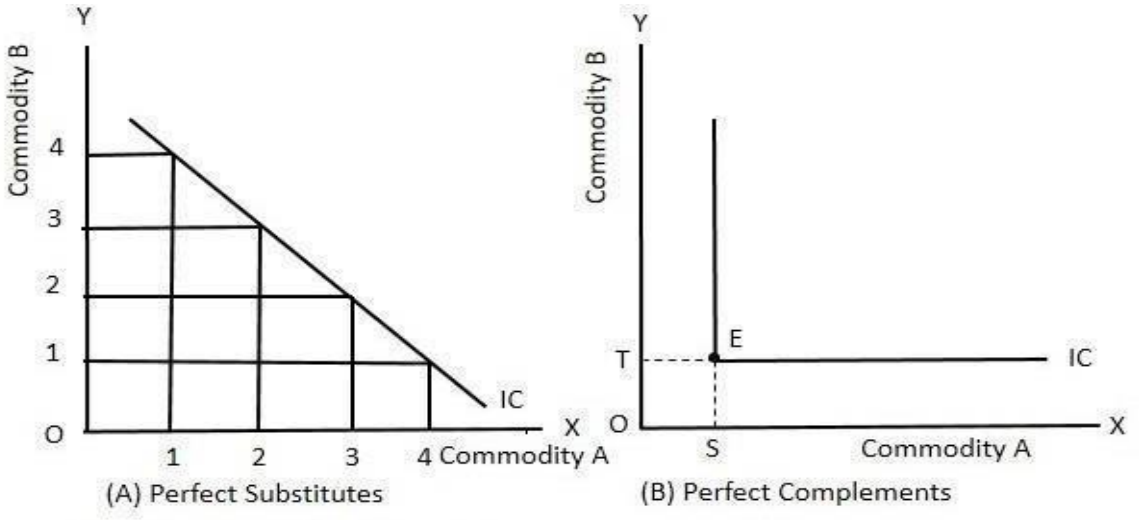


Figure 13: Shape of Indifference Curve

sacrificing same amount of commodity B. This is possible only in case of perfect substitutes. In figure 14 (B), indifference curve IC is a right-angled curve which shows that both the commodities A and B are purchased in fixed proportion by the consumer. At point E, consumerhas fixed proportion combination of OS of commodity A and OT of commodity B.

8) Indifference Curve Becomes Complex in Case of More than Two Commodities

When the consumer wants to have combinations of more than two commodities i.e., 3commodities, 4 commodities etc., then we have to draw a three-dimensional indifference curvewhich are very difficult to draw.

2.3.6 Price Line

Indifference curve is the locus of all those combinations of two commodities which give same level of satisfaction to the consumer. Now, the question arises whether the consumercan purchase certain combinations or not.

Table 5: Possible Combinations of A and B

Combinations	Commodity A (Rs.6)	Commodity B (Rs.3)
P	0	10
Q	1	8
R	2	6
S	3	4
T	4	2
U	5	0

This is determined by money income of the consumer as well as prices of two commodities. The price line shows all those combinations of two commodities which can be bought by the consumer with the given money income and given prices of two commodities. According to Ferguson, "The price line shows the combinations of goods that can be purchased if the entiremoney income is spent." The price line is also known as budget line and opportunity line.

The equation of the price line can be written as follows:

$M=P_A.A+P_B.B$

where M = Money Income, P_A = Price of Commodity A, A = Quantity of Commodity A, P_B = Price of Commodity B, B = Quantity of Commodity B.

The table 5 shows the possible combinations of commodities A and B which consumer can buywith given income and prices. Suppose consumer has Rs. 30 with him and the price of commodity A and B is Rs. 6 and Rs. 3, respectively. If consumer want to purchase only commodity A then he can buy 5 units, each

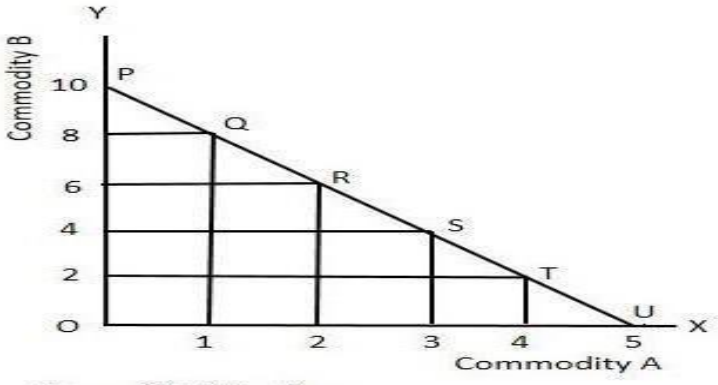


Figure 14: Price Line

costs Rs. 6, with entire income. Similarly, if consumer wants to purchase only commodity B then he can buy 10 units, each costs Rs. 3, with entire income. The other combinations availableto consumer are Q (1 unit of commodity A + 8 units of commodity B), R (2 units of commodityA + 6 units of commodity B), S (3 units of commodity A + 4 units of commodity B) and T (4 units of commodity A + 2 units of commodity B) which he can buy with given income at givenprices. Figure 14 shows the various combinations that lie on price line. The commodity A andcommodity B have been measured on X axis and Y axis, respectively. PU is the price line which shows various combinations P, Q, R, S, T and U which he can buy with his given incomeat given prices. If there is any combination which is right to the price line, then consumer cannotbuy that with given money income. If, there is any combination which is left to the price line, then consumer can buy that but his entire money income is not spent. The slope of price line refers to the ratio of prices of two commodities i.e. A and B.

Slope of Price Line = P_A/P_B

where P_A = Price of commodity A and P_B = Price of commodity B

The position and slope of price line depends upon two factors (i) income of the consumer (ii) prices of the two goods. These factors have been explained as follows:

(A) Effects of Change in Income: If prices of the goods remain same but income of the consumer changes, it will only change the position of the price line not the slope. As income increases, the price line will shift to the right of the original price line and as income declines, price line will shift to the left of the original price line at given prices. The effects of change in income on price line has been shown in the figure 15.

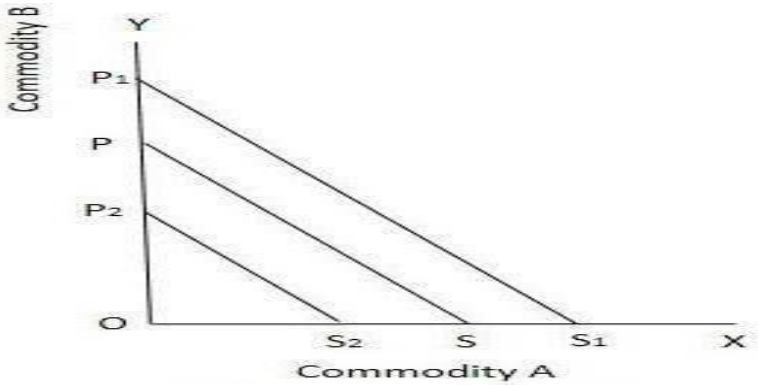


Figure 15: Effects of change in Income

The original price line is PS. With increase in income, price line will shift from PS to P_1S_1 and with decline in income, price line shifts from PS to P_2S_2. At PS, the maximum amount that

consumer can buy is OS amount of commodity A and OP amount of commodity B. At P_1S_1, the maximum amount that consumer can buy is OS_1 amountof commodity A and OP_1 amount of commodity B which is higher than the maximum amount of both the commodities on PS price line. At P_2S_2, the maximum amount that consumer can buy is OS_2 amount of commodity A and OP_2 amount of commodity B which islower than the maximum amount of both the commodities on PS price line.

(B) Effects of change in Prices: If the income of the consumer is given, the proportionate change in all money prices will shift the price line to left of original price line with increase inprices and to right of original price line with decrease in prices. The figure 16 (A) shows the effects of proportionate change in prices. The original price line is PS. With decrease in prices, price line will shift from PS to P_1S_1 and with increase in prices, price line shifts from PS to P_2S_2. At PS, the maximum amount that consumer can buy is OS amount of commodity A and OP amount of commodity B. At P_1S_1, the maximum amount that consumercan buy is OS_1 amount of commodity A and OP_1 amount of commodity B which is higher than the maximum amount of both the commodities on PS price line. At P_2S_2, the maximum amount that consumer can buy is OS_2 amount of commodity A and OP_2 amount of commodityB which is lower than the maximum amount of both the commodities on PS price line. If the price of one commodity i.e. commodity A changes and price of commodity B as wellas money income remain constant, the one end of price line where we measure commodity B will remain at same point and other end where we measure commodity A changes with changein price of commodity A. This can be explained with the help of figure 16 (B).

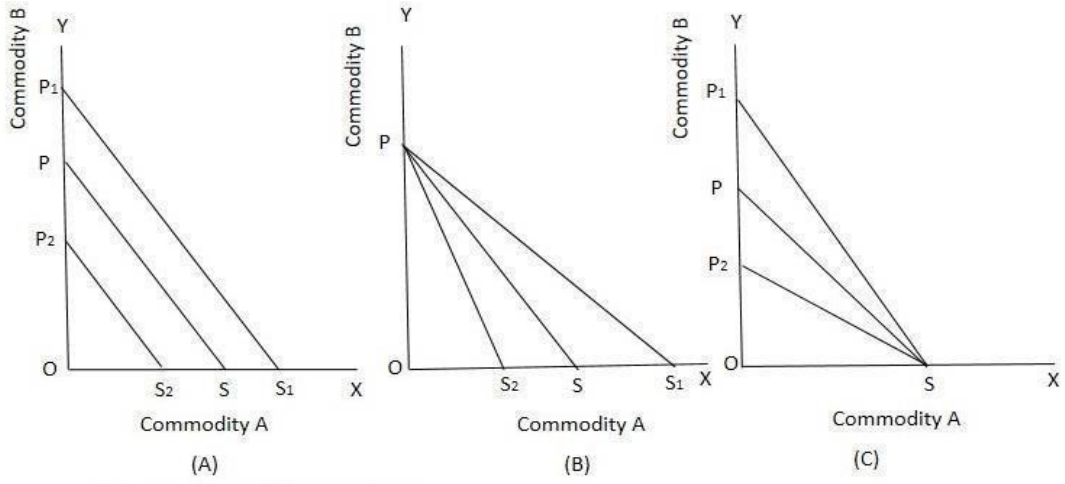


Figure 16: Effects of change in price

The original price line is PS. With decrease in prices, price line will shift from PS to PS_1 and with increase in prices, price line shifts from PS to PS_2. At PS_1, consumer can buy more quantity of commodity A than on price line PS i.e., $OS_1 > OS$. At PS_2, consumer can buy lessquantity of commodity A than on price line PS i.e., $OS_2 < OS$. If the price of one commodity i.e. commodity B changes and price of commodity A as well as money income remain constant,the one end of price line where we measure commodity A will remain at same point and otherend where we measure commodity B changes with change in price of commodity B. This canbe explained with the help of figure 16 (C). The original price line is PS. With decrease in prices, price line will shift from PS to $P_1S$and with increase in prices, price line shifts from PSto P_2S. At P_1S, consumer can buy more quantity of commodity B than on price line PS i.e. $OP_1 > OP$. At P_2S, consumer can buy less quantity of commodity B than on price line PS i.e. $OP_2 < OP$. Hence, slope of price line changes with change in price of one commodity, while the price of other commodity and money income remains the same.

2.3.7 Consumer Equilibrium

The consumer is said to be in equilibrium when consumer with given income and prices buysthat combination of two commodities which yields him maximum satisfaction and he does notwant to make any change in his spending.

Assumptions

The various assumptions of consumer's equilibrium under indifference curve analysis are as follows:

1) Consumer is rational in nature as he wants to maximize his utility.
2) The prices of the commodities will remain constant.
3) The money income of the consumer will be constant.
4) Consumer has knowledge about price of all the commodities.
5) There exists perfect competition in the market.
6) Commodities are divisible.
7) Consumer has complete knowledge about indifference map.
8) Income will be spent in small quantities by consumer.

There are two main conditions to attain equilibrium of consumer under indifferencecurve

analysis.

(i) The price line should be tangent to indifference curve.

(ii) The indifference curve must be convex to the origin at the point of tangency.

The first condition for consumer's equilibrium is that price line should be tangent toindifference curve which has been shown in figure 17.

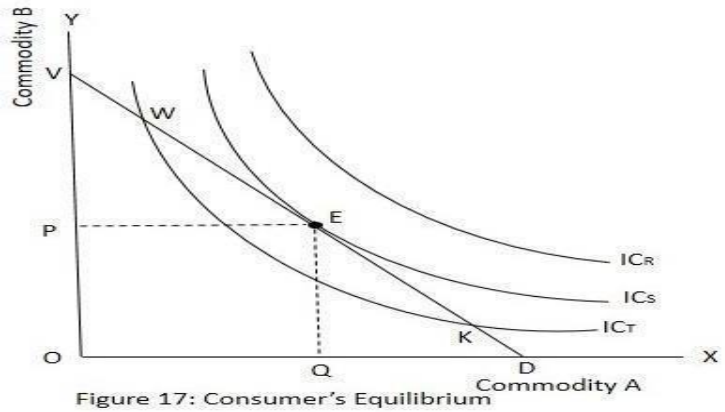


Figure 17: Consumer's Equilibrium

In figure 17, VD is the price line and IC_R, IC_S and IC_T are the indifference curves. The consumer can buy any combination i.e. E, W and K but he cannot buy any combination on IC_R because it is away from price line VD. Out of E, W and K, consumer will be in equilibrium at point E as at this point price line is tangent to the higher indifference curve IC_S. At point E, consumer will buy OQ amount of commodity A and OP amount of commodity B which yields maximum satisfaction to the consumer. At points W and K, consumer will not get maximum satisfaction as both the pointslie on the lowest indifference curve IC_T.At equilibrium point E, slope of indifference curve and price line coincide. Slope of indifference curve shows marginal rate of substitution of commodity A for commodity B (MRS_{XY}) and slope of price line is the ratio of price of commodity A (P_X) and price of commodity B (P_Y). At the point of equilibrium, slope of indifference curve is equal to the slope of price line. It can be written as:

$MRS_{XY} = P_X/P_Y$

The second condition for consumer's equilibrium is that indifference curve should be convex to the origin at the point of tangency which has been shown in figure 18.

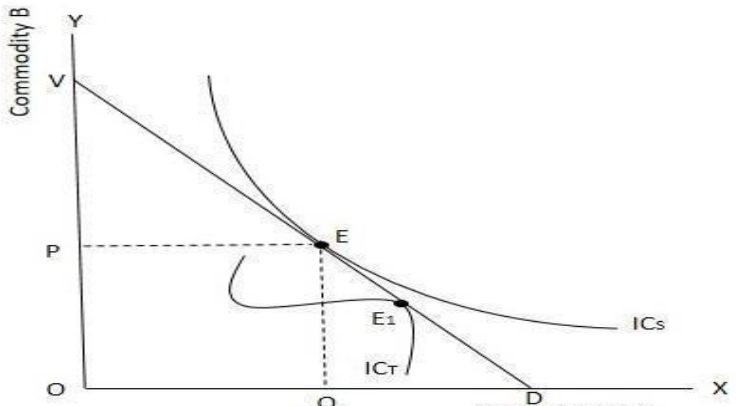


Figure 18: Consumer's Equilibrium

In figure 18, VD is the price line and ICS and ICT are the indifference curves. The consumer can buy any combination i.e. E and E1. At E1, price line is tangent to indifference curve but indifference curve is concave to the origin at the point of tangency which shows that second condition for equilibrium is not fulfilled and also point E1 lie on lower indifference curve ICT. So, consumer will not be in equilibrium at point E1 rather at point E. At pointE, both the conditions for consumer's equilibrium are fulfilled. The consumer will buy OQ amount ofcommodity A and OP amount of commodity B which gives maximum satisfaction to the consumer.

2.3.8 Criticism of Indifference Curve Analysis

1) Indifference curve analysis is based on unrealistic assumptions i.e. rational consumer, perfect knowledge of scale, divisibility of goods and perfect competition. The spending of a consumer isgenerally based on habits, fashion and customs. Hence, a consumer does not always behave rationally. It is not possible that consumer has complete knowledge of his indifference map. Divisibility of goods is not possible in case of most of the goods and perfect completion is not a reality rather it's a myth.

2) Prof. D.H. Robertson has highlighted that the indifference curve analysis is only "An old wine innew bottle. "This analysis is similar to the cardinal utility analysis as it has only given new namesto old concepts. The term 'utility' has been replaced by scale of preference, law of diminishing marginal utility has been substituted with diminishing marginal rate of substitution and the concept of cardinal numbers i.e. 1, 2, 3 etc., has been labelled as ordinal numbers i.e. I, II, III, etc. In cardinal utility analysis, consumer is in equilibrium when ratio of marginal utilities of two commodities is equal to the ratio of price of two commodities i.e.

$$MU \text{ of } A / MU \text{ of } B = PA / PB$$

In indifference curve analysis, consumer is in equilibrium when marginal rate of substitution of A forB is equal to the ratio of prices of two commodities i.e.

$$MRS_{AB} = P_A / P_B$$

Marginal rate of substitution is the ratio of marginal utilities of two commodities i.e. $MRS_{AB} = MU_A / MU_B$

Hence, MU of A / MU of B = P_A / P_B Therefore,

conditions for consumer equilibrium are same in both the analysis.

3) According to Prof. W.E. Armstrong, a consumer is indifferent among close alternative combinations only as he cannot find the difference between the two. As the difference among various combinations rises, the difference in the satisfaction of alternative combinations become clear and, therefore, different combinations which lie on the same indifference curve do not provide equal level of satisfaction. If argument of Armstrong is considered, different combinationson same indifference curve provide different level of satisfaction. Therefore, indifference curve will become non-transitive.

4) Indifference curve analysis fails to explain, how consumer behave when he has to make a choice among alternative combinations which involve risk or uncertainty of expectation. In order to choose among uncertain combinations, quantitative measurement of utility is required to determine whether the risk is worth taking. In these situations, cardinal measurement of utility can prove to be helpful to explain consumer behaviour.

5) Indifference curve analysis is based on absurd and unrealistic combinations. When consumer considers various combinations of two commodities, then some of the combinations are meaningless and it is not possible to apply theses combinations in the real life.

6) Indifference curve analysis can easily explain consumer behaviour in respect of two commodities but when consumer considers more than two commodities, this analysis becomes complex in nature.

7) Schumpeter has said that indifference curve is not based on real life experiences rather on imaginary combinations. Every time, it is not possible for a consumer to do calculations and decidelike a computer as to which combination of two commodities he would like.

8) The indifference map is considered to be hypothetical as is not based on observed market

behaviour. It is not objective in nature rather subjective as it does not set up functions and curves in purely objective terms. Purely objective indifference curves are possible only if quantitative data is obtained. The logical structure of indifference curve analysis is such that it is almost impossible to measure indifference curves quantitatively. Although efforts have been made to quantify indifference curve but not successful.

9) Indifference curve analysis is based on the weak ordering hypothesis i.e., consumers can be indifferent among a large number of combinations. However, according to Prof. Samuelson, it is not possible to find many situations of indifference in real world. The weak ordering makes it subjective in nature. However ordinal analysis is certainly better than cardinal analysis as it is basedon fewer assumptions.

2.4 Comparison of Cardinal Utility Analysis and Indifference Curve Analysis

The cardinal utility analysis and indifference curve analysis has many similarities as well as dissimilarities.

Similarities

1) The cardinal utility analysis as well as indifference curve analysis are based on the assumption that consumer is rational in nature as he wants to maximise his satisfaction.
2) Both the analysis is subjective in nature as these are based on the concept of utility. In cardinal utility analysis, total utility is the summation of all the marginal utilities that the consumer derivesfrom the consumption of various units of the commodity. In indifference curve analysis, total utility derived from the consumption of a commodity is based on the marginal utilities that the consumer derives from the consumption of various units of commodity.
3) In cardinal utility analysis, consumer is in equilibrium when ratio of marginal utilities of two commodities is equal to the ratio of price of two commodities i.e.

$$\text{MU of A / MU of B} = P_A / P_B$$

In indifference curve analysis, consumer is in equilibrium when marginal rate of substitution of A forB is equal to the ratio of prices of two commodities i.e.

$$MRS_{AB} = P_A / P_B$$

Marginal rate of substitution is the ratio of marginal utilities of two commodities i.e.

$$MRS_{AB} = MU_A / MU_B$$

Hence MU of A / MU of B = P_A / P_B Therefore, conditions for consumer equilibrium are same in both the analysis.

4) Both the analysis is based on the law of diminishing marginal utility. In cardinal utility analysis, law of diminishing marginal utility applies. In indifference curve analysis, second condition for equilibrium is that indifference curve must be convex to the origin at the point of tangency which shows that marginal rate of substitution is diminishing at the point of equilibrium.

Dissimilarities

1) Indifference curve analysis is more realistic in nature as it is based on the ordinal measurement ofutility i.e. first, second etc. Cardinal utility analysis is based on the assumption of cardinal

   measurement of utility i.e. 1, 2, 3 etc. which is not possible in the real world.

2) Cardinal utility analysis is based on the assumption of constant marginal utility of money which is unrealistic in nature. Indifference curve is not based on this assumption.

3) Indifference curve analysis is based on less assumptions as compared to cardinal utility analysis.Hence, indifference curve analysis becomes more realistic in nature.

4) In cardinal utility analysis, marginal utility of money is assumed to be constant so it is not possibleto divide price effect into income effect and substitution effect but in indifference curve analysis,it is possible to divide price effect into income effect and substitution effect. Indifference curve analysis provides more comprehensive explanation of theory of demand.

5) The Giffen's Paradox has been explained in indifference curve analysis but cardinal utility analysis failed to explain this concept.

6) The cardinal utility analysis has been based on the unrealistic assumption of independence of utilities but indifference curve analysis is free from this and has highlighted that substitute goodsand complimentary goods are capable of influencing the utilities of each other.

7) Although both the analysis are based on the same equilibrium condition, yet indifference curve analysis is superior to cardinal utility analysis as it is based on less unrealistic assumptions.

8) Indifference curve analysis helps to highlight the effect of change in price on the welfare of consumer. If as a result of change in price, consumer moves from lower to higher indifference curve, his welfare is enhanced.

9) Both the analysis are subjective in nature but construction of preference schedule on the basis of changing physical quantities of two commodities and replacement of the law of diminishing marginal utility with diminishing marginal rate of substitution in case of indifference curve analysis indicates that this analysis is leading towards greater objectivity and behaviourism.

2.5 Summary

The concept of consumer behaviour has been explained in respect of cardinal utility analysis as well as indifference curve analysis. In cardinal utility analysis, relation between total utility and marginal utility has been highlighted. Further, law of diminishing marginal utility and law of equi-marginal utility have been explained. In case of cardinal utility, consumer equilibrium has been analysed with single commodity as well as two commodities. The consumer is said to be in equilibrium if he does not want to purchase either more or less quantity of a commodity when entire income of the consumer is spent on single commodity. If consumer spends his entire income on two commodities, he will go on substituting the commodity giving low marginal utility with commodity giving high marginal utility till the marginal utilities of both the commodities become equal assuming that prices of both the commodities are same. In indifference curve analysis, the concepts i.e., definition of indifference curve, marginal rate of substitution, budget line and consumer equilibrium have been examined. In indifference curve analysis, consumer is said to be in equilibrium when consumer buys that combination of two commodities which yields him maximum satisfaction with given income and prices. Moreover, he does not want to make any change in his current spending. Cardinal utility analysis as well as indifference curve analysis are of utmost importance in certain fields of real life but, at the same time, both the analysis suffers from various limitations also. According to various economists, although both the analysis has many similarities, yet indifference curve analysis is superior to cardinal utility analysis

2.6 Questions for Practice

A. Short Answer Type Questions

Q1. Explain the relationship between total and marginal utility with the help of diagram.

Q2. List the assumptions of cardinal utility analysis.

Q3. What do you mean by Law of diminishing marginal utility?

Q4. Give example and draw a diagram for law of equi-marginal utility

Q5. Explain Consumer's Equilibrium with Single Commodity through example.

Q6. Discuss Consumer's Equilibrium of two Commodities with the help of suitable example.

Q7. What do you mean by indifference curve?

Q8. Explain the concept of Consumer Equilibrium.

Q9. What is the meaning of price line under indifference curve?

B. Long Answer Type Questions

Q1. What are the laws of cardinal utility? Give assumptions.

Q2. Discuss the consumer's equilibrium under cardinal utility analysis with the help of suitable diagrams.

Q3. Critically evaluate the Cardinal Utility Analysis.

Q4. Explain the effects of change in income and prices of commodities on budget line.

Q5. Explain the various properties of Indifference Curve Critically explain consumer's equilibrium determined under indifference curve analysis.

Q6. Why indifference curve analysis is superior to cardinal utility analysis?

2.7 Suggested Readings

- H.L. Ahuja: Advanced Economic Theory (Microeconomic Analysis).
- A. Koutsoyiannis: Modern Microeconomics.
- K.N. Verma: Micro Economic Theory.

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

MICRO ECONOMICS I

UNIT 3: PRODUCTION FUNCTION: LAW OF VARIABLE PROPORTIONS AND RETURNS TO SCALE

STRUCTURE

3.0 Learning Objectives

After completion of this unit, learner will be able to:

- Describe the meaning of production function
- Identify different types of production function
- Differentiate between the law of variable proportion and law of returns to scale

3.1 Introduction

A product's supply depends upon its cost of production, which in turn depends upon the physical relationship between inputs and outputs as well as input prices. In deciding the cost of production, thephysical relationship between inputs and outputs is crucial. Therefore, theory of production relates tothe physical laws governing production of goods. The theory of production, like the theory of demand,examines how a producer or firm can use its capital effectively to maximize profit. They must make the following production decision:

(a) What should be produced by a firm?

(b) How should the firm produce?

(c) How much and at what price does the firm sell?

(d) hat is the best way for the firm to market its product?

These decisions are critical in the production process because they determine the goals of the firm. In the forthcoming pages, we will thoroughly study these aspects of production.

3.2 Meaning of Production Function

Production function means transformation of physical inputs into physical outputs. Thefunctional relationship between physical inputs and physical output of a firm is known as production function. Algebraically, it can be written as:

$Y = f(N, K, L, E)$

Basically, there are four factors of production i.e., land, labor, capital and entrepreneur. From the above equation it will be read as: Production (Y) is a function (*f*) of labour (N), capital (K), land (L) and entrepreneur (E).

According to Koutsoyiannis, "The production is purely a technical relation which connects factor inputs and output." Watson defined production function as, "The relation between a firm's physical production and the material factors of production is called as production function."

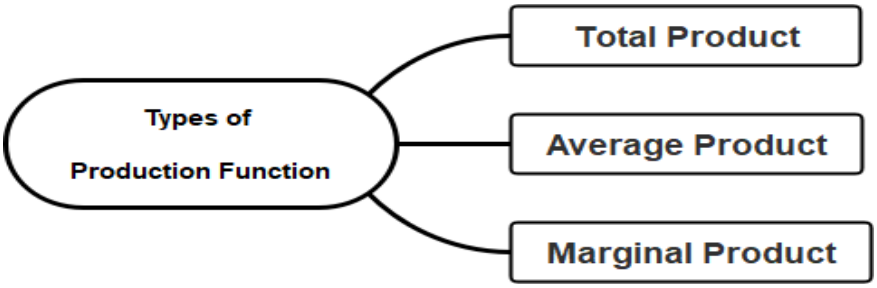
3.0 Types of Production Function

In economic theory, we are interested in two types of production functions. Firstly, when the quantities of some inputs are kept constant and the quantity of one input is varied. This kind of production function is called as the law of diminishing marginal returns or law of variable proportions and returnsto a factor. It is important to note that returns to variable factors are relevant for the short run becausein the short run some factors like, capital equipment, machines and land remained fixed and factors such as labour and raw material are increased to expand output. Secondly, the production functions with two or more than two variable factors which is called the law of returns to scale. The short run production function can be written as

$$Q = f(L, K)$$

In this, Q stands for output, L for labour and K for capital which is held constant in the short run. Thus,the concept of returns to a factor is concerned with the study of how output changes when the amountof variable factor, such as labour is increased.

To understand this, first we will study some concepts of physical products that are generally used forthe study of returns to a variable factor. Regarding physical production of factors there are three concepts



Total Product (TP): Total product of a variable factor is the amount of total output produced by agiven quantity of the variable factor, keeping the quantity of other factors such as capital constant.

A. Average Product (AP): The average product of a variable factor (labour) is the total output dividedby the amount of labour employed with a given quantity of fixed factors used to produce a commodity. Symbolically,

AP = Q/L

Here, AP = Average product, Q = Total output, L = Total units of variable factor (labour). It has beengenerally found that the average product is an indicator of productivity of the variable

factor.

Table 1 Total Product, Marginal Product, and Average Product of Labour

Labour (No. of Workers)	Total Product (TP)	Product (AP =Q/L)	Marginal Product (MP = ΔQ/ΔL)
1	20	20	20
2	36	18	16
3	48	16	12
4	56	14	8
5	60	12	4
6	60	10	0
7	56	8	-4

B. Marginal Product (MP): The marginal product of a variable factor is the addition made to thetotal production by the employment of an extra unit of a factor.

Symbolically,MP = $\Delta Q / \Delta L$

MP = marginal product of labour,

ΔQ = Change in total output,

ΔL = Change in = variable factor (labour).

It is important to note that the marginal product of a factor changes at different levels of employmentof the factor. It has been found that the marginal product of a factor rises in the beginning and then falls as more of it is used for production. The concepts of Total Product (TP), Marginal Product (MP)and Average Product have been explained with the help of a Table 1.

Check Your Progress-I

Q1. What is meant by production function?

Ans:_____

_____

Q2. Explain the types of production functions.

Ans:_____

_____

3.4 Laws of Production Function

In the preceding pages, we have studied that in the short run the output can be increased by increasingthe amount of the variable factor. Therefore, the response of output to changes in the amount of a variable factor, while keeping the units of fixed factors constant, is referred to as returns to a factor. Besides this, output can be increased by increasing all the factors of production in the long run. The response of output to changes in the size or scale of all the factors is called as returns to scale. Thus, there are two laws of production:

Law of Variable Proportions or Returns to a Factor and Law of Returns to Scale.

3.4.1 Law of Variable Proportions

In economic theory, the law of variable proportion occupies an important place. This law examines the production function with one-factor variable, keeping the quantities of other factors constant. When one factor's quantity is increased while the quantity of other factors remains unchanged, the proportion between fixed and variable factors changes. The law of variable proportions states that as the proportion of factors is changed, the total production at first increases more than proportionately, then equi-proportionately and finally less than proportionately. The classical economists named it the law of diminishing returns. It is now usually called the law of variable proportions. It can also be called the law of diminishing marginal product or diminishing marginal returns.

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 output will increase, but beyond some point the resulting output increases will become smaller and smaller."

According to Samuelson, “An increase in some inputs relative to other fixed inputs will, in a given state of technology, causes output to increase; but after a point the extra output resulting from the same additions of extra inputs will become less and less”.

3.4.1.1 Assumptions of the Law

The law of variable proportions holds good under the following assumptions:

1 One of the factors is variable while all other factors are fixed.

2 All units of the variable factor are homogeneous.

3 The state of technology is assumed to be given and unchanged. If change in technology will

occurthen AP and MP may rise instead of diminishing.

4 This law is based upon the possibility of varying the proportions in which the various factors can be combined to produce a product. For instance, 2 hectares of land with 1 labourer; or 2 hectares of land with 4 labourers. It is important to mention here that this law does not apply to those caseswhere the factors must be used in fixed proportions to yield a product.

3.3.1.2 Stages of Law of Variable Proportion

When a variable quantity of one factor is combined with a fixed quantity of the other, the productionprocess can be divided into three stages, as shown in the table below.

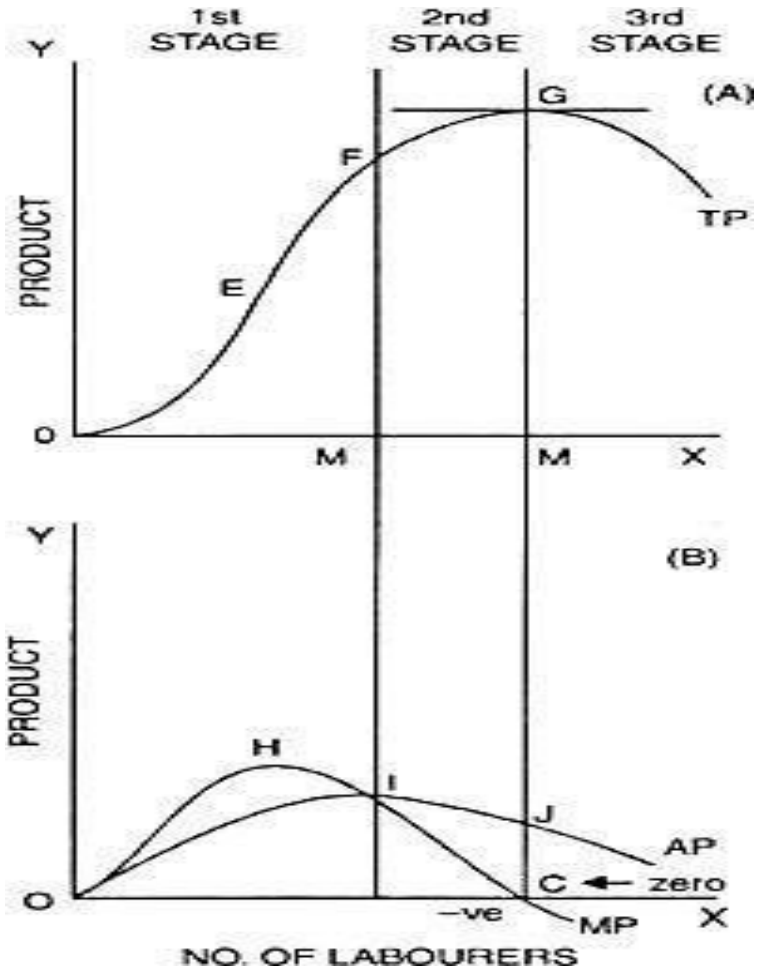
Units of Land (Hectare)	Labour (No. of Workers)	Total Product (TP)	Average Product (AP = Q/L)	Marginal Product(MP =ΔQ/ΔL)	Three Stages of Production
1	1	2	2	2	**Stage 1** Increasing Returns to a Variable Factor
1	2	5	2.5	3	
1	3	9	3	4	
1	4	12	3	3	**Stage 2** Diminishing Returns to a Variable Factor
1	5	14	2.8	2	
1	6	15	2.5	1	
1	7	15	2.1	0	**Stage 3** Negative Returns to a Variable Factor
1	8	14	1.7	-1	

It will be seen from figure 1 that the behaviour of the variable factor's total, average and marginal products in response to an increase in its amount is typically divided into three stages.

A. **Increasing Marginal Returns to a Factor (Stage 1):** Total product rises at an increasing rate to a point in this stage. During stage 1, the total product continues to rise, but its slope is decreasing, implying that from point E to G, the total product rises at a diminishing rate (the totalproduct curve is concave downwards at this level), i.e., the marginal product falls but remains positive. The point E where the total product stops increasing at an increasing rate and starts increasing at the diminishing rate is called the point of inflection. The average product curve reaches its maximum point at the end of stage 1. It is worth noting that the marginal product in this stage initially rises and then falls, but it remains higher than the average product during stage1, implying that the average product continues to rise.

B. Diminishing Marginal Returns to a Factor (Stage 2): Total product continues to increase at a diminishing rate in this stage until it reaches its maximum point G, where the second stage ends. The variable product's AP and MP both are diminishing at this stage, but they have remained positive. The variable factor's marginal product is zero at the end of the second level, i.e. at pointC.

C. Negative Marginal Returns to a Factor (Stage 3): Total product is declining in this stage, and



the total product curve is sloping downward. As a result, the variable factor's marginal product is negative, and the marginal product curve goes below the X-axis.

From the above figure the relationship between AP and MP can be explained.

a. AP is rising in Stage 1. MP rises at first, and then starts to fall. It's worth noting that as AP rises, MP must be greater than AP.

b. AP decreases in Stage 2. MP continues to decrease until it reaches zero at point C. MP

remains below AP as long as AP is declining.

c. MP becomes negative in Stage 3. While AP continues to decline, it remains positive. It is important to remember that even if MP is negative, AP must remain positive.

The relationship between MP and TP can also be explained.

a. TP increases at an increasing rate in Stage 1 as long as MP rises. However, as MP decreases, TP increases at a decreasing rate.

b. During Stage 2, as MP begins to decline, TP rises at a diminishing rate. There is no rise in TP when MP = 0.

c. When MP is negative in Stage 3, TP begins to decline.

The Stage of Rational Decisions

A key question now is in which stage a rational producer would seek to produce. A rational producerwould never try to produce in stage 3, where the variable factor's marginal product is negative. He willstop at the end of stage 2, when the variable factor's marginal product is zero. The producer will maximize the total product and thus make maximum use of the variable factor at end point C of the second stage, where the marginal product of the variable factor is zero. According to Ferguson, "Evenif units of the variable input were free, a rational producer would not employ the zero marginal products because their use entails a reduction in total output."

A rational producer will not want to produce in stage 1, where the fixed factor's marginal product is negative. It means he will not make the maximum use of the fixed factor in stage 1, and he will also not completely exploit the opportunities to increase output by raising the quantity of the variable factor, whose average product will continue to grow during stage 1. As a result, a reasonable producerwill not stop at stage 1, but will expand further. From the above, it is clear that a rational producer cannever be found producing in stages 1 and 3. As a result, stage 1 and 3 in the production function reflectnon-economic regions. Therefore, a reasonable producer will often try to produce in stage 2, where themarginal and average product of the variable factor is decreasing.

3.3.1.3 Causes of Increasing Marginal Returns to a Variable Factor

A. Effective utilization of the Fixed Factor: In the beginning, the quantity of the fixed factor is abundant relative to the quantity of the variable factor. Therefore, when more and more units of the variable factor are added to the constant quantity of the fixed factor, then the fixed factor is more intensively and effectively utilised, that is, efficiency of the fixed factor increases as

additional units of the variable factor are added to it. Due to this, initially production increases at an increasing rate. On the other side, some amount of the fixed factor remains unutilised because the variable factor is relatively smaller in quantity.

B. **Increase in Efficiency of the variable factor**: As more and more units of the variable factor areemployed; the possibility of division of labour and specialisation increases. Thus, greater the quantity of the variable input, the greater the scope for specialisation which will further help to increase efficiency and productivity.

C. **Better Coordination between the factors:** So long as the fixed factor remains underutilized, additional application of the variable factor tends to improve the degree of co- ordination betweenthe fixed and variable factors. As a result, total output increases at an increasing rate.

3.3.1.4 Causes of Diminishing Marginal Returns to a Factor

This is the most important stage of the law of diminishing returns. Following are the main causes for the operation of this law:

1) **Scarcity of the Fixed Factor:** When with the increase in the variable factor the fixed factor becomes more and more scarce in relation to the variable factor so that as the units of the variablefactor are increased, they receive less and less aid from the fixed factor. Hence, marginal and average products of the variable factor decline.

2) **Imperfect Substitutability of the Factors:** Factors of production are imperfect substitutes of each other. More and more of labour, for example, cannot be continuously used in place of additional capital. Accordingly, diminishing returns to the factor becomes inevitable.

3) **Indivisibility of the Fixed Factor:** If the factors were perfectly divisible, there would have beenno necessity of taking the large quantity of the fixed factor in the beginning to combine with the varying quantities of the other factor. A significant point worth mentioning is that if factors werecompletely divisible, the issue of differing factor proportions would not have arisen and thus the phenomenon of increasing and decreasing marginal returns to a factor would not have occurred.

4) **Poor Coordination between the factors**: Increasing the application of the variable factor along with the fixed factor(s) above a certain point crosses the ideal factor ratio limit. Consequently, theco-ordination between the fixed and the variable factor becomes poor.

3.3.1.5 Causes of Negative Marginal Returns

The total product declines and the marginal product become negative as the amount of the variable factor is increased to the constant quantity of the fixed factor. The phenomenon of negative marginal returns to the variable factor occurs when the amount of the variable factor increases too large in relation to the fixed factor, as they get in each other's way, causing total production to fall rather thanrise. In short, just as the marginal product of the fixed factor was negative due to its abundance in thefirst stage, the marginal product of the variable factor is negative due to its excessiveness in the third stage.

3.3.1.6 General Applicability of the Law of Diminishing Returns

The law of diminishing returns, which states that marginal physical product ultimately diminishes, even though it increases at first, has been discussed previously. Until Marshall, it was assumed that three laws of production are distinct and different. Modern economists, on the other hand, believe thatdecreasing, constant and increasing returns are three phases of one general law i.e., law of variable proportions, rather than three different laws. Furthermore, before Marshall, it was assumed that the law of diminishing returns applied to agriculture and manufacturing industries was characterized by constant or increasing returns. However, this is no longer the case; the law of diminishing returns hasa wide range of applications. This law covers industries as well as agriculture. In case of application to industries Factors of production must be increased in order to maximise the output of manufactured products. Labor and capital are more important in manufacturing industries than land and capital is usually fixed in supply during the short term. As a result, increasing the number of workers is pursued to increase productivity. When more labour is used on a fixed amount of capital, the marginalproduct of labour must eventually decrease. Whereas in case of application to agriculture, labor and capital can be increased to the desired extent in order to increase agricultural output since these are variable factors, but not land, which is a fixed factor of production. As a result, when rising doses of labour or capital are added to a fixed amount of land, the variable factor's marginal return starts to decrease, and the law of diminishing returns becomes operative.

3.3.1.7 Causes for the Application of this Law to Agriculture Sector:

There are various reasons due to which this law is applicable to the agriculture sector.

A. In agriculture, nature plays a significant role. Natural factors such as rainfall have a significant

impact on agricultural production. However, there is a lot of concern about the supply of rainwater.As a result, the law of diminishing returns kicks in quickly.

B. With continued agriculture, land fertility continues to decline. As a result, the marginal return decreases as more units of labour or capital are added to it.

C. Agricultural activities are spread out over vast areas of land, requiring less supervision. As a result,it cannot be efficiently supervised. Consequently, the cost of production rises.

D. Agriculture is considered as a seasonal occupation. The demand for labour in the agriculture sector is for some months only while the rest of the time they remain idle, which causes a rise in cost ofproduction.

E. Due to the lower degree of division of labour and specialisation, agriculture experiences a faster application of the law of diminishing returns.

F. In addition to this, all pieces of land are not fertile in the same way. When demand for land rises,even less fertile land is cultivated. It translates to lower marginal returns and higher production costs.

Thus, the law of diminishing returns is considered universal since it applies to all fields of output.

3.3.1.8 Importance of the Law of Diminishing Marginal Returns

a. Malthus based his population theory on this law. According to him, food grain production lags behind population growth because agriculture is subject to the law of diminishing returns. This law is the foundation for Ricardo's theory of rent. The first dose of labour and capital to land yields higher returns than the second. The difference between the first and second dose's returnsis referred to as 'rent.

b. This law is also considered as the basis of the theory of distribution. According to the marginal productivity theory of distribution, as more and more units of factor of production are employed its marginal productivity decreases. As a result, it's per unit share in total production decreases.

3.3.1.9 Postponement of the Law of Diminishing Marginal Returns

In the following two situations, the law of variable proportions can be postponed:

A. If technological advancements occur, the application of the law of variable proportions can be delayed. Because, with the advancement in technology the law of variable proportions

becomes ineffective, resulting in increased efficiency and lower cost.

B. The operation of this law can also be postponed when the factors of production are perfect substitutes of each other.

Check Your Progress II

Q1. What is law of variable proportion?

Ans:_____

Q2. Define TP and MP.

Ans:_____

3.4.2 Law of Returns to Scale

Next, the scale of production in the context of two factors of production means a given amount of labour and capital is used in the production process. Thus, the proportionate change in both the factorsbrings about a change in the scale. The behaviour of total output when all inputs are varied by the sameproportion is called returns to scale as applicable in the long run. Long run is that production functionin which all the factors of production are variable. Thus, in this type of production function we try to find out the behaviour of output when it is possible to change the size of all the factors. It means we tried to explain the behaviour of output in response to changes in these scales. Any change in the scalemeans that all inputs or factors are changed in the same proportion. According to Koutsoyiannis, "Theterm returns to scale refers to the changes in output as all factors change by the same proportion."

In the long run, output can be increased by increasing all factors in the same proportion or different proportions. Ordinarily, law of returns to scale refers to increase in output as a result of increase in allfactors in the same proportion. Such an increase in output is called returns to scale. In the long run output may be increased by changing all factors by the same proportion or by different proportions.

Let us start from an initial level of inputs and outputs:

$$P = f(L, K)$$

If both the factors of production, i.e., labour (L) and capital (K) are increased in the same

proportion (k), then production function will be rewritten as:

$P^* = f$ (kL, kK) Let us start from an initial level of inputs and outputs:

$$P = f (L, K)$$

If both the factors of production, i.e., labour (L) and capital (K) are increased in the same proportion (k), then production function will be rewritten as:

$P^* = f$ (kL, kK)

If P*, increases in the same proportion as increase in factors of production, i.e., $\frac{P_*}{P} = m$, then we say that there are constant returns to scale.

If P*, increases less than proportionate increase in factors of production, i.e., $\frac{P_*}{P} < m$, then we have decreasing returns to scale.

If P, increases more than proportionate increase in factors of production, i.e., $\frac{P_*}{P} > m$, we

increasing returns to scale.

3.4.2.1 Increasing Returns to Scale

Increasing returns to scale occurs when a given percentages increase in all factor inputs causes' proportionately greater increase in output. For example, if 100% increase in all factor inputs (labour and capital) causes 150% increase in output then returns to scale are called increasing. From above, it can be said that when output increases at a higher rate than the increase in factors of production employed.

It can be said that as the scale of production is increased, due to indivisibility of factors such as labour, machines, division of labour and specialisation and many types of economies are available to the firm. On account of these economies, proportional increase in returns is more thanthe proportionate increase in factors of production. All these economies are only internal economies as these are related to the scale of production of the concerned firm.

3.4.2.2 Constant Returns to Scale

Constant returns to scale occur when a given percentage increase in all factor inputs causes equal percentage increase in output. Therefore, if we are doubling or trebling all factors then output will also respond in the same proportion. For instance, if 100% increase in all factor inputs causes 100% increase in output, it is a case of constant returns to scale. In mathematics, the case of constant returns to scale is called as linear homogeneous production function or homogeneous production function of the first degree.

Thus, constant returns to scale occurred when total output increases at the same rate at whichall the factors of production are increased. This situation arises, when after reaching a certain levelof production, economies of scale are counter-balanced by diseconomies of scale. This function states that if labour and capital are increased in equal proportion then output will also increasein the same proportion. Cobb and Douglas production function is based on this scale.

3.4.2.3 Decreasing Returns to Scale

Decreasing returns to scale occurs when a given percentage increase in all factor inputs causes proportionately lesser increase in output. If 100% increase in all factor inputs causes, say, only 80% increase in output, it is a case of decreasing returns to scale. The fundamental cause forthe operation of decreasing returns to scale, according to some economists, is when diseconomies surpass economies of scale. For instance, indivisible factors becoming inefficient and less

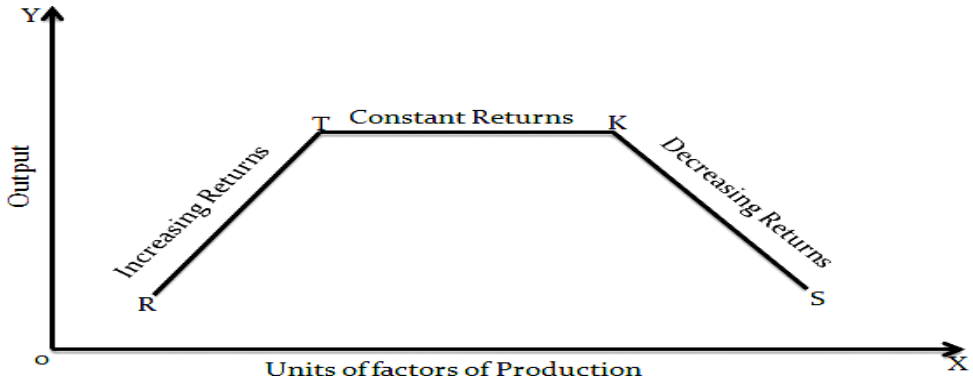
productive, difficulties of control and rigidities due to large managements, higher cost of skilled labour, higher price of raw material and high transport charges. Thus, as a company grows in size, its administrative structure becomes more complex. The management is likewise unable to adapt quickly to shifting demand and cost conditions. After a certain point in the expansion of the factors, diseconomies of scale occur, resulting in decreasing returns to scale. It is important to mention here that there is a difference between decreasing returns to scale and diminishing marginal returns.

Table 3 Returns to Scale

Units of all factor inputs used	Total Returns (quintals)	Average Returns (quintals)	MarginalReturns (quintals)	Scale
One	10	10	10	Increasing
Two	22	11	12	
Three	35	11.66	13	
Four	60	15	25	Constant
Five	85	17	25	
Six	102	17	17	Decreasing
Seven	114	16.28	12	

The former arises due to the increasing complexities of the organisation, while the latter is due to the application of increasing units of a variable factor to fixed factors. Table 3 explains the law of returns toscale, when the units of all factors are increased in the same proportion, the total output responds at different rates i.e., increasing, constant and decreasing.

The returns to scale can be explained with the help of a figure. It will be seen from figure 2 that when the units of factors of production are increased, the output increases at a higher scale initially.



As more and more units are put into the production process the marginal product becomes constant because the percentage increase in output is equal to the percentage increase in inputs. If we

increase further the units of inputs the output will start declining**.** In this figure, the product curve shows increasing returns from R to T, constant returns from T to K and diminishing returns from K to S. From the above discussion, it is clear that when the units of all the factors are increased in the sameproportion, total output increases at the different rates i.e., increasing, constant and decreasing.

Check Your Progress -III

Q.1 What is the law of returns to scale? Explain the different stages of this law.

Ans:_____

_____

Q2. Which is the rational stage of production and why?

Ans:_____

_____

3.5 Summary

In this unit, we discussed that the production function describes a physical relationship which must be combined with prices of inputs to determine the efficient resource combination of producing a specific level of output. There are two types of input-output relations or production functions. Firstly, the production function when the quantities of some inputs are kept constant and the quantity of one input are varied which is called the law of variable proportion. Secondly, the input-output relation by varying all inputs proportionally is called as returns to scale. Since in the long run all factors can be varied, thus law of returns to scale relates to long-run production function. The way resources are combined in a production process, the productivity of resources in various combinations and the prices of the resources involved in the production process all have a major role in determining the cost of production of a commodity. Thus, production is the most important activity taking place in an economy because the decisions about what to produce and how to produce are important to any economic system.

3.6 Questions for Practice

A. Short Answer Type Questions

Q1. What is the production function?

Q2. Distinguish between fixed and variable factors of production?

Q3. Mention the assumptions of law of variable proportion.

Q4. Explain the law of increasing returns to a factor.

Q5. What do you understand about the law of returns to scale?

Q6. Define long run production function.

Q7. Define TP, AP and MP.

Q8. Distinguish between fixed and variable factors of production.

Q10. Will a producer ever stop in stage 1st and 3rd of production?

Q11. Which is the rational stage of production?

Q12. What are diminishing returns and increasing returns to scale?

B. Long Answer Type Questions

Q1. Explain the law of variable proportions. Explain various stages of this law with the help of a table and a diagram.

Q2. State and explain the law of variable proportions. How does it differ from the law ofreturns to scale?

Q3. Explain and illustrate the three stages of production with the help of law of variable proportions. In which stage a rational producer would like to operate?

Q4. Explain and illustrate the law of diminishing returns. Why does this law operate? Does it apply to agriculture only?

Q5. Explain the circumstances under which the increasing returns to a factor operate. Is it always applicable to industry?

Q6. What do you understand by returns to scale? Explain the three types of returns to scale.

3.7 Suggested Readings

- L. Ahuja, Principles of Microeconomics, S. Chand & Company Ltd. New Delhi
- D.N. Diwedi, Microeconomics, Theory and Application, Vikas Publishing House, New Delhi.
- Perloff, J. M, Microeconomics, Theory and Application with Calculus, Pearson Addison Wesley.
- Koutsoyiannis, A, Modern Microeconomics, The Macmillan Press Ltd.

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

COURSE: MICRO ECONOMICS I

UNIT 4: CONCEPTS OF COST AND REVENUE STRUCTURE

STRUCTURE

4.0 Learning Objectives

At the end of this unit, the learner will be able to:

- Determine the meaning of fixed and variable cost.
- Know the concept of short run cost curves under traditional theory of cost
- Define the concept of long run cost curves under traditional theory of cost.
- Describe the short run and long run cost curves under modern theory.

4.1 Introduction

The production is one of the important activities of any economy. There are four factors of production i.e., land, labour, capital and entrepreneurship. Production is mainly transformation of inputs into output. For production purpose, when these factors are used then some remuneration is given to these factors for their services, payment made to them is cost for the production unit. The payment made to the use of inputs is called cost. The importance of costs cannot be ignored especially in the modern world. Costs are one of the important factors that determine the size and quality of the product. The costs affect both the supply and demandin a society. The cost of production in relation to price advises a firm to produce or not to produce and determine the level of production or service to be provided to the customers.

4.2 Types of Costs

There are different types of costs used in price theory, these are money costs, explicit costs, implicit costs, real costs, opportunity costs, private and social costs etc.

1) **Money Cost:** It is the money outlays of a firm on the processes of production of its output.A producer considers only the money costs of procuring the inputs necessary for products.These are the payment made to buy raw material, rent, wages and salaries paid to its labour, buying and repairing of machinery, payment for electricity, fuel, transportation, insurance and tax payment etc. Money cost is the production cost expressed in monetary terms.

2) **Explicit Cost:** These refer to all those expenses made by firm to buy goods directly. These include purchase of raw material, depreciation charges, fuel, electricity bills, transportation cost etc. so directly made to the agents. These are also called accounting costs.

3) **Implicit Cost:** These refer to implied or unnoticed costs. Implicit costs are the costs of self -owned or self -employed resources. These include rent on his own land, interest paid on his own capital and salary to his own labour. The accounting costs or the contractualcash payment, which the firm makes to other factor owned for purchasing or hiring the various factors are also known as explicit costs. The money rewards for other factors the entrepreneur himself owns and employs in the firm are known as implicit cost. The economiststake into consideration both the explicit and implicit cost.

   Economic cost = Accounting costs + Implicit costs

   =Explicit cost + Implicit costs

4) **Real Cost:** The producer calculates his private cost of production only and he does not include those costs which are borne by the society is called real cost. A mill owner will count his money cost only and ignore the sufferings or sacrifices of the people living nearby, who have to pay in the form of increased medical bills due to smoke coming outof chimneys or water waste coming out of the mill.

5) **Opportunity Costs:** The concept of opportunity cost occupies a very important place in modern economic analysis. The opportunity cost of any commodity is the next best alternative that is sacrificed. Prof. Benham defines the opportunity cost as, "The opportunity cost of anything is the next best alternative that could be produced instead bythe same factors or by an equivalent group of factors, costing the same amount of money."

The concept of opportunity cost bears two important points first, the opportunity cost of anything is only the next best alternative foregone. Thus, opportunity cost producing a good is not any other alternative good that could be produced with the same factors, it is only the most valuable other good, which the same factors could produce Second point worth noting is all the factors used in the production of one thing may notbe the same as are required for the production of next best alternative good.

Therefore, the opportunity cost of a good should be viewed as the next-best alternative good that could be produced with the 'same value' of the factors which are more or less the same. It is the cost of production of any unit of commodity for the valueof factors of production used in producing another unit. These are also known as the alternative costs or transfer costs. With the given resources in a factory washing machinesand refrigerators can be produced, only washing machines are produced worth two lakhs so opportunity cost of refrigerators is two lakh rupees.

6) **Private and Social Costs:** There are certain costs which arise due to the function of the firm but do not normally figure in business decisions nor are such costs explicitly paid by the firms. Certain such costs are paid by the society. Thus, the total cost generated by the firm's decision may be divided into two categories.

   a) Those paid out or provided by the firms and are known as 'private costs',

   b) Those not paid by the firms including use of resources freely available plus the disutility created in the process of production and are known as 'Social costs'

Private costs are those which are actually incurred or provided for by an individual or a firm on the purchase of goods and services from the market. For a firm, all the actual costs, both explicit and implicit, are private costs. Private costs are internalised in the sense that 'the firm must compensate the resources owned in order to acquire the right to use the resource.' It is only the internalised cost that is incorporated in firm's total cost to production.

Social cost, on the other hand, implies the cost which society bears on account of production of a commodity. Social cost includes both 'private cost' and 'external cost'. External cost includes (a) the cost of 'resources for which the firm is not compelled to pay a price', e.g., atmosphere, rivers, lakes and also for the use of public utility services like roadways, drainage system etc. and (b) the cost in the form of disutility created through air, water and noise pollution's etc. The cost of expenditure incurred to safeguard the individual and public against various kinds of health

hazards created by production system and thus, is used in the estimation of social costs.

Check Your Progress- I

Q1. Differentiate between Explicit and Implicit costs.

Ans:_____

_____

Q2. What is opportunity cost?

Ans:_____

_____

4.3 Theories of Cost

Now, we will explain the shape of cost curves in short run and long run with the help oftraditional and modern theories of costs.

4.3.1 Traditional Theory of Cost

There are some factors which can be readily adjusted with the changes in output level.These factors may be labour, raw material etc. On the other hand, there are some factors such as capital equipment, buildings etc. which can't be so readily varied. It requires a comparatively longer time to make variations in them. The factors such as raw materials, labour etc., which can be readily varied with the change in the level are known as variable factors and the factor

such as capital equipment and buildings which cannot be so readily varied are called fixed factors.

Corresponding to this distinction between variable factor and fixed factors, economists distinguish between short run and long run. The short run is a period of time in which outputcan be increased or decreased by changing only the amount of variable factors such as labour, raw material etc. In the short run, quantities of the fixed factors such as capital equipment, factory building etc. cannot be varied, i.e. the quantities of fixed factors remain unaltered.

On the other hand, the long run is defined as the period of time in which the quantities of all factors may be varied, all factors being variable in the long run.

In the short run, almost all the factors of production are fixed in quantity and the total fixed costs (TFC) include the expenditures of the firm per unit of time for all the fixed inputs. Similarly, the total variable costs (TVC) are the total expenditure incurred by the firm per unitof time for all variable inputs. Total cost equals total fixed cost plus total variable cost. Some other concepts of

costs include explicit costs and implicit costs. Explicit cost includes the value of actual inputs used by the firm to produce the product. The value inputs owned by the firm should be estimated from what they could earn in their best alternative use.

4.3.1.1 Fixed Costs and Variable Costs

Fixed costs are those costs which are independent of output, that is they do not change with changes in output. These costs are a 'fixed' amount which must be incurred by a firm in the short run whether the output is large or small. Even if the firm closes for some time in the short run, these costs have to be borne by it. Fixed costs are also known 'as overhead costs' and include charges such as contractual rent, insurance fee, maintenance costs, interest on capital invested, property taxes minimum administrative expenses etc. Thus, fixed costs are those which are incurred in hiring the fixed factors of production whose amount cannot be altered in the short run.

Variable costs, on the other hand are those costs, which are incurred on the employment of variable factors of production, and their amount can be altered in the short run when output rises or falls. If the firm shuts down for some time in the short run, it will not use variable factors and will not, therefore, incur any variable costs. Variable costs are also called 'prime costs' or 'direct costs.' The sum of total fixed cost and total variable costs is called the total cost of production. The total fixed cost curve is horizontal straight line to the OX axis which shows that whatever the quantity of output the same i.e. constant. The total variable cost curve is sloping upward rising from zero output initially gradually and later at a fast speed. Besides this, the total cost of the vertical addition of total fixed cost (TFC) and total variable cost (TVC).Since the TFC is constant the difference between TC and TFC will always continue to be the same.

Total cost of business is the sum of its total variable costs and total fixed costs.

$$TC = TFC+TVC$$

Where TC = Total costs, TFC= Total fixed costs TVC= Total variable costs

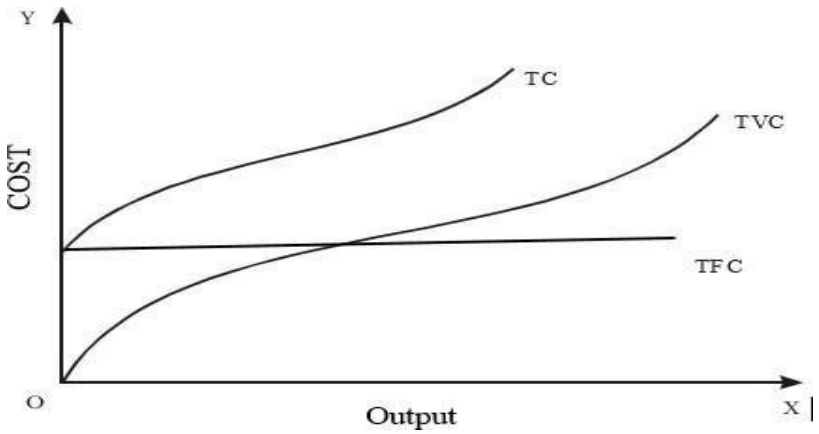


Figure 1

One or more factors of production are fixed quantity in the short run. Total fixed cost (TFC), total variable cost (TVC) and total cost (TC) have been shown in fig. no. 1

Since the total fixed cost remains constant whatever the level of output, the total fixed cost curve is parallel to the X-axis. It is seen in the fig. 1 that total fixed cost curve starts from apoint on the Y-axis meaning thereby that total fixed cost will be incurred even if output is zero. On the other hand, the total variable cost curve (TVC) rises upward showing thereby that as the output is increased, the total variable costs also increase. The total variable cost curve TVC starts from the origin which shows that when output is zero, the variable costs are also nil. It is also noted that TC is a function of the total output.

TC = f (Q)

Total cost curve (TC) has been obtained by adding up vertically total fixed cost and total variable cost curve. Therefore, vertical distance between TVC and TC is constant throughout.

The total cost curve (TC) is exactly the same as that of the total cost (TVC) because the same vertical distance always separates the two cost curves.

4.3.1.2 Short-Run Average Cost Curve

The short run is a period of time in which output can be increased or decreased by changing only the amount of variable factors such as labour, raw material etc. In the short run, quantities of the fixed factors such as capital equipment, factory building etc. cannot be varied,

i.e. the quantities of fixed factors remain unaltered.

The concept of average costs is more frequently used term in economic theory. Average cost is total cost divided by the number of units of total output produced.

AC= TC/TQ

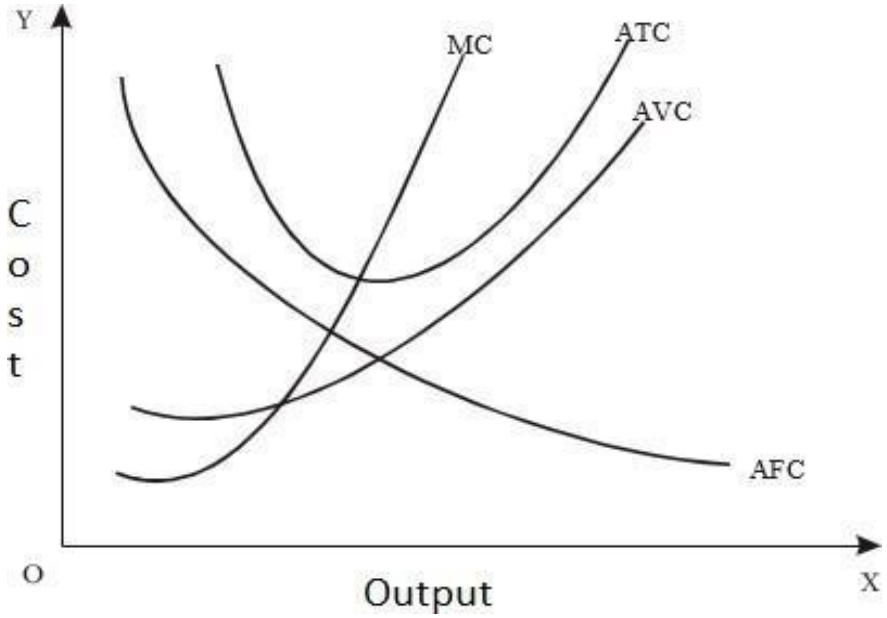
A. Average Fixed Cost (AFC)

Average fixed cost is the total fixed cost divided by the number of units of total output produced. Therefore,

AFC = TFC/TQ

Where TQ is total output produced. It is seen from the figure2 that the average fixed cost continuously falls throughout.

Figure 2



The average fixed cost curve possesses another property; if we pick up any point on the (AFC) curve and multiply it with the corresponding quantity of output produced, the product will be same because total fixed cost remains constant throughout.

B. Average Variable Costs (AVC)

Average variable cost is the total variable cost divided by the number of units of output produced. Therefore

AVC = TVC/TQ

Thus, average variable cost is variable cost per unit of output. The average variable cost will generally fall as the output increases from zero to the normal capacity output due to the occurrence of increasing returns. But beyond the normal capacity output the average variable cost will rise steeply because of the operation of diminishing returns.

Average Total Cost ATC or AC

Average total cost of what is simply known as average cost is the total cost divided by the number of units of output produced.

Average cost = Total Cost/Output

$$AC = TC/TQ$$

Since the total cost is the sum of total variable cost and total fixed cost, the average total cost is also the sum of average variable cost and average fixed cost.

$$TC = TVC + TFC \quad AC = AVC + AFC$$

The shape of average total cost will depend on average fixed cost and the average variable cost. We find in the Fig. 2 that in the beginning, both AVC and AFC curves fall, the ATC curve, therefore, falls sharply in the beginning. When AVC begins rising, but AFC curve is falling steeply, the ATC curve continues to fall. But as output increases further, there is a sharp rise in AVC which more than offsets the fall in AFC. Therefore, the ATC curve rises after a point. Therefore, the average cost curve (ACC) like the AVC curve first falls, reaches its minimum value and then rises. Average cost curve is therefore almost of a 'U' shape.

4.3.1.3 Short Run Marginal Cost Curve

The concept of marginal cost occupies an important place in economic theory. Marginal cost is 'addition' to the total cost caused by producing one more unit of output. In other words, marginal cost is the addition to total cost of producing n units instead of n-1 units where n is a given number.

$$MC = TC - TC_{n-1}$$

Since marginal cost is a change in total cost as a result of change in output, it can also be written as:

$$MC = \Delta TC / \Delta TQ$$

Where ΔTC is a change in Total cost and ΔTQ is a small change in output.

MC is independent of fixed cost. Since fixed costs do not change with output, there are no marginal fixed costs when output increases.

$MC_n = TC_n - TC_{n-1} TC = TVC + TFC$

$= TVC_n + TFC - TVC^{n-1} - TFC$

$=TVC_n - TVC_{n-1}$

Marginal cost is independent of fixed cost and, thus, can be directly attributed to change in variable cost

$$MC = \Delta TVC / \Delta TQ$$

4.3.1.4 Relation Between Average and Marginal Cost Curves

The relationship between the marginal cost and average cost is same as that betweenany other marginal average quantities. It can be illustrated with the help of following example shown in table no. 1.

Table 1**:** Relationship Between Average and Marginal Cost

Units of Output	Fixed Cost (Rs.)	Variable Cost (Rs.)	Total Cost (Rs.)	Average Cost (Rs.)	Marginal Cost (Rs.)
1	42	60	102	102	
2	42	110	152	76	50
3	42	150	192	64	40
4	42	210	252	63	60
5	42	310	352	70.4	100
6	42	540	552	97	230

The relationship between average and marginal cost can be shown with the help of fig. 3 when marginal cost is above average cost, the average cost rises but when marginal cost is below the average cost, average cost falls. When marginal cost stands equal to the average cost, the average cost remains constant. The minimum point of marginal cost curve comes prior to the minimum point of average cost curve.

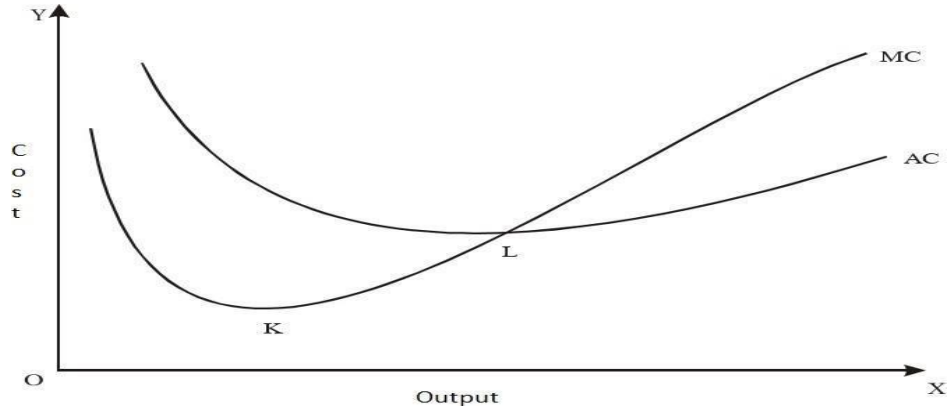


Figure 3: Relationship between Marginal Cost and Average Cost Curves

It is not necessary that when average cost curve is falling, marginal cost curve will also be falling what can be said definitely is that, when average cost curve is falling, marginal cost curve will be below the average cost curve.

Average Cost (AC) Curve U-shaped

Basically (AC) average cost curve gets its shape because of the operation of the law of variable proportions. In the beginning, the proportion of fixed factors is relatively large as these are under-utilised in the beginning. Therefore, AC will fall with increase in the amount of variable factors. When the proportion between fixed and variable factors is most desirable, AC touches its minimum. Later on, proportion of variable factors becomes relatively larger and, therefore, AC swings upward. In other words, we know that AC is the addition of AFC and AVC. In the beginning both AFC and AVC fall with increase in output, therefore, AC should decline as more is produced. AC does not necessarily go up as AVC begins to rise because during this period fall in AFC may be greater than rise in AVC only when increase in AVC is more than a decrease in AFC, that AC will move up. Thus, AC has a minimum point at a large output while AVC records a minimum at a lower output. The availability of internal economies and diseconomies also offer an explanation to the U-shape of average cost curve. It is because of due to the application of the law of the diminishing returns (or increasing costs) that the AVC curve rises. That is why it becomes U shaped.

Check Your Progress-II

Q1. Explain short run cost curves.

Ans:_____

_____

Q2. Why is Average Cost (AC) Curve U-shaped?

Ans:_____

_____

4.3.1.5 Long-run Average Cost Curve

All factor inputs are assumed to be freely variable in the long period. There is a view represented by economists like Knight, John Robinson and Kaldor that if all factors are freely variable and the commodity is perfectly divisible, a large firm has no advantage over a small firm under perfect competition. For this view inputs all economies and diseconomies in production to the existence

of indivisible factors and assumes that there are no independent economies or diseconomies of scale. The scale of a firm is increased accordingly as it increases all of its factors inputs together in the same proportion so that the proportion in which they are combined remains the same. Naturally, then the long period cost curves of the firm (LAC and LMC) willbe horizontal as shown in Fig. 4 below:

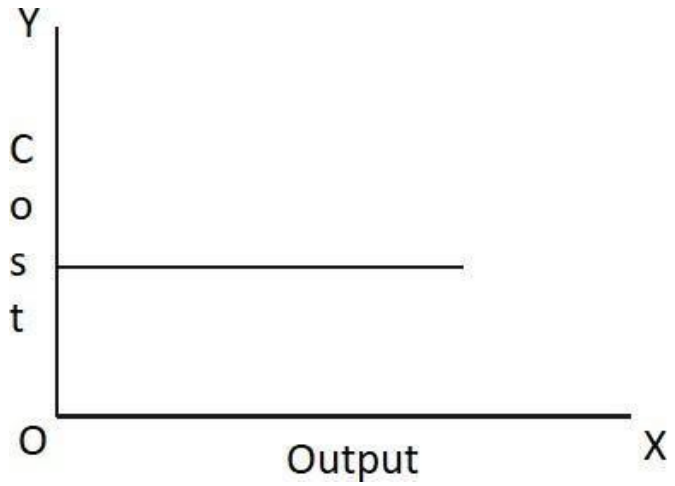


Figure 4

But there is an opposite view represented by Chamberlin, according to whom there are independent economies as well as diseconomies of scale. If we agree with this view, the long period cost curves will also be U-shaped as shown in Fig. 5 below:

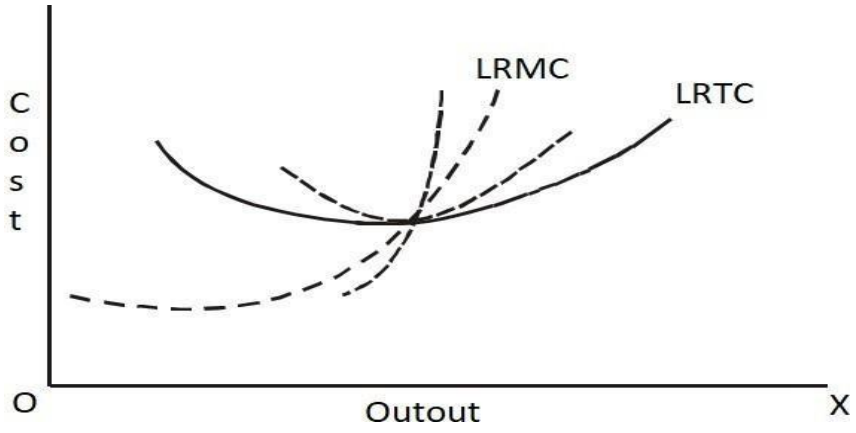


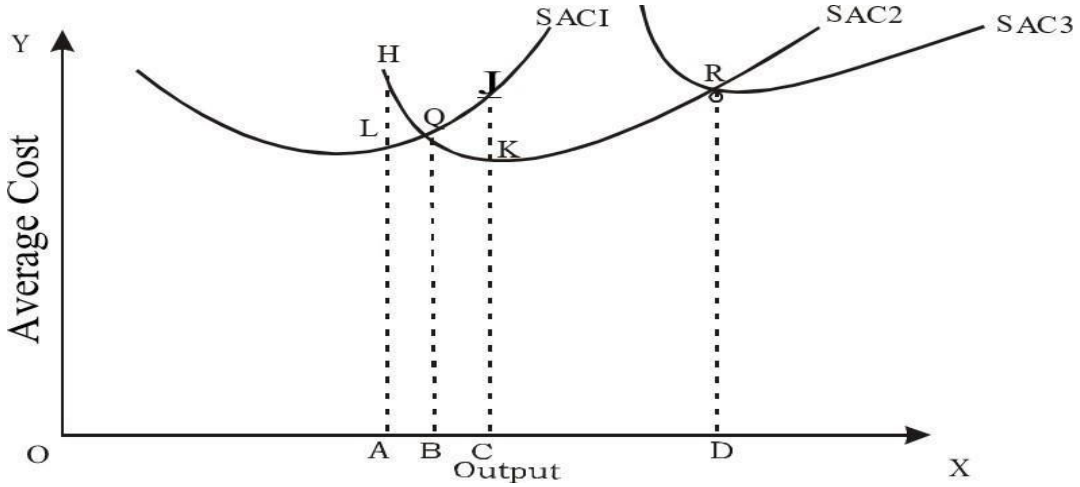
Figure 5

However, they will be flatter than the short-period cost curves for the obvious reason that in the long period it is possible to adjust the factor proportion adequately and thus to reduce the rate

at which total cost tends to change in the firm's output.

In the long run, none of the factors is fixed and all can be varied to expand production and, therefore, the firm has no fixed costs in the long run. A long run cost curve depicts the functional relationship between output and long run cost of production. Long run average cost curve depicts the possible average cost of producing all possible level of output.

In order to understand the derivation of long run average cost curve, we consider the three short run average cost curves as shown in the figure 6. These short run average cost curves are also known as plant curves. In the short run, the firm can be operating on any short run average cost curve, given the size of the plant. It is seen that upto OB amount of output, the firm will operate on the short run average cost curve SAC1 though it could also produce with short run (Figure 6)



It is seen that upto OB amount of output, the firm will operate on the short run average cost curve SAC1 though it could also produce with short run average cost curve SAC2 because upto OB amount of output production on SAC_1 curve entails lower cost than on SAC_2. For instance, if the level of output OA is produced with SAC_1 it will cost AL per unit and if it is produced with SAC_2, it will cost AH per unit. It is clear from the figure that AL is smaller than AH. Similarly, all other output levels upto OB can be produced more economically with the smaller plant SAC1 than with the larger plant SAC_2. It is thus clear that in the long run the firm will produce an output which is larger than OB (but less than OD), than it will be economicalto produce on SAC_1. It will be seen from the figure that the output is larger than OB but lessthan OD, can be produced at a lower cost per unit on SAC_2 than on SAC_1. Thus, the output OCif produced on SAC_2 costs CK per unit which is lower than. CJ which is the cost incurred when produced on SAC_1. Therefore,

if the firm plans to produce between outputs OB and OD, it will employ the plant corresponding to short-run average cost curve SAC_2. If the firm has to produce an output which exceeds OD, then the cost per unit will be lower on corresponding to the short-run average cost curve SAC_3 than on SAC_2.

It is, thus, clear that in the long run the firm has a choice in the employment of a plant, and it will employ the plant which yields possible minimum unit cost for producing a given output. The long run average cost curve depicts the least possible average cost for producing various levels of output when all factors including the size of the plant have been adjusted.

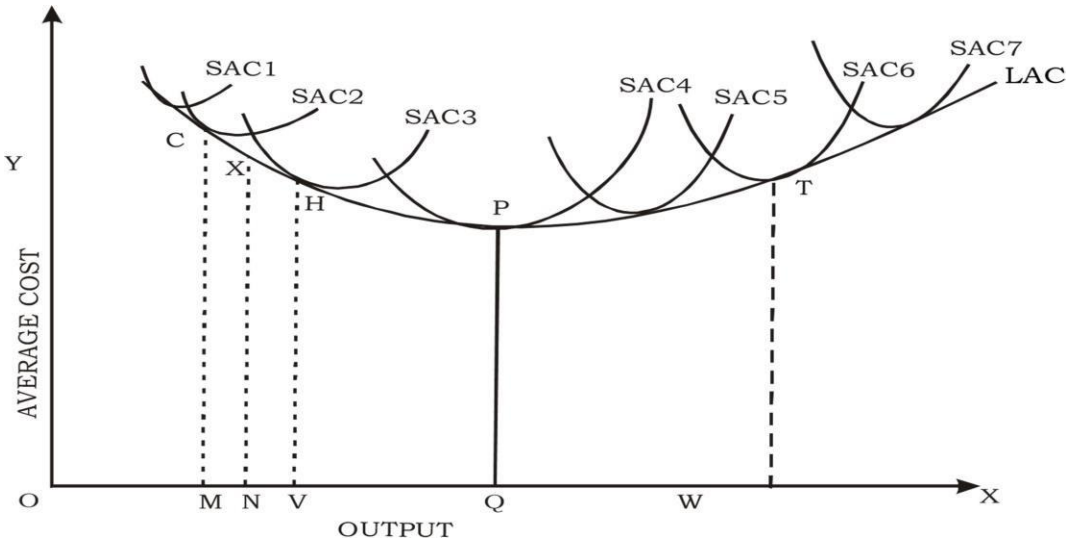


Figure 7: Long Run Average Cost Curves

Suppose now that the number of alternative plants that the firm can have are very large. Then instead of having a wide area for each short period AC, now the LAC will have one point from each SAC, the point of tangency LAC and the relevant SAC. The LAC then envelops the SACs hence it is known as the 'envelop curve'. As Leftwich writes 'the point of tangency is taken to minimum cost for any given output, the firm should use the scale of plant whose short run average cost curve is tangent to the long-run average cost at that output.

The LAC is tangent to only the lowest SAC at the minimum point of the latter. In caseof all those plants which come earlier the point of tangency is prior to the minimum point of SAC, indicating that a bigger plant reduces cost. But in the case of plants coming after thelower SAC, the points of tangency are to the right of the minimum of SACs implying that over utilisation of a smaller plant reduces cost rather than the construction of a bigger plant. Thus LAC is the locus of all those points which represent minima of cost of production for various output levels. LAC is

also called envelope curve.

Long- Run Average Cost Curve in Constant Cost Case

If the production function is linear and homogeneous and also the prices of inputs remain constant, then the long run average cost will remain constant at all levels of output as depicted in fig. 8

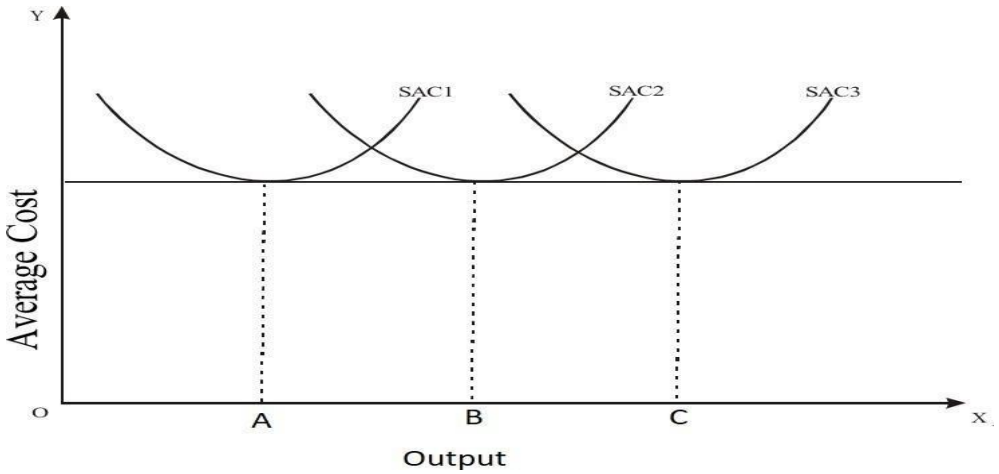


Figure 8: Long Run Average Cost Curve

It will be noticed that all the short run average cost curves such as SAC_1, SAC_2 and SAC_3 have the same minimum average cost of production. This means that whatever the size of the plant, the minimum average cost of production is the same. This implies that all factors can be adjustedin the long run in such a way that the proportion between them always remains optimum.

4.3.1.6 Long-run Marginal Cost Curve

The long run marginal cost curve can be directly derived from the long run total cost curve, sine the long-run marginal cost at a level of output is given by the slope of the total cost curve at the point corresponding to that level of output. In the figure 9 long run marginal average cost curve which is U-shaped. It is noticeable that long run marginal cost (LMC) curve is flatter than the short-run marginal cost curves.

The relationship between long run marginal cost curve and long run average cost curve is the same as that between short-run average and short-run marginal cost curve. It is also seen thatat the level of output at which a particular SAC curve is tangent to the LAC curve the corresponding SMC curve intersects the LMC curve. In other words, at the level of outputwhere the short- run average cost is equal to the long run cost, the corresponding short-run marginal cost is equal to long run marginal cost too.

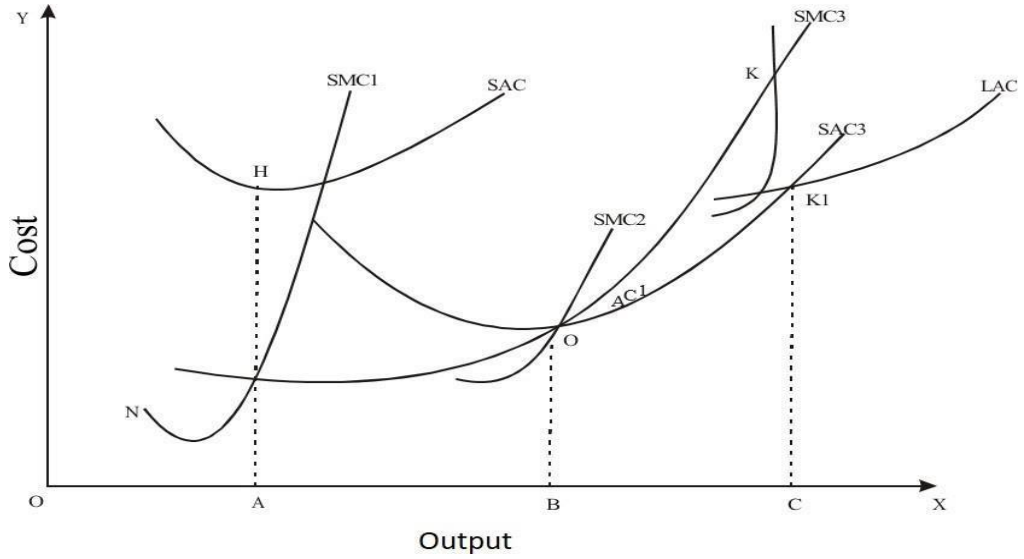


Figure 9 Long Run Marginal Cost Curve

Check Your Progress-III

Q1. Why long run cost curve is called envelope curve?

Ans:_____

Q2. Explain the long run cost curves in Traditional theory of costs?

Ans:_____

4.3.2 Modern Theory of Cost

The traditional theory of cost has been criticised by a number of scholars and and they have given new theories of costs. The writers of this new approach were mainly G. Stigler, Sargent Florence, C. A. Smith, K.J. Arrow etc., It was in 1939 that G. Stigler advanced the idea that average variable cost in the short-run has a flat stretch over a period of time. It is also called saucer-shaped short run average variable cost (SAVC). It is also argued that this flatness is mainly due to the fact that firm helps some provision for additional productive capacity which is known as the 'reserve capacity' to increase the output in the context of abrupt demand of its product.

4.3.2.1 Short run Average Cost Curves

A. Average Fixed Cost Curve: Some changes have been introduced regarding the average fixed cost (AFC). Basically, this cost comprises of the cost of physical and personal organisation of the firm i.e., the following one;

a) The salaries of staff employed directly in production and paid on a fixed term basis.

b) The wear and tear of machinery.

c) The salaries and expenditures of administrative staff.

d) The costs on maintenance/repair of buildings.

e) Expenses on the maintenance of land.

The importance of AFC is that it mainly determines the size of the plant. The entrepreneur would like to plan the level of output that he can produce efficiently and flexibly. Moreover, such a plant will have the capacity more than the 'expected average' level of sales. It is because of the businessman prefers to have some 'reserve capacity' due to some reasons. Actually, he wants to meet seasonal and cyclical fluctuations in his demand. Secondly, the reserve capacity would provide more freedom to increase his output in case of abrupt increase in demand for his product. Thirdly, the reserve capacity is required to have time for repairs without affecting the running of the plant continuously. At fourth place, some kind of technology needs reserve capacity because it is very difficult to install and operate time and again. Even at the organisational and administrative level some reserve capacity is needed for employing the administrative staff to allow some increase in the production operations of the firm.

The figure 10 shows that the firm has some largest

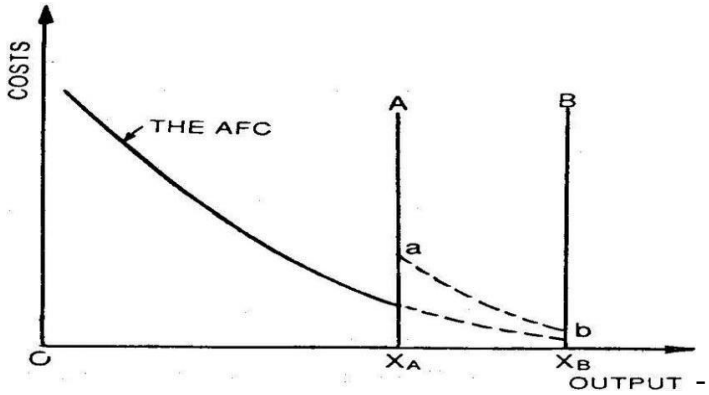


Figure 10

capacity units of machinery which causes setting an absolute limit B in case of short run increase in output. Besides, the firm has small unit machinery which limit expansion of output to boundary (A) given in the diagram.But this is not an absolute boundary as the firm can expand its output in the short-run to absolutelimit B. This can be done either by paying overtime to direct

labour for working longer hours.In this context AFC is depicted by dotted line in the figure or this limit can be increased by purchasing some additional small units types of machinery. In this context AFC curve shifts upwards but starts declining again.

B. Average Variable Cost curve

In the modern theories of cost, P.W.S. Androw's theory come to be one of the most recognised theories regarding average variable cost. In his theory cost consists of (i) rawmaterials (ii) direct

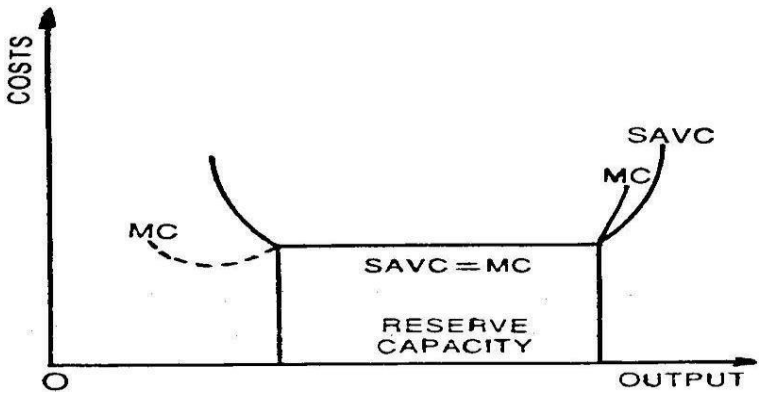
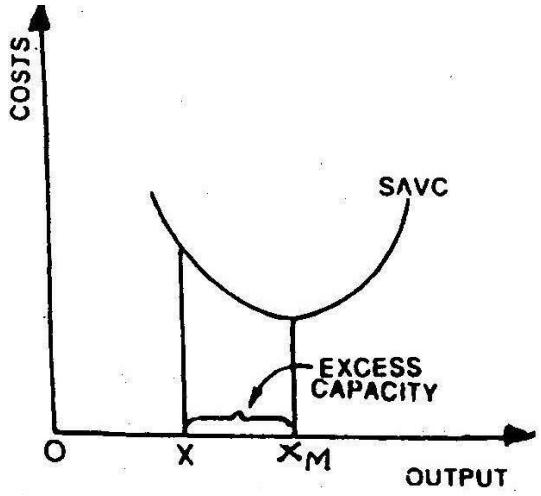
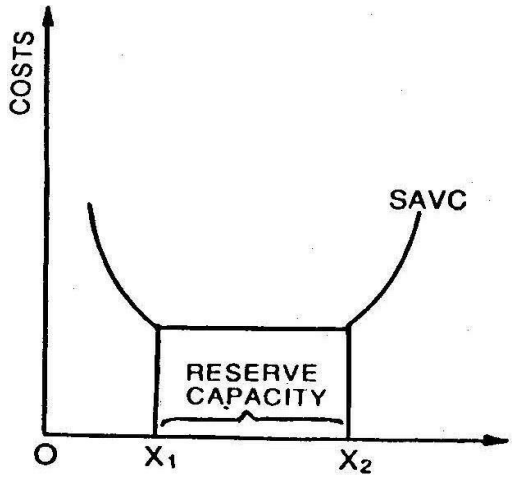


Figure 11

labour that changes with output and (iii) running costs of machinery.

In the short run, average variable cost is almost like U shaped but having a flat stretch over reasonable range of production as is shown in the figure 6. This flat stretch shows that the SAVC coincides with MC which remains per unit of output. Whereas to the left of this range of stretch MC remains below SAVC but on the right-side MC remains above the SAVC. The declining portion of the SAVC indicates fall in costs because of better utilisation of the fixed factors. It is mainly because of this both skills and productivity increase of variable factor i.e. labour. This





better skill further reduces the cost of production by making the proper use of raw materials etc. But the rising part of the SAVC indicates the declining productivity of labour due to frequent breakdown of machinery because of its over rise, the increasing cost of labour due to overtime payments, etc. The importance of SAVC with having a certain as flat portion that represents a reserve capacity of the firm necessary for fulfilling the urgent demand of its product. The reserve capacity has been shown in figure 12

But it is different from the excess capacity that increases with the U-shaped cost curves as given in the traditional theory of firms. This traditional theory in a way takes the assumption that each plant is designed without any flexibility. It is designed in such a way that optimal production take place only in a single level of output (x_m in the figure 12). If a firm produces output x whichis smaller than x_m $x_1$there is excess capacity i.e. equal to the difference between x-x_1. Thisexcess capacity is considered undesirable as it leads to higher units costs.

In the modern theory of costs, the range of output x_1x_2 as shown in figure 12 reflects the planned reserve capacity which does not lead to increase in costs. The firm anticipates using its plant sometimes closer to x_1 and other closer to x_2. Usually on an average an entrepreneur wants to operate his plant within the range of x_1 x_2. It is said that generally firms consider the 'normal' level of utilization of the plant which may be somewhere between two-third and three-quarters of their capacity. It has been shown at a point closer to X_2 and X_1.

B. Average Total Cost Curve

In the modern theory, it becomes desirable to know the shape of the average total cost curve especially when the variable cost curve has a saucer type shape. This has been depictedin figure no. 13

4.3.2.2 Short run Marginal Cost Curve

The ATC curve continues to decline up to certain level of output (X_A) and at this point the reserve capacity ends. At this level of output the MC intersects the average total cost curve at its minimum level. This takes place to the right of the level of output X_A, where the flat portion of SAVC comes to its end.

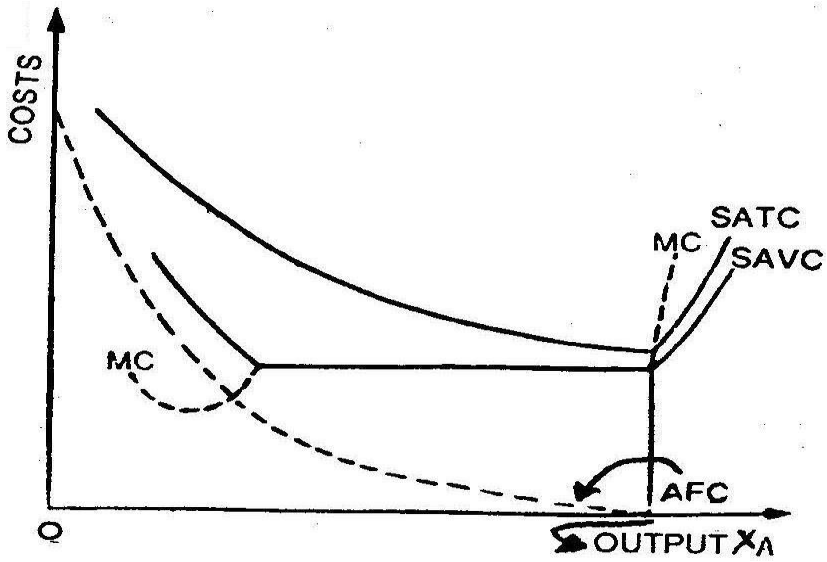


Figure 13

Long Run Average Costs Curve (L-Shaped Cost Curve)

In the long-run all costs are considered variable costs and these costs make the long-run cost L-shaped. These costs have been further divided into production costs and managerial costs. At the large scale of production, managerial costs may increase but on the other hand, the production costs decline more than the increase in managerial costs. It is due to this fact thatthe total LAC curve declines with the increase in scale.

Production costs decline steeply in the beginning and then gradually. As the scale of production increases, the L-shape of the production cost curve is described by the technical economies of the large-scale production. If the large firms introduce new techniques, they must be cheaper to operate. Anyhow, even with the existing known technology some economies can always be achieved at the larger output. It may be because of further decentralisation, skill improvement, secondly, less repair costs as firm reaches a certain size, and thirdly a multiproduct firm may well undertake itself in the production of some of the material or equipment, which it requires rather buying from other firm's managerial costs. There exists various level of management each with its appropriate kind of management techniques. There are small scale and large-scale organisational techniques, having different techniques of management that fall up to certain plant size but at very large scale of production managerial costs may rise but at a very slow rate.

In brief, production cost falls smoothly at large scales but managerial cost may rise at a slow rate at very large scale.

Today, modern scholars seem to accept the decline in technical costs more than that of the probable rise of managerial costs, that is why the LRAC curve falls smoothly or remains constant at a very large-scale output. LAC may be drawn implying that each short period SRAC which includes production costs, administrative costs, other fixed costs and an allowance for normal profit. LAC curve may be drawn by joining the points on the SATC curve correspondingto the two thirds of the full capacity of every plant size. This has been shown in figure 14

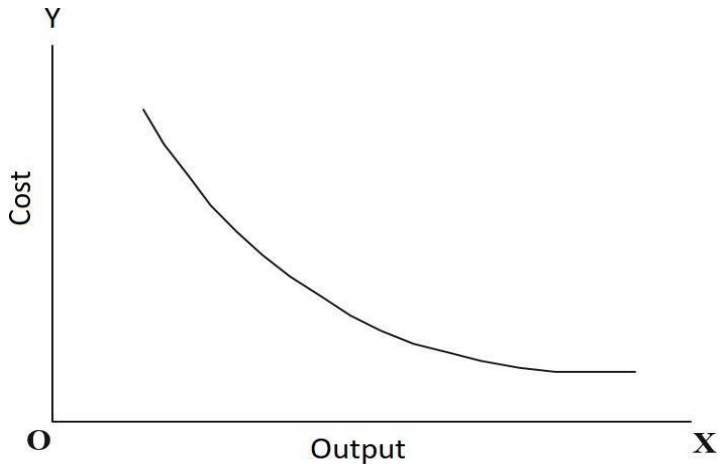


Figure. 14

4.3.2.3 Long Run Marginal Cost Curve

If LAC declines continuously the LMC will be below the LAC at all scales as have been shown in figure 15.

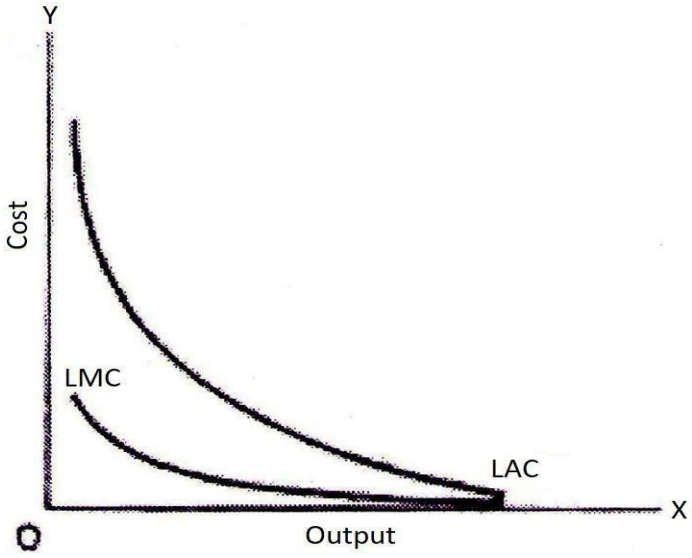


Figure 15

There is a minimum optimal scale of plant (in figure 15) at which all possible scales of economies are enjoyed, but beyond those scales the LAC remains constant. Here the LMC lies below the LAC until the minimum optimal scale is been achieved and coincides with the LAC beyond that level of output as shown in figure 16.

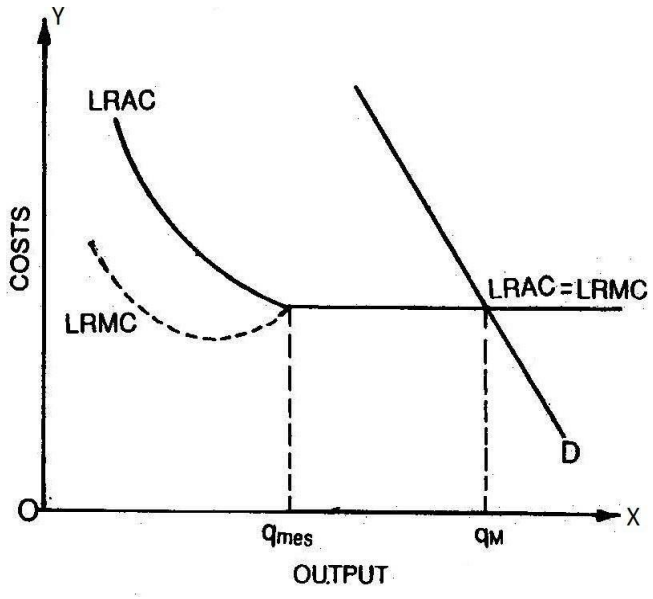


Figure 16

The above shapes of costs are more realistic than the traditional theory using U shaped cost curves.

Check Your Progress-IV

Q1. Explain average variable cost of short run of modern theory of cost?

Ans:_____

_____

Q2. What do you mean by average total cost of short run?

Ans:_____

_____

Q3. Explain long run cost curves.

Ans:_____

_____

4.4 Revenue Concepts

Every producer, after producing a product is interested to sell his product in the market. The

revenue of a firm, together with its cost, determines profit. In this chapter, we study theconcept of revenue. The term 'revenue' refers to the receipt obtained by a firm from the saleof certain quantities of a commodity at various prices. There are three main types of revenuei.e., total revenue, average revenue and marginal revenue. The revenue is required for determination of price. Without revenue profit cannot be found out. Even in market forms equilibrium can be found out with the help of revenue.

The three basic revenue concepts are:

- Total Revenue
- Average Revenue
- MarginalRevenue

4.4.1 Total Revenue (TR)

Total revenue is the amount of income received by the firm from the sale of its products. It is obtained by multiplying the price of the commodity by the number of units sold. The income which a firm receives after selling its output in the market is known as total revenue.

Total Revenue = Price x quantity sold

$$TR = P \times Q$$

where, TR denotes Total Revenue, P denotes Price and Q denotes Quantity sold.

For example, a calculator company sold 100 calculators at the price of Rs. 500 each. TR is Rs. 50,000. (TR= 500 × 100 = 50,000).

Table 2: Total Revenue at Constant Price

Quantity sold (Q)	Price (P)	Total Revenue (TR)
1	5	5
2	5	10
3	5	15
4	5	20
5	5	25
6	5	30

When price is constant, the behaviour of TR is shown in table 2, assuming P=5.When P = 5;

TR = PQ and TR=5x1=5

When price is declining with increase in quantity sold. (eg. Imperfect Competition on the goods market) the behaviour of TR is shown in table 3and figure 17.

Table 3: Total Revenue when Price is Declining

Quantity sold (Q)	Price (P)	Total Revenue (TR)
1	10	10
2	9	18
3	8	24
4	7	28
5	6	30
6	5	30
7	4	28
8	3	24
9	2	18
10	1	10

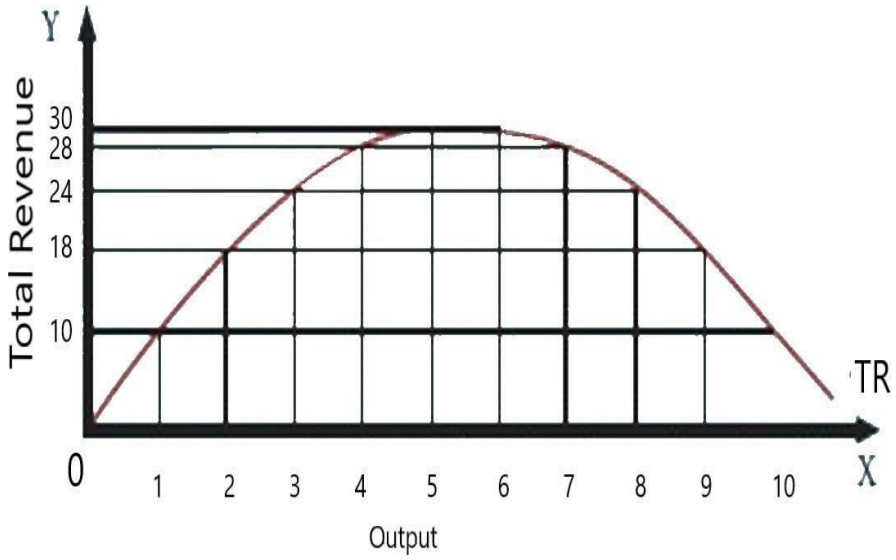


Figure 17

TR = PQ

When P =1, Q=10, TR=1 × 10 = 10When P = 3, Q = 8, TR = 24

When P = 10, Q = 1, TR = 10

4.4.2 Average Revenue (AR)

Average Revenue is the revenue per unit of output sold, found by dividing total revenue by the

number of units sold. In the words of Prof. Liebhafsky, "Average revenue is defined as total revenue divided by the number of units sold. Average revenue is, thus, merely another term meaning price of the product."

Average Revenue (AR) =Total Revenue/No. of units sold

average revenue is the revenue per unit of the commodity sold. It is calculated by dividing the Total Revenue (TR) by the number of units sold (Q)

$$AR = TR /Q; \text{if } TR = PQ,$$

$AR = PQ/Q = P$

AR denotes Average Revenue; TR denotes Total Revenue and Q denotes Quantity of unit sold.

For example, if the Total Revenue from the sale of 5 units is Rs 30, the Average Revenue is (AR= 30/5 =6)

It is to be noted that AR is equal to Price.

$AR=TR/Q = PQ/Q=P$

In other words, average revenue means price. As consumer's demand curve illustrates the relationship between price and quantity demanded, it also represents the average revenue or the price at which various units of the commodity are being sold, since price paid by a buyer constitutes the revenue from the seller's point of view. One man's expenditure is other person's income.

4.4.3 Marginal Revenue (MR)

Marginal revenue is addition made to the total revenue by the sale of an additional unit of the same commodity. In the words of MC Connel, "Marginal revenue is the addition to total revenue which results from the sale of one more unit of output." Marginal revenue can be expressed as

MR	=	$TR_n - TR_{n-1}$
Here, MR	=	Marginal Revenue
TR_n	=	Total Revenue of n Units
TR_{n-1}	=	Total Revenue of (n –1) Units

To illustrate the concept of marginal revenue, it by sale of 10 units total revenue (TR) equals Rs. 1000 and by the sale of 11 units, total revenue (TRn-1) increases to Rs. 1100,

then marginal revenue is Rs. 100 (being the difference between Rs. 1100 and Rs. 1000).

4.5 Relationship between AR and MR

If a firm is able to sell additional units at the same price, then AR and MR will be constant and equal. If the firm is able to sell additional units only by reducing the price, then both AR and MR will falland be different.

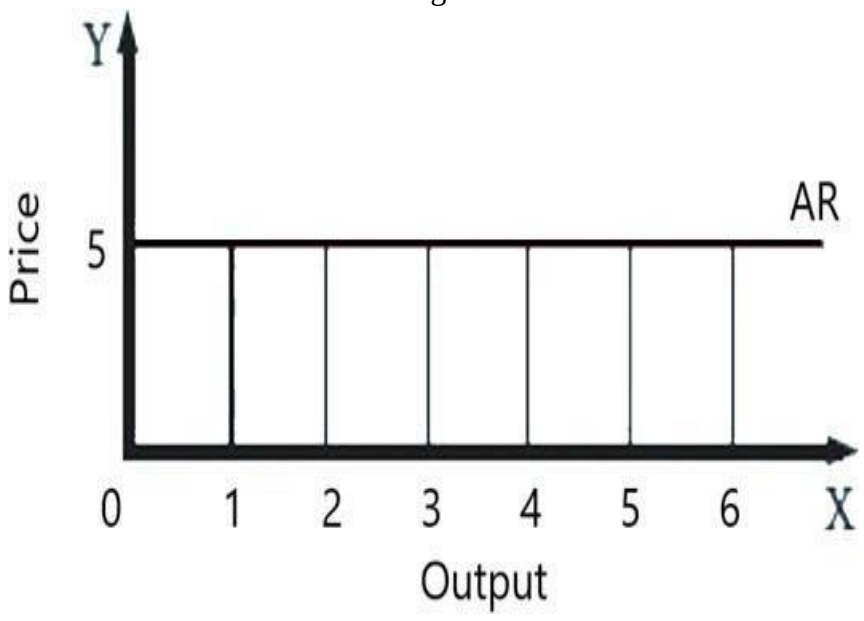
A. Constant AR and MR (at constant Price)

When price remains constant or fixed, the MR will be also constant and will coincide with AR. Under perfect competition as the price is uniform and fixed, AR is equal to MR and their shape will be a straight line horizontal to X-axis. The AR and MR Schedule under constant price is given in Table 4 and in the figure 18.

Table 4: TR, AR, MR at Constant Price

Quantitysold (Q)	Price(P)	Total Revenue (TR)	Average Revenue (AR)	MarginalRevenue (MR)
1	5	5	5	5
2	5	10	5	5
3	5	15	5	5
4	5	20	5	5
5	5	25	5	5
6	5	30	5	5

Figure 18



B. Declining AR and MR (at Declining Price)

When a firm sells large quantities at lower prices both AR and MR will fall but the fall in MR will be more steeper than the fall in the AR. It is to be noted in table 4 and fig.19 that MR will be lower than AR. Both AR and MR will be sloping downwards straight from left to right. The MR curve divides the distance between AR Curve and Y axis into two equal parts. The decline in AR need not be a straight line or linear. If the prices are declining with the increase in quantity sold, the AR can be non-linear, taking a shape ofconcave or convex to the origin.

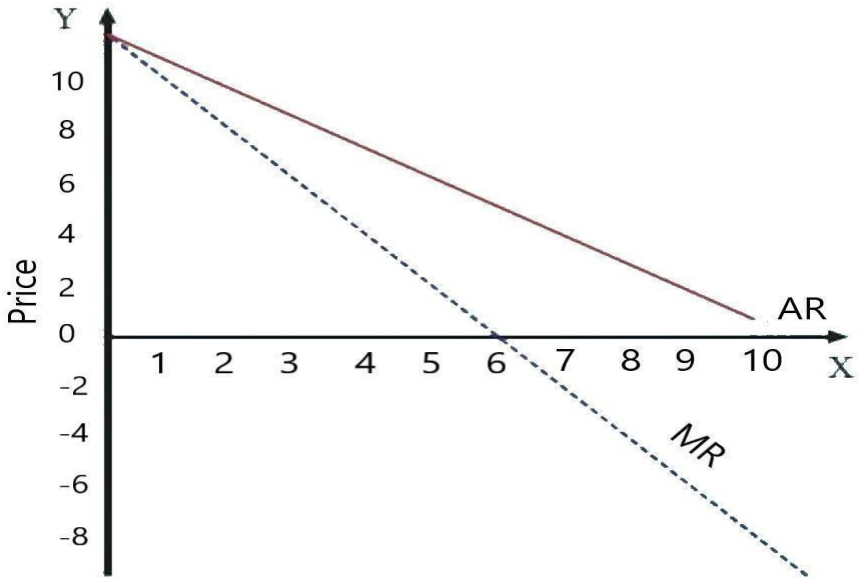
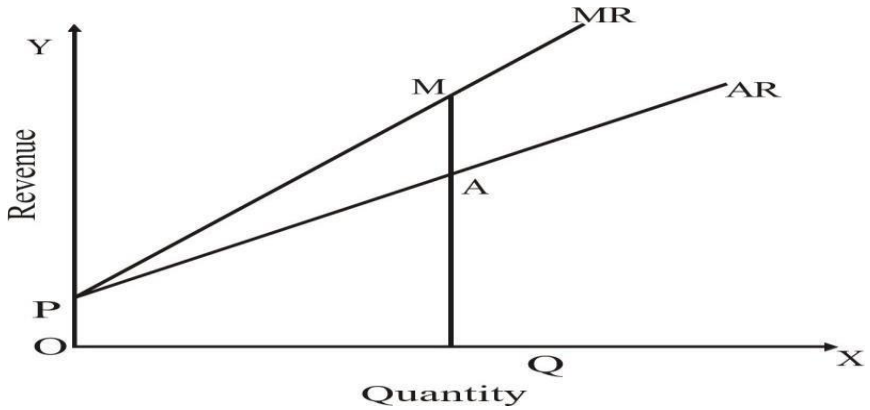


Figure 19

Table 5: AR, TR, MR at declining price

Quantity sold (Q)	Price (P)/ Average Revenue (AR)	Total Revenue (TR)	Marginal Revenue (MR)
1	10	10	-
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	-2
8	3	24	-4
9	2	18	-6
10	1	10	-8

Relationship between AR and MR can be explained as: **If AR Curve is rising upward from Left to Right:** Then MR curve will also rise upward (Figure 20). This means that MR will be greater than AR. And the revenue curves drawn will show that MR curve is above AR curve.



In the above figure, we find that AR and MR starts from the same point P. AR rises upwards from left to right. The MR curve also rises upward and MR curve is above AR curve. It shows

a. MQ > AQ
b. Or MR > AQ

b. If AR Curve is a Straight-Line Downward Sloping: Then MR curve will pass through middle of any perpendicular drawn to the Y-axis.

c. If AR Curve is Convex to the Origin: It means, as more and more of commodities are sold, convexity of the AR shows that AR falls but at a slower rate. In case of MR, the curve will be again convex to the origin. The convexity of the curve shows that MR falls but at a slower speed. When we compare convex AR with convex MR, MR will be falling faster than AR and MR will be below AR.

d. If AR Curve is Concave to the Origin: In that case MR is also concave to the origin. AR curve is concave to the origin, when the curve is sloping downward from left to right, means that AR is falling at a higher rate for additional units, the MR curve will also fall ata higher rate for additional units.

4.6 Relationship between AR, MR and TR

To understand the relationship between AR and MR, let us understand these concepts with the help of a table 6 and figure21.

Table 6: Relationship between AR, MR and TR

Units Sold(q)	AR(P) (TR/q)	TR (Pq)	MR (TRn – TRn–1)
1	10	10	10
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	– 2
8	3	24	– 4
9	2	18	– 6
10	1	10	– 8

he table shows that as price falls from Rs. 10 to Rs. 1, the output sold increases from 1 to 10. TR increase from 10 to 30, then remains 30 and ultimately falls from 30 to 10. We find that when AR falls, MR falls more than that, i.e., from Rs. 10 to 0 and then becomes negative. TR increases initially at a diminishing rate, it reaches maximum and then starts falling.

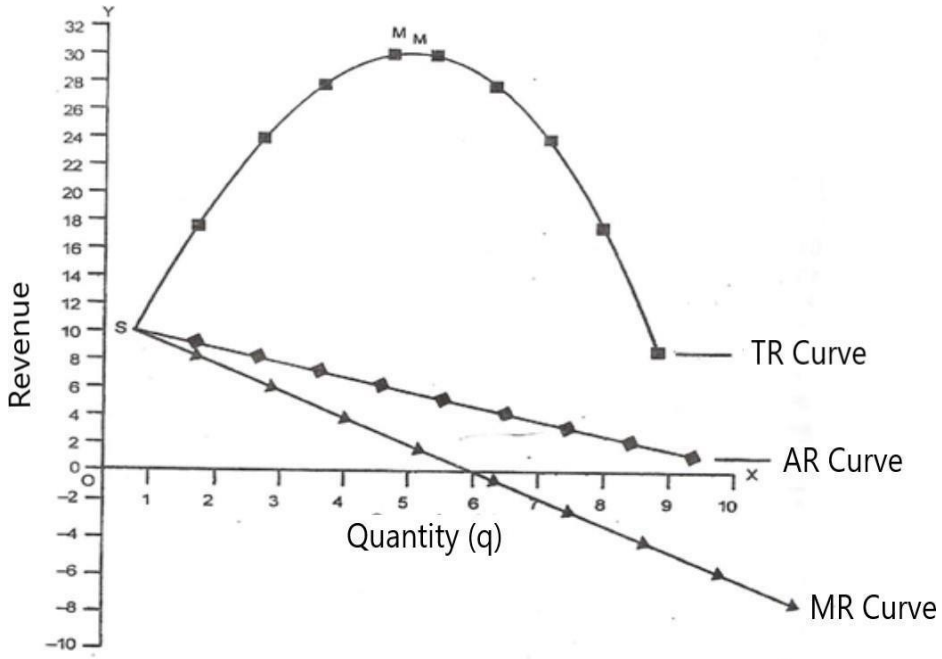


Figure 21

The Fig. 21 shows that TR curves start from S. It is known as initial total revenue.

The TR rises from S to M. At M, TR is maximum. After that, it falls. Thus, TR rises, reaches

maximum and then falls. In the same figure, AR and MR start from point S. AR falls, MR also falls but MR is much below AR. MR falls, reaches zero and then it becomes negative.AR falls but remains positive throughout. When average revenue functions are linear (straight lines), the rate of fall of marginal revenue is double the rate of fall of average revenue.

When marginal revenue is positive, total revenue rises, when MR is zero the total revenue becomes maximum. When marginal revenue becomes negative total revenue starts falling. When AR and MR both are falling, then MR falls at a faster rate than AR.

4.4 Relationship between AR, MR, TR and Elasticity of Demand

The relationship among AR, MR and elasticity of demand (e) is stated as follows.

$$MR = AR\ (e-1/e)$$

The relationship between the AR curve and MR curve depends upon the elasticity of AR curve (AR = DD = Price).

a. When price elasticity of demand is greater than one, MR is positive and TR isincreasing.
b. When price elasticity of demand is less than one, MR is negative and TR isdecreasing.
c. When price elasticity of demand is equal to one, MR is equal to zero and TR ismaximum and constant.

It is to be noted that, at the output range of 1 to 5 units, the price elasticity of demand is greater than one according to total outlay method. Hence, TR is increasing and MR is positive (Table 6, Fig 22).

At the output range of 5 to 6 units, the price elasticity of demand is equal to one.Hence, TR is maximum and MR equals to zero.

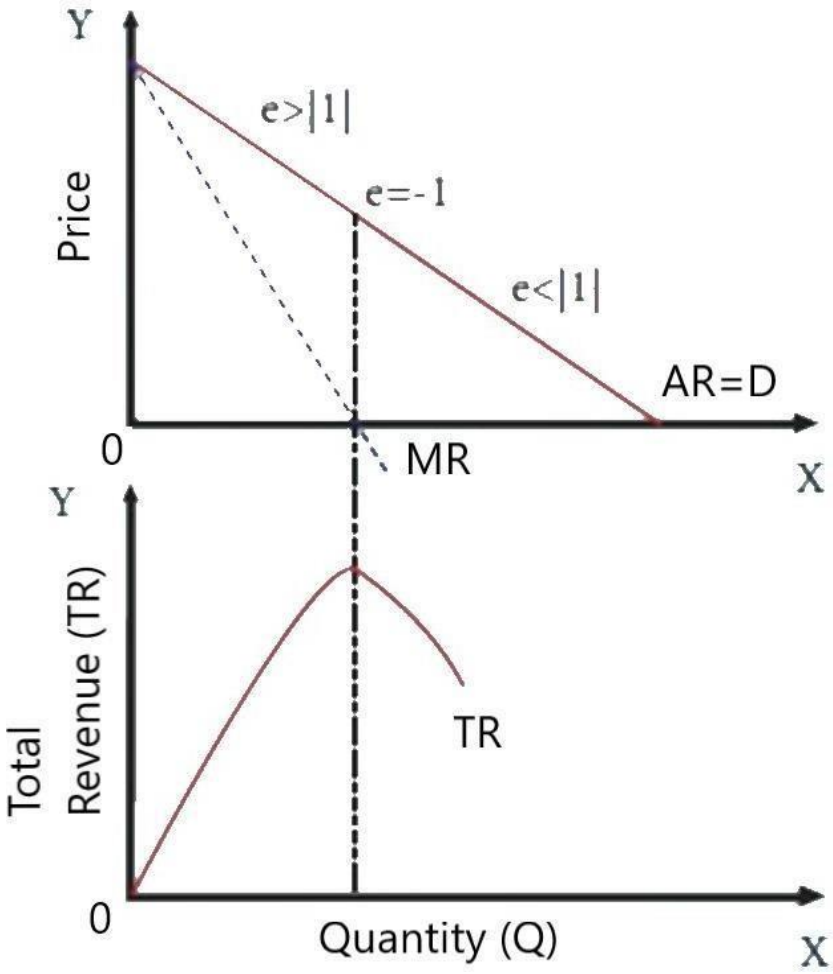
At the output range of 6 units to 10 units, the price elasticity of demand is less than unity. Hence, TR is decreasing and MR is negative.

Table 7: TR, AR, MR and Elasticity

Quantity (Q)	Price (P)	TR	AR	MR	Elasticity
0	11	0	11	-	e > 1
1	10	10	10	10	
2	9	18	9	8	
3	8	24	8	6	

4	7	28	7	4	
5	6	30	6	2	
6	5	30	5	0	e = 1
7	4	28	4	-2	e < 1
8	3	24	3	-4	
9	2	18	2	-6	
10	1	10	1	-8	
11	0	0	0	-10	

Figure 22



The exception occurs under conditions of perfect competition wherein demand is perfectly elastic because the coefficient of elasticity in infinitely large and the term to be subtracted is infinitely small and may be taken as zero.

Through the application of this formula, it can be seen that MR is always positive at any point

where elasticity of AR or demand curve is greater than unity and MR is always negative where elasticity of the AR curve or the demand curve is less than unity.

From this relationship, we can maintain that MR equals price minus the ratio of price toelasticity of demand. It is evident from this relationship that MR is always less than price, with one exception, because it is calculated by subtracting some value, represented by P/E from price.

Check Your Progress-V

Q1. Define AR and MR?

Ans:_____

Q2. Explain the terms between AR and TR

Ans:_____

4.8 Revenue Curves

Now we will discuss shape of the revenue curves and their relationship in different market forms.

4.8.1 Revenue Curves Under Perfect Competition

Under perfect competition or a Perfectly competitive market, the firm is a price taker. It cannot change the market price as it has to sell its products at the price prevailing in the market. If a firm tries to sell its products at a price above the market price, it can lose its customers in the market. It is because there would be other firms in the market which sell the same products at the price prevailing in the market or at a lower price than the firm's price.

Therefore, under perfect competition, the firm has to accept the price prevailing in the market-determined by market forces such as demand and supply. Hence, it means that the average revenue or the price would remain constant for the firm. Furthermore, constant AR implies constant MR. Thus, it means that under perfect competition, AR=MR=Price.

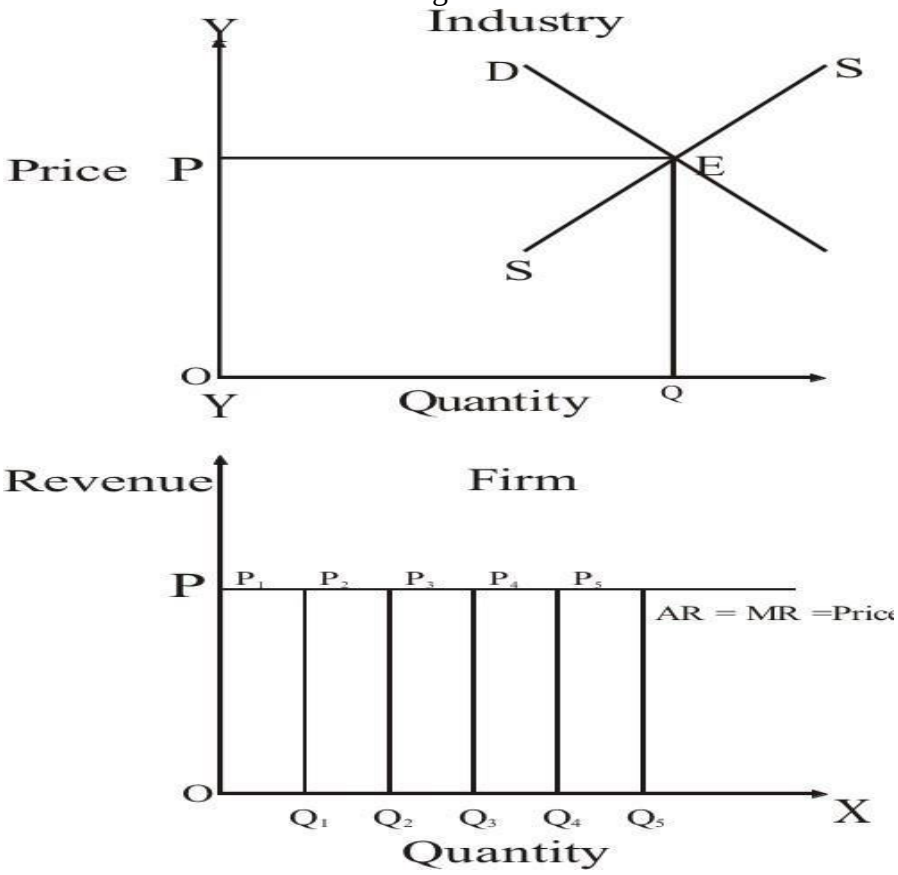
AR is constant, MR will also be constant. In this case AR and MR will be equal. It happens under perfect competition where AR curve and MR curve of the firm will coincide. Thecurves drawn will be horizontal i.e., parallel to X-axis. Now, we can show with the help of following table 8 and fig 23. As we increase output, price or AR remains the same, i.e. Rs. 10.TR increases but at a constant rate.

MR is also constant i.e., Rs. 10 and it is equal to AR.

Table 8: Relationship between TR, AR and MR

Units Sold	Price (AR)	TR	MR
1	10	10	10
2	10	20	10
3	10	30	10
4	10	40	10
5	10	50	10

Figure 23



In fig, X-axis shows the output sold and the Y-axis shows the revenue. As shown in Fig. at price, OP, the seller can sell any amount of the commodity. In this case the AR curve is the horizontal line. The MR curve coincides with the AR. It is so because additional units are soldat the same price as before. In that case AR= MR. A noteworthy point is that OP price is determined by Demand and Supply of industry and the firm only follow.

Here, the horizontal straight line indicates the firm's revenue curve (price line or demandcurve). It implies that at Rs.10 per unit, the seller or firm can sell any quantity of output. Therefore, the

firm's AR curve is perfectly elastic under perfect competition.

4.8.2 Behaviour of AR and MR under Imperfect Competition

If AR falls, MR also and MR falls faster than the AR. In that case MR is below AR. The downward slopping of AR and MR curves is actually found in case of a firm. It can be shown with the help of a table 9 and fig 24.

Table 9: Relationship between AR, MR and TR

Units Sold Price (AR)	Price	TR (pxq)	AR (TR/q)	MR (TRn –TRn–1)
1	10	10	10	10
2	9	18	9	8
3	8	24	8	6
4	7	28	7	4
5	6	30	6	2

The above table shows that as AR or price falls from Rs. 10 to Rs. 6, the TR increases from Rs. 10 to Rs. 30 at a diminishing rate. MR in this case falls from Rs. 10 to Rs. 2. MR is the rate at which TR changes. When we compare AR with MR, we find that AR falls at a slowrate whereas MR falls at a faster rate.

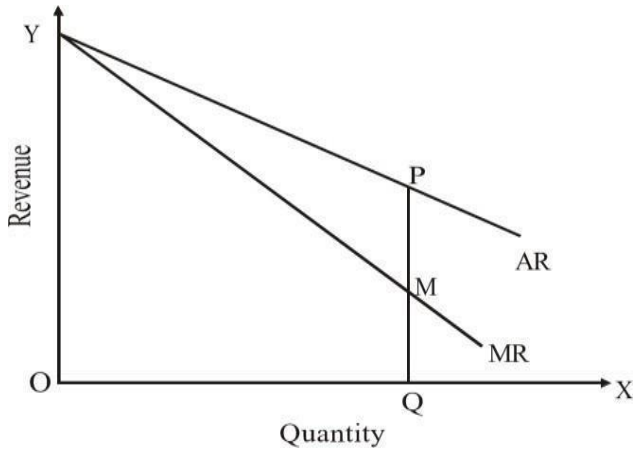


Figure 24

AT OQ output, AR is PQ whereas MR is MQ.PQ > MQ

AR > MR (Since AR = P) or P > MR

4.8.3 Revenue Curve Under Monopoly

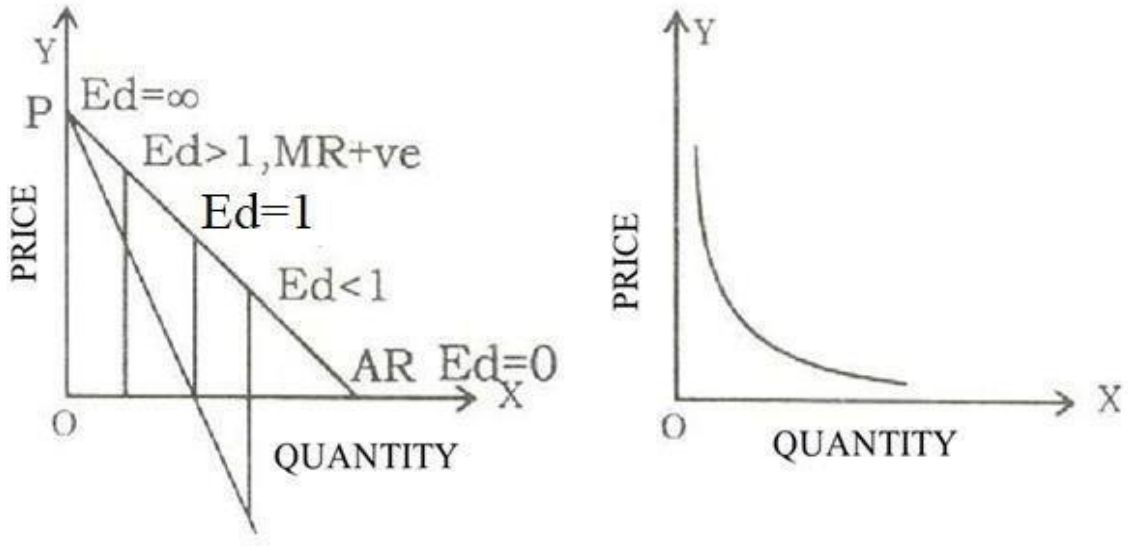
Under the Monopoly market, there is a single seller in the market. Thus, a monopolist is a price maker. It implies that if a monopolist firm wants to sell more in the market, it can reduce the

price of the product. The demand curve for the monopolist's product is also market demand curve for the product since by definition the monopolist is the only supplier in the industry. As the demand curve of the consumers for a product slope downwards, the monopolist faces a downward sloping demand curve. It thus implies that the monopolist can expand the demand for his product by lowering the price. The market demand curve facing downward the monopolist can expand the demand for his product curve since price is identical with average revenue. Unlike perfect competition, where average revenue curve is a horizontal straight line, average revenue curve of the monopolist is downward sloping. It shows the sales he would be able to have at different prices. Since average revenue curveslopes downwards. Throughout its length marginal revenue curve will also slope downward and lie below average revenue curve. It because marginal revenue fails at a much faster ratethan the average revenue. It implies that whenever the monopolist sells a large quantity, the price of his product falls, hence marginal revenue must be less than the price.

Under this type of market, the firm's average revenue curve slopes downward from left to right. Accordingly, the firm's AR curve or demand curve or price line slopes downward. Also, if the AR curve slopes downward, the MR curve also slopes downward, and faster thanthe AR curve. So that MR<AR.

The average revenue and marginal revenue are related to each other through elasticity of AR curve, MR can be known with the help of the following formula:

MR = AR[e/e-1]



Here AR stands for average revenue and e for elasticity AR can also be known by the following formula:

Price = AR = MR[e-1/e]

Since elasticity will be less unity, MR will be less than price. The extent to which MR lies below AR depends upon the value of the fraction It becomes evident from the fig 25 (a) that

Fig. 25 (a) Fig. 25 (b)

where elasticity of AR curve is greater than unity.

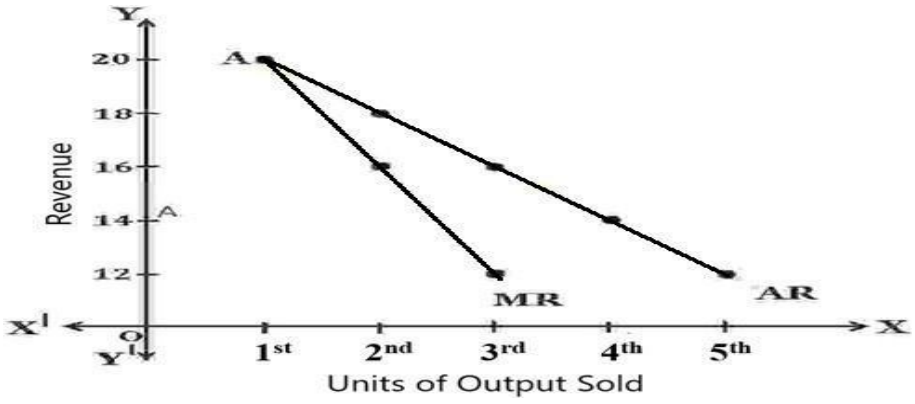
MR is always positive. Where it is equal to unity, MR is always Zero. In case the elasticity of AR curve is unit throughout its length like a rectangular hyperbola, the MR curve will coincide with X- axis as shown with dotted line in Figure 25 (b).

The following schedule illustrates the behaviour of AR, MR and TR in a monopoly market:

Table 10: Relationship between AR, MR and TR

Output/SalesQ (In units)	**Average Revenue AR = TR/Q = Price(in Rs.)**	**Total RevenueTR = AR*Q (In Rs)**	**Marginal RevenueMR = TRn– TRn-1 (In Rs.)**
1	20	1*20=20	20
2	18	2*18=36	16
3	16	3*16=48	12
4	14	4*14=56	8
5	12	5*12=60	4

The above table 10 shows that the monopolist sells 5 units of a product when the price is Rs.12 per unit. If it increases its price to Rs.14, he can sell only 4 units. Similarly, as he tries to increase the price, the demand for the same would decline.



On the other side, in a monopoly market, if a firm wants to sell more units, it will lower the price of the product. In the table, it is evident that if the firm increases the sales from 1 unit to2 units, the price would be reduced to Rs.18 from Rs.20. Likewise, the increment in sales to 3,4 and 5 units results in a reduction in prices to Rs.16, Rs.14 and Rs.12 respectively.

In fig 26, X-axis shows the output and Y-axis shows the average revenue and marginal revenue. Here, AR shows the average revenue curve and MR shows the marginal revenue curve. The point A indicates equal AR and MR. Furthermore, the AR curve slopes downward showing less price with an increase in sales of output. It represents that a monopoly firm mustlower the price or AR of product to sell more of it. Also, If AR falls, MR would also fall but faster than the AR resulting in MR < AR.

4.8.4 Revenue Curve under Monopolistic Competition

Under Monopolistic competition, the market involves features of both perfect competition and monopoly. It is more common than in the other two markets. Furthermore, in this type of market, there are a large number of sellers having products with some differentiation to createa monopoly in the market. As a result, there wouldn't be closer substitute and competitive product in the market. It implies that if a monopolist firm wants to sell more inthe market, it can reduce the price of the product. Under this type of market, the firm's average revenue curve slopes downward from left to right.

Table 11: Relationship between AR, MR and TR

Output/SalesQ (In units)	Average Revenue AR = TR/Q = Price(in Rs.)	Total Revenue TR = AR*Q (In Rs)	Marginal Revenue MR = TRn– TRn-1 (In Rs.)
1	20	1*20=20	20
2	19	2*19=38	18
3	18	3*18=54	16
4	17	4*17=68	14
5	16	5*16=80	12

The above table 11 shows that the monopolistic firm sells 5 units of a product when the priceis Rs.16 per unit. If it increases its price to Rs.17, he can sell only 4 units. Similarly, as he tries to increase the price, the demand for the same would decline.

On the other side, in a monopolistic market, if a firm wants to sell more units, it will lower the price of the product. In the table, it is evident that if the firm increases the sales from 1 unit to2 units, the price would be reduced to Rs.19 from Rs.20. Likewise, the increment in sales to 3,4 and 5 units results in a reduction in prices to Rs.18, Rs.17 and Rs.16 respectively.

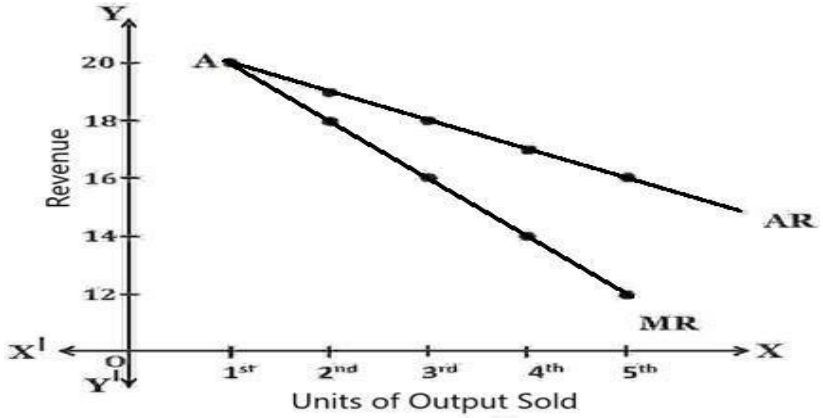


Figure 26

In fig 27, X-axis shows the output and Y-axis shows the average revenue and marginal revenue. Here, AR shows the average revenue curve and MR shows the marginal revenue curve. The point A indicates equal AR and MR. Furthermore, the AR curve slopes downward showing less price with an increase in sales of output. It represents that a monopolistic firm must lower the price or AR of product to sell more of it. Also, If AR falls, MR would also fall but faster than the AR resulting in MR < AR.

The difference between the monopoly and monopolistic competition is that under monopolistic competition, the AR curve is more elastic. It means that in response to a given change in price, the change in demand will be relatively more for a monopolistic competitive firm than monopoly firm. It is because of the availability of close substitutes in monopolistic competition and there is no close substitute in monopoly.

4.9 Significance of Revenue Curves

The main points of the significance of AR and MR curves are as under:

A. **Estimation of Profits and Losses:** A producer finds out whether he is making supernormal profits, normal profits or sustaining losses. For this purpose, he compares AR with AC:

IF AR > AC, the firm makes the supernormal profits.IF AR = AC, the firm earns normal profits. IF AR < AC, the firm sustains losses.

B. Equilibrium: The other point of importance of AR and MR curves is to know how much a producer should produce. The firm will be in equilibrium at that point where MR = MC. This is a general condition for the firm under all market situations.

C. Capacity Utilisation: It is through revenue curves that we come to know whether a firmis producing to its full capacity or not e.g. under perfect competition, if AR curves are tangent to AC curve at its minimum point, the firm will be producing at its full capacity.

D. Price Changes: The concepts of AR and MR are also useful to the factor services (such as rent, wages, interest and profits) in determining their prices. In factor pricing, they become inverted U-shaped. The AR and MR curves become ARP and MRP (Average Revenue Productivity and Marginal Revenue Productivity).

Check Your Progress-VI

Q1. Explain the shape of revenue curves in perfect competition.

Ans:_____

Q2. Explain the shape of revenue curves in imperfect competition?

Ans:_____

Q3. Why AR curve slopes downward in monopoly?

Ans:_____

4.10 Summary

In the short run, almost all the factors of production are fixed in quantity and the total fixed costs (TFC) include the expenditures of the firm per unit of time for all the fixed inputs. Similarly, the total variable costs (TVC) are the total expenditure incurred by the firm per unitof time for all variable inputs. Total cost equals total fixed cost plus total variable cost. Some other concepts of costs include explicit costs and implicit costs. Explicit cost includes the value of actual inputs used by the firm to produce the product. The value inputs owned by the firm should be estimated from what they could earn in their best alternative use. Cost curves are a useful tool to analyse firm behaviour. In most cases, we can observe three properties of cost curves. The marginal cost

curve eventually rises as output increases, the average total cost curve is U-shaped, and the marginal cost curve intersects the average total curve at its bottom. Revenue refers to the amount received by a firm from the sale of a given quantity of a commodity in the market. Revenue is a very important concept in economic analysis.It is directly influenced by sales level, i.e., as sales increases, revenue also increases. The revenue concepts are concerned with total revenue, average revenue and marginal revenue. When MR falls but is positive, TR increases at a diminishing rate. When MRis zero, TR is at its maximum point. When MR falls and becomes negative, TR starts falling. Revenue curves have different shapes in different market forms. Revenue curves are important for price as well as for profit determination.

4.11 Questions for Practice

A. Short Answer Type Questions

Q1. What do you mean by Private and Social Costs?Q2. Write a short note on:

- Explicit cost
- Opportunity cost
- Money cost

Q3. Explain the concept of fixed and variable cost of traditional theory of cost.Q4. Define short run average cost curve under traditional theory of cost

Q5. Explain the relationship between AC and MC under short period of traditional cost.Q6. Discuss short run marginal cost curve under traditional theory of cost

Q7. Explain long run cost curve under modern theory.

Q8. Define the terms

a. Total Revenue

b. Marginal Revenue

Q9. Discuss the relationship between TR, AR and MR with the help of suitable diagram.

Q10.Why elasticity of AR curve is greater than unity, MR is always positive and where it is equal to unity?

Q11.Explain the short run curves under monopoly.

B. Long Answer Type Questions

Q1. Explain the relationship among average cost and marginal cost. Why average costcurve is

U-shaped?

Q2. Explain short run cost curves in detail under traditional theory of cost.

Q3. Why LAC curve is also called envelop curve and why it is U-shaped undertraditional theory of cost?

Q4. Discuss the concept of short run cost curves of modern theory of cost with the helpof diagrams.

Q5. Explain the types of revenue curves with the help of table and diagrams.

Q6. Discuss the relationship between TR, AR, MR and elasticity of demand with thehelp of suitable table and diagram.

Q7. Explain the behaviour of AR and MR under monopoly and monopolisticcompetition.

Q8. What are the shapes of AR and MR under perfect and imperfect competition andwhy?

Q9. What is the effect of elasticity on shape of revenue curves under monopolisticcompetition?

4.12 Suggested Readings

- Koutsoyiannis: Modern Microeconomics
- Baumol, W.J. Economic Theory and Operations, Analysis, 4th Edn., Chapter-II
  Ferguson, C.E. Micro Economic Theory, 1972,
- Hicks, J.R., Value and Capital, 2nd Edn., Oxford University Press
- Robinson, Joan, The Production Functions Eco. II, 1955.
- Samuelson, P.A. Foundation of Economic Analysis, Cambridge, HarvardUniversity Press, 1974.
- Stonier A.W. and D.C. Hague, A Text Book of Economic Theory, John Wilcyand Sons
- H.L. Ahuja: Principles of Microeconomics

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

MICRO ECONOMICS I

UNIT 5: PERFECT COMPETITION: FIRM AND INDUSTRY EQUILIBRIUM

STRUCTURE

5.0 Learning Objectives

At the end of this unit, learner will be able to:

- Explain the concept of perfect competition and its features.
- Identify the effects of changes in demand and supply on price.
- Discuss price determination in market time, short time period and long time.
- Determine equilibrium of firm and industry under identical cost conditions.
- Analyse equilibrium of firm and industry under different cost conditions.

5.1 Introduction

The term 'market' is defined as a place where buyers and sellers meet each other for the sale and purchase of commodity. According to Cournot, "Economists understand by the term market not any particular market place in which things are bought and sold but the whole of any region in which buyers and sellers are in such free intercourse with each other that the price of same good tends to equality easily and quickly". Markets can be divided into two broad parts on the basis of competition i.e. perfect competition and imperfect competition. Further, imperfect competition is divided into four parts i.e. monopoly, monopolistic competition, duopoly and oligopoly. In this unit, perfect competition, its features, price and output determination of firm and industry have been analysed.

5.2 Perfect Competition and its Features

Perfect competition is a market form in which there exists large number of buyers and sellers selling homogenous products. According to Chong Yah, "Perfect competition is a market situation where there is a large number of sellers and buyers, a homogeneous product, free entry of firms into the industry, perfect knowledge among buyers and sellers of existing market conditions and free mobility of factors of production among alternative uses." The various characteristics or assumptions of perfect competition are as follows:

1) **Large Number of Sellers and Buyers**: In perfect competition, the number of sellers as well as buyers is infinitely large. The presence of large number of buyers implies that demand for various commodities is continuous and intense in nature. The presence of large number of sellers implies that cut throat competition exists between sellers and buyers. Under perfect competition, presence of large number of sellers indicates that individual seller sells only a small amount of the total demand of the product. Hence, individual seller does not have

control over the supply of the given product and cannot influence the price of the same. Therefore, individual firm is considered to be price taker not the price maker. The market forces of demand and supply help to determine the price of the product in this market situation, moreover these conditions are given for an individual firm. An individual firm has to decide whether it want to sell larger amount or the smaller of the product at given prices.

2) **Homogenous Products:** The products are homogenous in nature in perfect competition. Homogenous means same in quality, size, colour, form etc. In the market, products are perfect substitutes for each other and cross elasticity of demand is infinite in case of such products. The price of every unit of product is same as products are identical. If any firm charges slightly higher price for the given product, whole of the demand will shift to the other producers and consequently, firm will have to reduce the price to the original level and vice-versa.

3) **Free Entry and Exit of Firms**: In perfectly competitive market, firms are allowed to freely enter and exit the industry. If there exists supernormal profit in any industry, firm can independently choose to enter the industry but if there exists situation of losses in the industry, firm can leave the industry freely. The free entry and exit of firms imply that there is slight possibility of the emergence of monopoly and single firm cannot control the price and supply of the product.

4) **Perfect Knowledge:** In perfect competition, sellers as well as buyers have perfect knowledge of market conditions i.e. price, demand and supply. If buyers have perfect knowledge of price and supply conditions then it is not possible for sellers to charge higher price from buyers. Hence, same price will be charged for a certain product throughout the market. If sellers have perfect knowledge of demand conditions, then possibility of over-production or shortage does not exist. Moreover, there is no need for the sellers to advertise their products due to homogenous products and perfect knowledge of market conditions.

5) **Perfect Mobility of Factors of Production**: There exists perfect mobility of all the factors of production in the perfectly competitive market. A slight increase in the price of a certain factor will allow the movement of that factor units from other firms or industries to the specific firm or industry. As a result, the price of that factor will come down to the original level in the specific firm or industry. Hence, prices of various factors of production also remain same in the perfect competition.

6) **Absence of Controls:** The controls on the free choice of producers and consumers in form of price controls, rationing etc. do not exist in perfect competition. If government imposes restrictions, then forces of competition cannot perform their work i.e. free and continuous adjustments in the market, efficiently.

7) **Absence of Transport Cost:** cost for moving the product from one place to another is assumed to be constant. In this market situation, transportation of the products is not required as number of sellers is large, products are homogenous in nature and every commodity is easily available in every locality, village, town and city.

5.3 Price Determination under Perfect Competition

In perfectly competitive market, individual firm is not a price maker rather a price taker. Now the question arises, how the price is being determined under perfect competition. Different economists have given different views regarding this issue. According to Jevons and his followers, price of a commodity is always equal to its marginal utility (MU) i.e. MU=Price. If price is more than the marginal utility i.e. Price > MU, consumer will reduce the purchase of the commodity. individual seller does not have control over the supply of the given product and cannot influence the price of the same. Therefore, individual firm is considered to be price taker not the price maker. The market forces of demand and supply help to determine the price of the product in this market situation, moreover these conditions are given for an individual firm. An individual firm has to decide whether it want to sell larger amount or the smaller of the product at given prices. Therefore, average revenue curve or demand curve for an individual firm is perfectly elastic i.e. parallel to X axis and marginal revenue curve is also a straight line parallel to X axis which coincides with average revenue curve. Marginal as well as average revenue curves have been shown in figure 1.

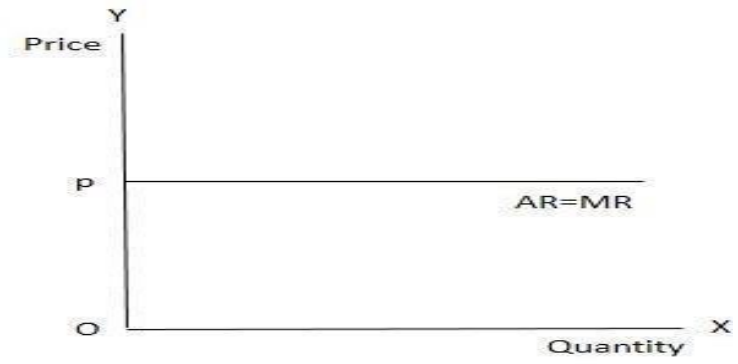


Figure 1: Average Revenue and Marginal Revenue Curves

The quantity and price have been measured on X axis and Y axis, respectively. Op is the given price for the individual firm and at this price firm can sell any amount of the commodity. Therefore, average revenue (AR) curve is perfectly elastic i.e., parallel to X axis and marginal revenue (MR) curve coincides with AR curve.

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Table 1: Price Determination under Perfect Competition

Price of Apples (in Rs. per Kilogram)	Demand for Apples (in Kilograms)	Supply of Apples (in Kilograms)	Changes in Price

20	120	40	D > S, Increase in Price
30	100	60	
40	80	80	D=S, Equilibrium Price
50	60	100	D < S, Decline in Price
60	40	120	

According to Marshall, views of Jevons and his followers as well as Ricardo and his followers are not completely right as price of a commodity is determined neither by its demand only nor by its supply alone. The price of a commodity is determined by both its demand as well as supply. This concept has been explained by Marshall with the help of an example of a pair of scissors. Whenever, a cloth piece is cut by scissors, it seems that only one blade cuts the cloth piece and other remains fixed. If we conclude that one blade of scissors is enough to cut a cloth piece that is totally wrong. If a person is given one blade of scissors to cut a cloth piece then he will not be able to do this. Therefore, both the blades are significant to cut a cloth piece. Hence, price of a commodity cannot be determined either by its demand alone or by its supply alone rather both demand and supply is needed to determine price. If the demand for a product is more than its supply, then it will intensify competition among buyers. Therefore, price has tendency to increase. If the supply of a product is more than its demand, then it will intensify competition among sellers. Therefore, price has tendency to decline. If supply of a commodity is exactly equal to its demand, then there will be no competition among buyers as well as sellers. Hence, there is no tendency for the price of a commodity to rise or fall. Therefore, equilibrium price will be determined at a point where there is equality between the demand for and supply of a commodity. This concept has been explained with the help of a table 1. At price Rs. 20, the demand for apples is 120 kg and supply is 40 kg. Excess of demand over supply will intensify competition among buyers which pushes the price to Rs. 30. At price Rs. 30, the demand for apples is 100 kg and supply is 60 kg. Competition among buyers will continue due to excess of demand over supply which further pushes the price to Rs. 40. At price Rs. 60, the demand for apples is 40 kg and supply is 120 kg. Excess of supply over demand will intensify competition among sellers which reduces the price to Rs. 50. At price Rs. 50, the demand for apples is 60 kg and supply is 100 kg. Competition among sellers will continue due to excess of supply over demand which further reduces the price to Rs. 40. At price Rs. 40, demand for and supply of apples are equal to each other i.e. 80 kg. At this price, there will no competition among buyers as well as sellers and

price has no tendency to increase or decrease. Therefore, Rs. 40 is the equilibrium price which is determined by the equality between supply of and demand for apples. The determination of price under perfect competition has been explained with the help of figure 2.

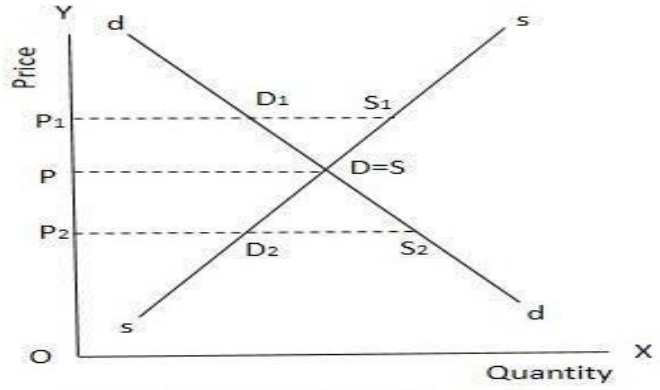


Figure 2: Price Determination

In this figure, dd is the demand curve and ss is the supply curve. At price OP_1, supply is more than demand i.e. $P_1S_1 > P_1D_1$. Excess of supply over demand will reduce the price to OP. At price OP_2, demand is more than supply i.e. $P_2S_2 > P_2D_2$. Excess of demand over supply will increase the price to OP. At price OP, demand is exactly equal to supply i.e. PD = PS. At this price, there will be no competition among buyers or sellers and price has no tendency to increase or decrease. Therefore, equilibrium price is determined by equality between supply of and demand for a commodity.

5.3.1 Effects of Changes in Supply and Demand on Price

The effects of changes in supply and demand on price can be divided into three parts i.e. effects of changes in demand on price, effects of changes in supply on price and effects of simultaneous changes in supply and demand on price.

A. Effects of Changes in Demand on Price

If supply of a commodity is given, increase in demand for a commodity will cause the price to rise due to excess of demand over supply. If supply of a commodity is given, decrease in demand for a commodity will cause the price to decline due to excess of supply over demand. This phenomenon has been explained with the help of figure 3. In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. ss is the supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve ss, OP price is determined. If supply is given but demand increases to d_1d_1, there will be intense competition

among buyers on price OP.

Therefore, price rises to OP_1 with increase in demand. The price OP_1 is determined by the intersection of demand curve d1d1 and supply curve ss. If supply is given but demand decreases

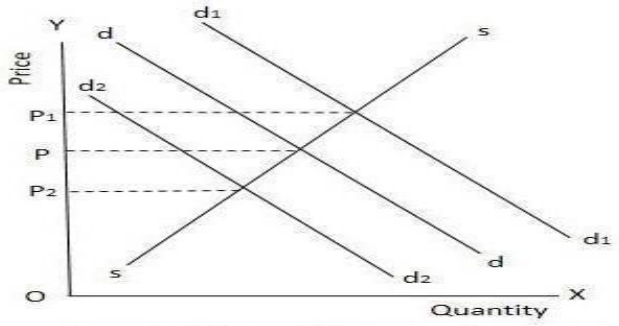


Figure 3: Effects of Change in Demand on Price

to d_2d_2, there will be intense competition among sellers on price OP. Therefore, price declines to OP_2 with decrease in demand. The price OP_2 is determined by the intersection of demand curve d_2d_2 and supply curve ss.

B. Effects of Changes in Supply on Price

If demand for a commodity is given, increase in supply of a commodity will cause the price to decline due to excess of supply over demand. If demand for a commodity is given, decrease in supply of a commodity will cause the price to increase due to excess of demand over supply. This phenomenon has been explained with the help of figure 4.

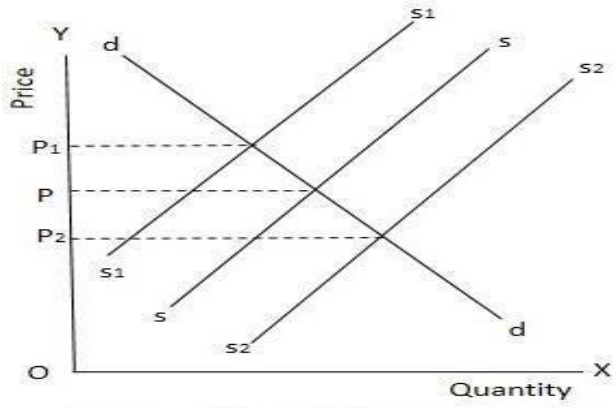


Figure 4: Effects of Change in Supply on Price

In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. ss is the supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve ss, OP price is determined. If demand is given but supply increases to s_2s_2, there will be intense competition among sellers on price OP. Therefore, price declines to OP_2 with

increase in supply. The price OP_2 is determined by the intersection of demand curve dd and supply curve s_2s_2. If demand is given but supply decreases to s1s1, there will be intense competition among buyers on price OP. Therefore, price increases to OP_1 with decrease in supply. The price $OP_1$is determined by the intersection of demand curve dd and supply curve s_1s_1.

C. Effects of Simultaneous Changes in Supply and Demand on Price

If demand for a commodity rises but its supply declines at the same time, the price of a commodity will increase. If demand for a commodity declines but its supply increases at the same time, the

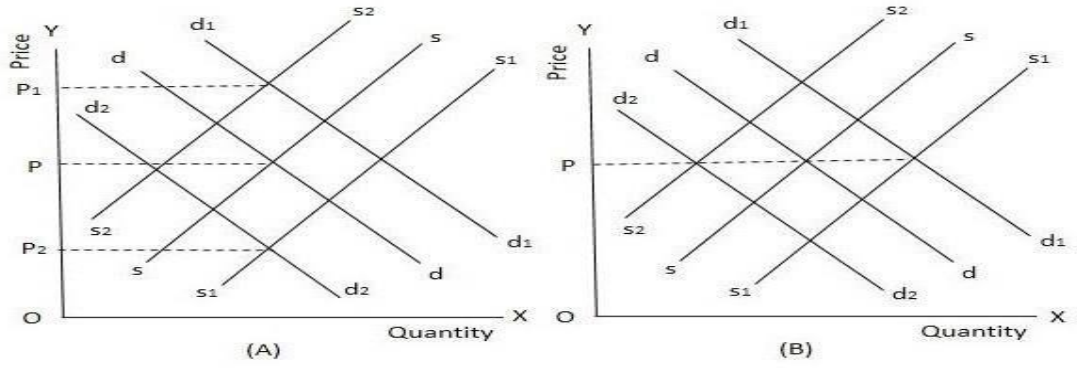


Figure 5: Effects of Simultaneous Changes in Demand and Supply on Price

price of a commodity will decrease. This concept has been explained with the help of figure 5 (A). In this figure, price is measured on Y axis as well as quantity demanded and

supplied on X axis. ss is the supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve ss, OP price is determined. If demand for a commodity rises to d_1d_1 but its supply declines to s_2s_2 at the same time, the price of a commodity will increase to OP_1. The price OP_1 is determined by the intersection of demand curve d1d1 and supply curve s_2s_2. If demand for a commodity declines to d_2d_2 but its supply increases to s_1s_1 at the same time, the price of a commodity will decrease to OP_2. The price OP_2 is determined by the intersection of demand curve d_2d_2 and supply curve s1s1.If demand for and supply of a commodity, changes in the same direction and in equal proportion, the equilibrium will remain unchanged. This concept has been explained with the help of figure 5 (B). In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. ss is the supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve ss, OP price is determined. If demand increases to d_1d_1 and supply increases to s_1s_1, price will remain unchanged

at OP. If demand declines to d_2d_2 and supply decreases to s_2s_2, price will remain unchanged at OP. if the rise in demand is more than the rise in supply, the equilibrium price will increase. If the rise in supply is more than the rise in demand, the equilibrium price will decline. It is not only the relative magnitudes of changes in supply and demand which affect the changes in equilibrium prices but relative magnitudes of the elasticities of supply and demand also affect the equilibrium price.

5.3.2 Price Determination under Different Time Periods

According to Marshall, price of a commodity is determined by its demand as well as supply under perfect competition. Now the question arises, is it demand or supply which has greater impact on price of a commodity. Marshall has given answer to this question. According to Marshall, "As a general rule, the shorter the period which we are considering the greater must be the share of our attention which is given to the influence of demand on value, and longer the period, the more important will be the influence of cost of production on value."

Time Elements are as follows:

- Very Short Period
- Short Period
- Long Period

The price of a commodity is affected more by demand or supply is determined by the time element. In short time period, it is very difficult for the sellers to adjust supply in accordance with demand. In long time period, sellers can easily adjust supply in accordance with demand. Therefore, in short time period, the influence of demand is more on price and in long time period, the impact of supply is more on price. To study price determination under perfect competition, time element has been divided into three parts i.e. market time period, short time period and long time period.

5.3.2.1 Determination of Very Short Period (Market Price)

The market time period is that time period in which supply of a commodity is perfectly inelastic as it is almost impossible to adjust supply according to the demand for a commodity. The market time period is also known as very short time period. Suppose, there is supply of 100 kg apples at a given place on a particular day. Suddenly, the demand for apples increases to 200 kg. It is not possible to increase supply of apples in very short time period. Increase in demand for apples will

rise competition among buyers, consequently there will be increase in the price of apples. The market price is that price which actually prevails in the market at a particular point of time. If there is sudden increase in demand, the market price will also rise instantly. If there is sudden decrease in demand, the market price will also fall instantly. The determination of market price can be discussed in case of perishable goods and non- perishable goods.

(A) Determination of Market Price in case of Perishable Goods

The perishable commodities are those commodities whose quality deteriorates within market time period or very short time period e.g. milk and milk products, fruits, vegetables etc. The producers want to sell these commodities immediately after their production as it is not possible to store these commodities for longer time period. Therefore, entire production of these commodities is supplied in the market immediately to avoid deterioration in the quality of these commodities. If demand for these commodities increases, it will lead to rise in price as supply of these goods is fixed in market time period. Contrary to it, if demand for these commodities decreases, supply will be more than its demand which will cause the price to decline in order to sell entire stock of these commodities. Therefore, increase in demand will lead to rise in prices and decrease in demand will lead to fall in prices in case of perishable commodities. This phenomenon has been explained with the help of figure 6 (A). In this figure, price is measured on Y axis as well as

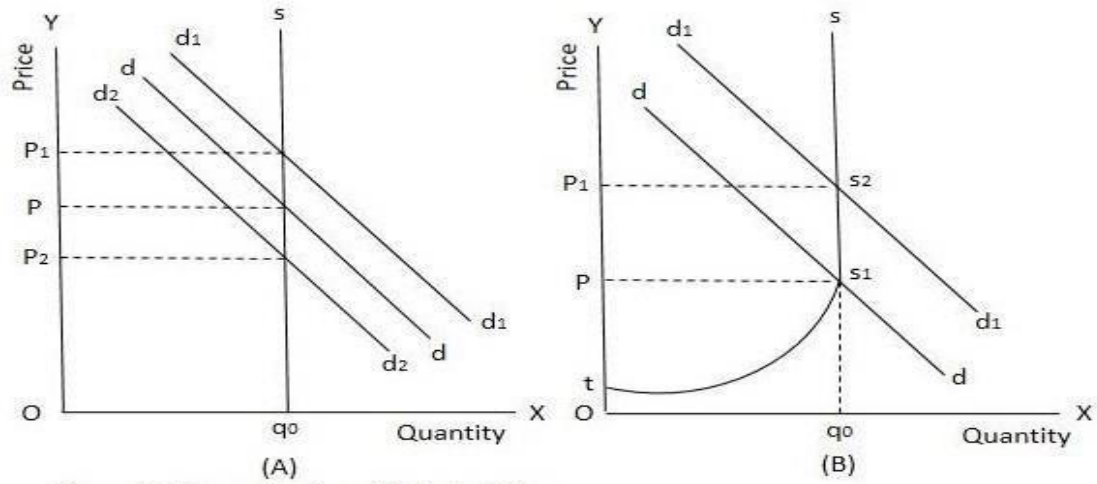


Figure 6: Determination of Market Price

quantity demanded and supplied on X axis. sq0 is the supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve sq0, OP price is determined. If demand for a commodity rises to d1d1but its supply remains fixed at sq0, the price of a commodity will instantly increase to OP1. The price OP1 is determined by the intersection of demand curve d1d1

and supply curve sq_0. If demand for a commodity declines to d_2d_2 but again its supply remains fixed at sq_0, the price of a commodity will instantly decrease to OP_2. The price OP_2 is determined by the intersection of demand curve d_2d_2 and supply curve sq_0.

(B) Determination of Market Price in case of Non-perishable Goods

The non-perishable commodities are those commodities which can be stored for a considerable period of time as their quality does not deteriorate within market time period or very short time period e.g. household furniture, shoes, toys, motor cars, cloth etc. In case of non-perishable commodities, the concept of reserve price exists in the mind of producers.

Reserve price is the minimum price at which producer does not want to sell any amount of the good. If market price of non-perishable commodities declines to reserve price or below it, producer will not sell any amount of the good rather he will store the commodity until price increases more than its reserve price. If price increases above the reserve price, producer will try to sell more and more amount of commodity. The producer is willing to sell the entire existing stock of the commodity at certain maximum level of price. If there is rise in demand after this maximum level, the supply becomes perfectly inelastic. The supply curve of non- perishable commodities in market time period is partly more elastic and partly perfectly inelastic. This concept has been explained with the help of figure 6 (B). In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. Ot is the reserve price at which producer is not willing to sell any amount of a commodity. ts_1s is the supply curve and dd is the demand curve. The ts_1 part of supply curve is more elastic and s1s part of supply curve is perfectly inelastic. At price OP, entire existing stock of a good i.e. Oq_0 is available for sale. Beyond this point, supply is perfectly inelastic. If demand increases to d_1d_1, supply will remain fixed at Oq_0 but price will rise to OP_1instantly. OP_1 price is determined by the intersection of demand curve d_1d_1 and inelastic part of supply curve s1s.

5.3.2.2 Determination of Short-run Price

Short time period is that time period in which some factors of production are fixed and others are variable in nature. This time period is longer than the market time period. Hence, supply of a commodity can be increased to some extent by increasing the units of variable factors of production i.e. labour and raw material. Therefore, short run supply curve is more elastic than perfectly inelastic supply curve of market time period. The supply curve of an industry in short

time period is upward sloping from left to right. If there is rise in demand for a commodity, price will increase but remains lower than the market price and higher than the original price. It is lower than market price as supply can be increased to a limited amount in short run. It is higher than the original price as complete adjustment of supply and demand is not possible in short run. The determination of short run price has been shown in the figure 7.

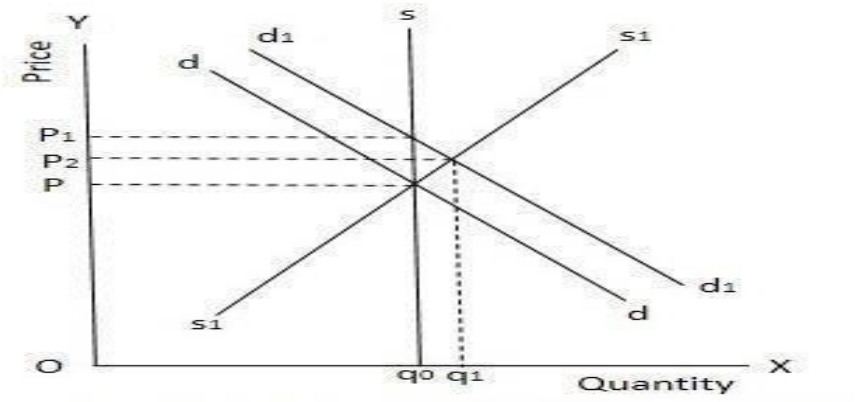


Figure 7: Determination of Short-run Price

In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. dd is original demand curve, ss is supply curve in market time period, Oq_0 is the quantity supplied and OP is the market price. If demand increases to d1d1, the intersection of d1d1 and ss will determine price at higher level OP_1 but quantity supplied will remain fixed at Oq_0. s1s1 is the short run supply curve which is more elastic than ss. The intersection between s1s1 and d1d1 determines short run supply at Oq_1 and short run price at OP_2. Hence, price OP_2 is higher than original price OP and lower than market price OP_1.

5.3.2.3 Determination of Long-run Price

The long time period is not a specific time period. This time period varies from industry to industry. In case of transport industry, iron and steel industry and engineering goods industry, the long time period is of ten years but in case of cotton textile, it is of one year only. The long time period is that time period in which all the factors of production are variable in nature. According to Bober, long time period is "long enough to enable the firm to make adjustment to a changed demand by varying the size of the plant and equipment."

Long Run Price:

- Law of Increasing Returns

- Law of Constant Returns
- Law of decreasing Returns

The long run price has been called normal price by Marshall and natural price by Adam Smith. The normal price is that price which prevails in long time period in the market, when there is complete adjustment among demand for and supply of commodity. Now the basic question is whether the long run price will become equal to original price or not. The answer to this question is that long run price can be more than, equal to and less than the original price based on the law of returns, operative in the given industry. Therefore, long run price can be determined in case of increasing costs industry, constant costs industry and decreasing costs industry.

A. Determination of Normal Price in Increasing Costs Industry

If the production is governed by law of increasing costs in a given industry, then diseconomies are more than the internal and external economies. In this phase, industry's long run supply curve will be more elastic than short run supply curve. The long run supply curve will slope upward from left to right. In this situation, normal price will be less than market price as well as short run price but more than the original price. This concept has been explained in the figure 8 (A). In this figure, dd is original demand curve, sq0 is supply curve in market period and the intersection of these

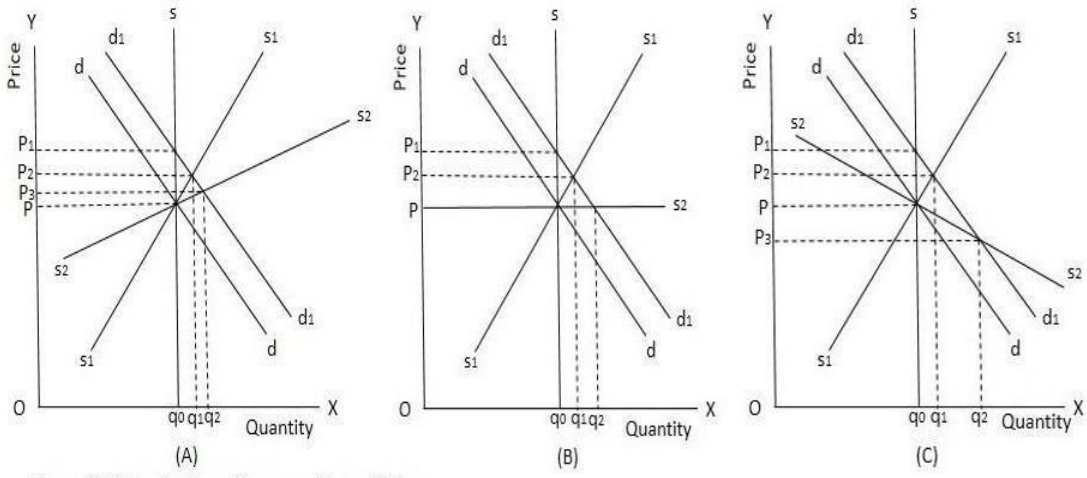


Figure 8: Determination of Long-run Normal Price

two curves determine the market price at OP and market period supply at Oq0. If demand rises to d1d1, its intersection with sq0 will determine market price at higher level OP1. s1s1 is the short run supply curve, its intersection with d1d1 will determine short run supply at Oq1 which is higher

than market period supply Oq0 and short run price at OP2 which is lower than market price OP1. s2s2 is the long run supply curve, its intersection with d1d1 will determine long run supply at Oq2 and long run price at OP3. The long run supply Oq2 is higher than market period supply Oq0 as well as short run supply Oq1. The long run price OP3 is lower than market price OP1 as well as short run price OP2but higher than original price OP.

B. Determination of Normal Price in Constant Costs Industry

If the production is governed by law of constant costs in a given industry, then diseconomies are exactly equal to the internal and external economies. In this phase,

industry's long run supply curve will be a straight line parallel to X axis. In this situation, normal price will be less than market price as well as short run price but equal to the original price. This concept has been explained in the figure 8 (B). In this figure, dd is original demand curve, sq_0 is supply curve in market period and the intersection of these two curves determine the market price at OP and market period supply at Oq_0. If demand rises to d_1d_1, its intersection with sq_0 will determine market price at higher level OP_1. s_1s_1 is the short run supply curve, its intersection with d1d1 will determine short run supply at Oq_1 which is higher than market period supply Oq_0 and short run price at OP_2 which is lower than market price OP_1. Ps_2 is the long run supply curve, its intersection with d1d1 will determine long run supply at Oq_2 and long run price at OP. The long run supply Oq_2 is higher than market period supply Oq_0 as well as short run supply Oq_1. The long run price OP is lower than market price OP_1 as well as short run price OP_2 but equal to original price OP.

C. Determination of Normal Price in Decreasing Costs Industry

If the production is governed by law of decreasing costs in a given industry, then diseconomies are less than the internal and external economies. In this phase, industry's long run supply curve will slope downward from left to right. In this situation, normal price will be less than market price, short run price and original price. This concept has been explained in the figure 8 (C). In this figure, dd is original demand curve, sq_0 is supply curve in market period and the intersection of these two curves determine the market price at OP and market period supply at Oq_0. If demand rises to d_1d_1, its intersection with sq_0 will determine market price at higher level OP_1. s1s1 is the short run supply curve, its intersection with d_1d_1 will determine short run supply at Oq_1 which is

higher than market period supply Oq_0 and short run price at OP_2 which is lower than market price OP_1. s_2s_2 is the long run supply curve, its intersection with d_1d_1 will determine long run supply at Oq_2 and long run price at OP_3. The long run supply Oq_2 is higher than market period supply Oq_0 as well as short run supply Oq_1. The long run price OP_3 is lower than market price OP_1, short run price $OP_2$and original price OP.

Therefore, it can be said that shorter the time period, more is the influence of demand on price. Longer the time period, more is the influence of supply on price.

Check Your Progress-I

Q1: Explain the concept of perfect competition.

Ans:_____

Q2: Define Market price and Normal price.

Ans:_____

Q3: Discuss the effects of change in demand on price when supply remains the same.

Ans:_____

5.4 Equilibrium of Firm and Industry under Perfect Competition

An Industry is a collection of various firms producing identical products. A firm is a single unit engaged in production for sale at a profit and with an aim of maximising profit. A firm is in equilibrium when there is no tendency to increase or decrease the output. According to Koutsoyiannis, "A firm is in equilibrium when it maximises its profit. "A profit maximising firm will go on increasing its output as long as rise in output provides larger profit to the firm. If a firm knows that reducing the output will provide larger profits, it will tend to reduce its output. If firm is already earning maximum profit, any increase or decrease in output may lead to decline in profit. In this phase, there is no tendency to expand or contract the output and this state is called the state of equilibrium. When the firm is incurring losses, its main aim is to minimise losses. The firm may increase or decrease its output as long as there is possibility of further decline in loss of the firm. The firm is in state of equilibrium when its losses are minimum. When the position

of equilibrium is attained, firm has no tendency to change the level of output.

5.4.1 Conditions for the Equilibrium of Firm

In perfect competition, equilibrium of an individual firm can be explained with the help of two approaches. Firstly, total revenue and total cost approach. Secondly, marginal revenue and marginal cost approach. Both the approaches have been explained as below:

A. Total Revenue and Total Cost Approach

In total revenue and total cost approach, there are two possibilities for the firm to attain equilibrium i.e. either to earn maximum profit or to incur minimum losses. The firm will be earning profit, if total revenue is more than total cost. The profit will be maximum at a point where the gap between total revenue and total cost is maximum. At this stage, firm has no tendency to increase or decrease its output. Therefore, required condition for attaining equilibrium is firm must earn maximum amount of profit. If firm is incurring losses, its main aim is to minimise losses. The firm will be incurring losses, if total cost is more than total revenue. The losses will be minimum at a point where the gap between total cost and total revenue is minimum. At this stage, firm has no tendency to increase or decrease its output. Therefore, if firm is incurring losses, required condition for attaining equilibrium is firm must incur minimum amount of losses.

B. Marginal Revenue and Marginal Cost Approach

According to marginal revenue and marginal cost approach, two necessary conditions must be fulfilled by the firm to attain equilibrium level. Firstly, marginal cost (MC) must be equal to marginal revenue (MR). Secondly, marginal cost curve must cut the marginal revenue curve from below.

The equilibrium of firm as well as industry can be studied under two different conditions i.e., identical cost conditions and different cost conditions

5.4.2 Equilibrium of Firm and Industry under Identical Cost Conditions

Equilibrium of firm and industry under identical cost conditions can be studied under short time period as well as long time period.

5.4.2.1 Short-run Equilibrium of Firm

The short time period is that time period in which some factors of production are fixed and others are variable in nature.

Short-run Equilibrium of Firm under Identical Cost Conditions

- Very Short Period
- Short Period
- Long Period

During such a short span of time, it is not possible to establish new firms in the industry. It is also not possible for new firms to enter the industry and old firms to leave the industry within such a limited time. Hence, the number of firms remain fixed during short run. The product as well as factor units are assumed to be homogenous and their price remains same throughout the market under perfect competition. This states that all firms in the industry work under identical cost conditions in which cost curves of all the firms are of same level and shape. In such a situation, price of a commodity is given for an individual firm and equilibrium of every firm will be determined at the same level of output.

The equilibrium of a firm in short time period can be attained by fulfilling following two necessary conditions:

MC = MR

MC curve must cut marginal revenue curve from below.

Three situations can exist while attaining short-run equilibrium of a firm under identical cost conditions i.e., super-normal profits, losses and normal profits.

A. Firm's Equilibrium with Super-normal Profits

In short-run, firm's equilibrium with super-normal profits has been shown in figure 9. SMC and SAC are the short-run marginal cost and average cost curves, respectively. The average variable cost curve is AVC. All the three curves i.e. SMC, SAC and AVC are U- shaped. AR is average revenue curve and MR is marginal revenue curve at given price OP. The firm is in equilibrium at point E as at point E, MR=MC and MC curve cuts MR curve from below.

OQ is the equilibrium level of output. The total revenue is OP×OQ = OPEQ. The total cost is LQ×OQ = LQOK.

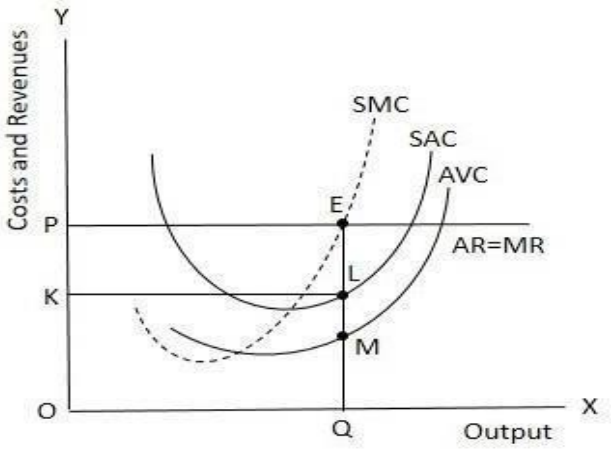


Figure 9: Equilibrium with Super-normal Profits

The firm will be earning super-normal profits as total revenue is more than total cost i.e. OPEQ > LQOK. The difference between total revenue and total cost is super-normal profit i.e. OPEQ – LQOK = KLEP. At output OQ, LQ is the average cost out of which MQ is average variable cost and LM is average fixed cost. The price OP or EQ is more than short run average cost LQ by EL. Hence, EL is profit per unit. At the point of equilibrium, total profit will be EL×LK (OQ) = ELKP.

B. Firm's Equilibrium with Normal Profits

The firm will be earning normal profits if total revenue is equal to total cost. The firm's equilibrium with normal profits has been explained in figure 11. The firm is in equilibrium at point E as at point E, MR=MC and MC curve cuts MR curve from below. OQ is the equilibrium level of output. The total revenue is OP×OQ = OPEQ. The total cost is EQ×OQ = OPEQ. The firm will be earning normal profits when total cost is equal to total revenue i.e. OPEQ. At output OQ, EQ is the average cost out of which MQ is average variable cost and EM is

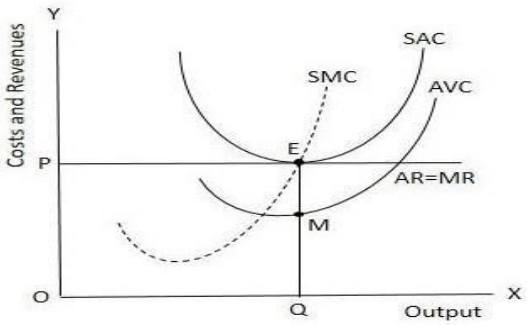


Figure 11: Equilibrium with Normal Profits

average fixed cost. The price OP or EQ is equal to average cost which covers both average variable cost MQ and average fixed cost EM. In this phase, firm is in equilibrium with normal profits.

C. Firm's Equilibrium with Losses

In short-run, firm's equilibrium with losses has been shown in figure 10. The firm is in equilibrium at point E as at point E, MR=MC and MC curve cuts MR curve from below. OQ is the equilibrium level of output. The total revenue is OP×OQ = OPEQ. The total cost is LQ×OQ = LQOK. The firm will be incurring losses as total cost is more than total revenue i.e. LQOK > OPEQ. The difference between total cost and total revenue is losses i.e. LQOK – OPEQ = KLEP. At output OQ, LQ is the average cost out of which MQ is average variable cost and LM is average fixed cost. The price OP or EQ is less than short run average cost LQ by EL.

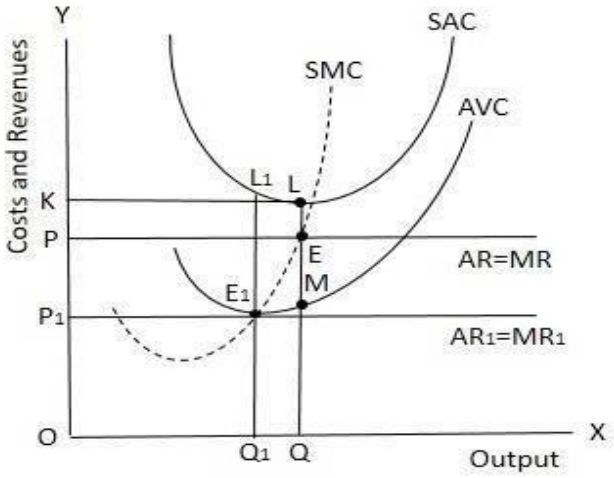


Figure 10: Equilibrium with Losses

Hence, EL is loss per unit. At the point of equilibrium, total loss will be EL×EP (OQ) = ELKP. If the firm is incurring losses, the question arises whether the producer will continue production or shut down the firm. In this situation, firm's main aim is to minimize losses. Firm will not be shut down as long as firm is able to minimize its loss by continuing production. In figure 10, firm is incurring losses at equilibrium point E but firm will not be shut down as firm is able to minimium losses at this point. At equilibrium point E, OP is equilibrium price and OQ is equilibrium output. With equilibrium price OP, firm is able to cover entire average variable cost MQ and some part of average fixed cost EM. If firm has been shut down at this point, the entire average fixed cost must have converted into losses. At this point, firm is able to minimise losses by continuing production. Suppose price has declined to OP1then firm will be in

equilibrium at E_1. At E_1, L_1Q_1 is average cost out of which $E_1Q_1$is average variable cost and E_1L_1 is average fixed cost. The price OP_1 covers only average variable cost E_1Q_1. No part of average fixed cost is being covered. Hence, there is no possibility of minimisation of losses in future. So, firm will be shut down at point E_1. In short time period, the condition for firm's shut down point is price should be equal to minimum average variable cost i.e. Price = minimum AVC. In figure 10, the condition for firm's shut down point is fulfilled at point E_1. Therefore, E_1 is the shut-down point of the firm in short- run.

5.4.2.2 Short-run Equilibrium of Industry

During short time period, it is not possible to establish new firms in the industry. It is also not possible for new firms to enter the industry and old firms to leave the industry within such a limited time. Hence, the number of firms remains fixed during short run. The cost conditions for all the firm are identical and price of product is given. If all the firms of an industry are in equilibrium, then industry will also be in equilibrium. If one firm is in equilibrium with super-normal profits then all the other firms and industry will be in equilibrium with super- normal profits. If a single firm's equilibrium is determined with losses then other firms as well as entire industry will in equilibrium with losses. If an individual firm's equilibrium is attained with normal profits, then all other firms and whole of the industry will be in equilibrium with normal profits. In short time period, there is very less possibility that industry is in equilibrium with normal profits as the adjustments that are needed to attain normal profits cannot take place within short span of time. Therefore, short-run equilibrium of industry can take place either with super-normal profits or losses.

5.4.2.3 Long-run Equilibrium of Firm and Industry

In long run, industry will be in equilibrium when there is no possibility either to expand or contract its output. The changes in the output of an industry can take place because of two reasons. Firstly, when existing firms of an industry either increase or decrease their output. Secondly, the entry of new firms may expand the output of an industry and industry's output may contract because some firms have left the industry. In long-run, for an industry to be in equilibrium, all the existing firms should be in equilibrium. As all the firms have identical cost conditions so if one firm is in equilibrium then all other firms will also be in equilibrium. In long-run, the conditions for firm's equilibrium are:

MC=MR and

MC must cut MR curve from below.

If firm is in equilibrium with super-normal profits in short-run, new firms will enter into the industry which will expand the output of an industry. In this situation, firms are in equilibrium but industry is not in equilibrium. Similarly, if firm is in equilibrium with losses in short-run, some existing firms will leave the industry which will contract the output of an industry. In this situation, firms are in equilibrium but industry is not in equilibrium.

For an industry to be in equilibrium in long-run, there are two conditions. Firstly, all the firms of an industry must be in equilibrium. Secondly, the firms must not enter or leave the industry. For existing firms to be in equilibrium, marginal cost must be equal to marginal revenue i.e. MR=MC. If firms earn normal profit, then no firm can enter or leave the industry. For a firm to earn normal profits, average cost must be equal to average revenue i.e. AC=AR. Therefore, two conditions for long-run equilibrium of firm and industry are

MR=MC and

AC=AR.

In perfect competition, AR=MR, so, condition can be written as: Price (AR) =MR=MC=AC

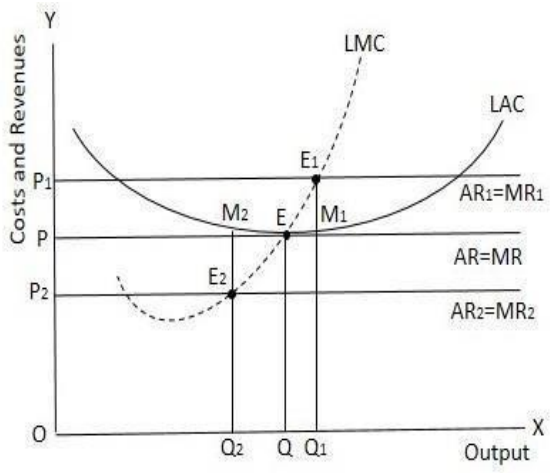


Figure 12: Long-run Equilibrium under Identical Cost Conditions

Marginal cost curve cuts the average revenue curve at lowest point. Therefore, above condition can be restated as:

Price (AR) =MR=MC= Minimum AC

The equilibrium of firm as well as industry in long-run under identical cost conditions has

been explained in figure 12. LAC is long-run average cost curve and LMC is long-run marginal cost curve. At price OP_1, AR_1 and MR_1 are average revenue and marginal revenue curves, respectively. Equilibrium is attained at E_1 where MC=MR and OQ_1 is output. At E_1, price OP_1 is higher than average cost M_1Q_1 by E_1M_1. E_1M_1 is super-normal profit per unit which leads to entry of new firms in the industry. At E_1, firms are in equilibrium but industry is not in equilibrium as AR>AC. At price OP_2, AR_2 and MR_2 are average revenue and marginal revenue curves, respectively. Equilibrium is attained at E_2 where MC=MR and OQ_2 is output. At E_2, price OP_2 is lower than average cost M_2Q_2 by E_2M_2. E_2M_2 is per unit loss which will induce some firms to leave the industry. At E_2, firms are in equilibrium but industry is not in equilibrium as AC>AR. At price OP, AR and MR are average revenue and marginal revenue curves, respectively. Equilibrium is attained at E where MC=MR and OQ is output. At E, price OP is equal to average cost EQ i.e., AR=AC. At E, firms as well as industry are in equilibrium as MC=MR=AR= minimum AC.

5.4.3 Equilibrium of Firm and Industry under Different Cost Conditions

The equilibrium of firm and industry under different cost conditions can be studied under short time period as well as long time period.

5.4.3.1 Short-run Equilibrium of Firm

In perfect competition, all the firms may not have same cost conditions rather there can be difference in cost conditions of various firms because of heterogeneity of different factors of production. If all the units of factors of production are homogenous, still the difference in cost conditions exists due to heterogeneity of entrepreneurs. Therefore, some firms will have lower costs as they are more efficient than other firms. With given price and different cost conditions, some firms will be in equilibrium with super-normal profits and other firms will either be having losses or normal profit at the point of equilibrium. In case of different cost conditions, equilibrium of firm in short time period can be attained by fulfilling following two necessary conditions:

MC = MR

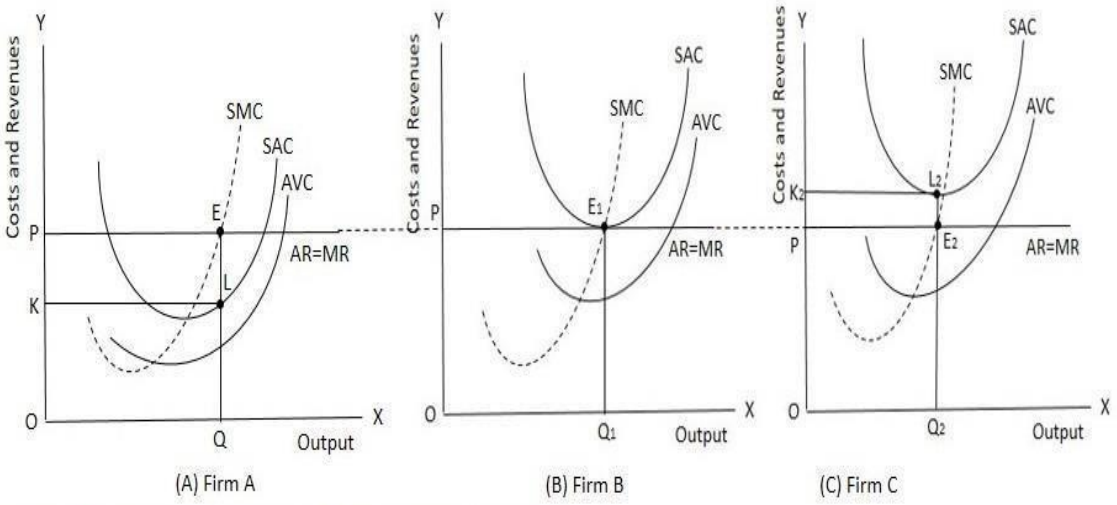


Figure 13: Short-run Equilibrium under Different Cost Conditions

MC curve must cut marginal revenue curve from below.

There are three firms in the industry i.e. Firm A, Firm B and Firm C. In short run, there is no tendency for entry and exit of the firms. The most efficient firm is Firm A which has the lowest costs. Firm B is less efficient than Firm A and more efficient than Firm C. The costs of Firm B is higher than Firm A and lower than Firm C. The Firm C is the least efficient and has the highest costs. The short-run equilibrium of firm under different cost conditions has been explained in figure 13. In this figure, output is measured on X axis and costs and revenues on Y-axis. SAC, SMC and AVC are short-run average cost, short-run marginal cost and average variable cost curves, respectively. AR is average revenue curve and MR is marginal revenue curve.

In figure 13 (A), Firm A is most efficient and has the lowest costs. The firm is in equilibrium at point E as at point E, MR=MC and MC curve cuts MR curve from below. OQ is the equilibrium level of output. The total revenue is OP×OQ = OPEQ. The total cost is LQ×OQ = LQOK. The firm will be earning super-normal profits as total revenue is more than total cost i.e. OPEQ > LQOK. The difference between total revenue and total cost is super-normal profit i.e. OPEQ – LQOK = KLEP. In figure 13 (B), Firm B is less efficient than Firm A and has costs higher than Firm A. The firm is in equilibrium at point E_1 as at point E_1, MR=MC and MC curve cuts MR curve from below. OQ_1 is the equilibrium level of output. The total revenue is $OP \times OQ_1 = OPE_1Q_1$. The total cost is $E_1Q_1 \times OQ_1 = OPE_1Q_1$. The firm will be earning

normal profits when total cost is equal to total revenue i.e. OPE_1Q_1. In figure 13 (C), Firm C is less efficient than Firm B and has costs higher than Firm B. The firm is in equilibrium at point E_2 as at point E_2, MR=MC and MC curve cuts MR curve from below. OQ_2 is the equilibrium level of output. The total revenue is $OP \times OQ_2 = OPE_2Q_2$. The total cost is $L_2Q_2 \times OQ_2 = L_2Q_2OK_2$. The firm will be incurring losses as total cost is more than total revenue i.e. $L_2Q_2OK_2 > OPE_2Q_2$. The difference between total cost and total revenue is losses i.e. $L_2Q_2OK_2 - OPE_2Q_2 = K_2L_2E_2P$.

Therefore, some firms earn super-normal profit, some other earn normal profits and still others incur losses while attaining short-run equilibrium under different cost conditions.

5.4.3.2 Short-run Equilibrium of Industry

The industry will be in equilibrium in short-run under different cost conditions if all the existing firms of an industry are in equilibrium. In figure 13, at given price OP, the equilibrium outputs of Firm A, Firm B and Firm Care OQ, OQ_1 and OQ_2, respectively. The industry's equilibrium output will be the summation of output of all the three firms. As different firms earn super-normal profit, normal profit and incur losses, their summation will decide whether industry will be in equilibrium with super-normal profits or losses. Therefore, short-run equilibrium of industry under different cost conditions exists either with super- normal profit or losses.

5.4.3.3 Long-run Equilibrium of Firm and Industry

The various firms operate under different cost conditions in long-run due to heterogeneity of various factors of production. To discuss long-run equilibrium of firm and industry under different cost conditions, the concept of marginal firm is of utmost importance. Marginal firm is the firm which is the least efficient and has the highest costs. This firm will be earning

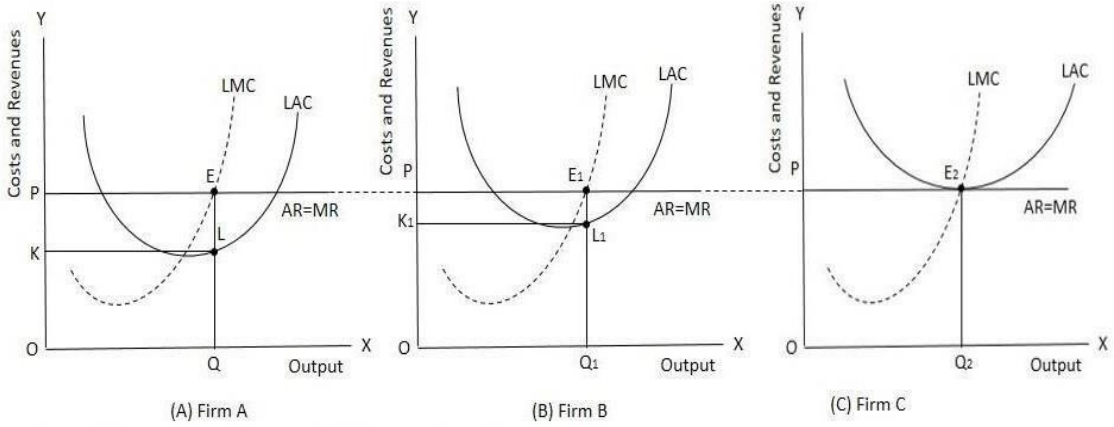


Figure 14: Long-run Equilibrium under Different Cost Conditions

normal profits so whenever there is decline in price, marginal firm will be the first firm to leave the industry. Those firms which are more efficient than marginal firm are regarded as intra marginal firms and will be earning super-normal profit. The two necessary conditions for long-run equilibrium of firm and industry under different cost conditions are (i) MR=MC of all the firms and (ii) Price (AR) = AC of the marginal firm. There are three firms i.e. Firm A, Firm B and Firm C in a specific industry. Firm A is the most efficient and has the lowest costs. Firm B is less efficient than Firm A and has higher costs than Firm A. Both Firms A and B are regarded as intra marginal firms and earning super-normal profits. The Firm C is the least efficient and has the highest costs. Firm C is regarded as marginal firm and earning normal profit. If there is slight decline in the price, Firm C will be the first to leave the industry. The long-run equilibrium of firm and industry under different cost conditions has been explained in figure 14. In this figure, at price OP, AR is average revenue curve and MR is marginal revenue curve for all the firms. LAC and LMC are long-run average cost and long-run marginal cost curves, respectively. Firm A is the most efficient and has the lowest costs. Firm B is less efficient than Firm A and has higher costs than Firm A. The Firm C is the least efficient and has the highest costs. Firm C is regarded as marginal firm and earning normal profit. In case of Firm C, price is exactly equal to long-run average cost E_2Q_2. If price declines slightly below OP then Firm C will be the first to leave the industry. Both Firms A and B are regarded as intra marginal firms and earning super-normal profits. In case of Firm A and Firm B, equilibrium is attained at E and E_1, respectively as at these points MC=MR. In figure 14 (A), Firm A is most efficient and has the lowest costs. The firm is in equilibrium at point E and OQ is the equilibrium level of output. The total revenue is OP×OQ
= OPEQ. The total cost is LQ×OQ = LQOK. The firm will be earning super-normal profits as total revenue is more than total cost

i.e. OPEQ > LQOK. The difference between total revenue and total cost is super-normal profit

i.e. OPEQ – LQOK = KLEP. In figure 14 (B), the Firm B is in equilibrium at point E_1 and OQ_1 is the equilibrium level of output. The total revenue is $OP \times OQ_1 = OPE_1Q_1$. The total cost is $L_1Q_1 \times OQ_1 = L_1Q_1OK_1$. The firm will be earning super-normal profits as total revenue is more than total cost i.e. $OPE_1Q_1 > L_1Q_1OK_1$. The difference between total revenue and total cost is super-normal profit i.e. $OPE_1Q_1 - L_1Q_1OK_1 = K_1L_1E_1P$. In figure 14 (C), Firm C is marginal firm. This firm is in equilibrium at point E_2 and OQ_2 is the equilibrium level of output. The

total revenue is $OP \times OQ_2 = OPE_2Q_2$. The total cost is $E_2Q_2 \times OQ_2 = OPE_2Q_2$. The firm will be earning normal profits as total revenue is equal to total cost i.e. OPE_2Q_2. Firm A and Firm B, both are earning super-normal profits but super-normal profit is higher in case of more efficient firm i.e. Firm A. Figure 14 has shown that all the firms are in equilibrium. The marginal firm is earning normal profit so there is no tendency for other firms to enter or leave the industry. Therefore, if all the firms i.e. Firm A, Firm B and Firm C are in equilibrium then industry is also in equilibrium. As intra-marginal firms are in equilibrium with super-normal profit then long-run equilibrium of industry under different cost conditions is also attained with super- normal profits.

Check Your Progress-II

Q1. Mention the conditions necessary to attain short-run equilibrium of a firm.

Ans:_____

Q2. List the necessary conditions to attain long-run equilibrium of firm and industry.

Ans:_____

5.5 Summary

In this unit, the concept of perfect competition, its features and effects of changes in demand and supply on price have been discussed. The price determination in market time period, short time period and long time period have also been explained. Moreover, the equilibrium of firm and industry under identical as well as different cost conditions have been analysed. Perfect competition is a market situation in which there exists large number of buyers and sellers selling identical products. In this market form, there is free entry and exit of firms, absence of transportation cost, perfect mobility of factors of production and perfect knowledge among buyers and sellers. The two necessary conditions to attain short-run equilibrium of an individual firm are (i) MC=MR (ii) MC must cut MR curve from below. The two necessary conditions to attain long-run equilibrium of firm and industry are (i) MC=MR (ii) AC=AR. In short time period, firm can earn super-normal profits, normal profits and incur losses. Super-normal profit exists if firm's average revenue is more than average cost. When average revenue is exactly equal to average cost then firm is earning normal profits. If average cost is more than average revenue

then firm must be incurring losses. Under identical cost conditions, industry will be in equilibrium with normal profits in long-run.

5.6 Questions for Practice

A. Short Answer Type Questions

Q1. Explain the various features of perfect competition.

Q2. Describe the effects of simultaneous changes in demand and supply on price.

Q3. Discuss the price determination in market time period with the help of suitable diagrams.

Q4. Explain long-run equilibrium of firm and industry under identical cost conditions.

Q5. Discuss short-run equilibrium of firm and industry under different cost conditions.

B. Long Answer Type Questions

Q1. Give the meaning of perfect competition. How is price determining under perfect competition?

Q2. How price and output of a firm is determined in perfect competition.

Q3. Discuss the price determination in short and long run under perfect competition.

Q4. Explain Long-run Equilibrium of Firm and Industry under different cost conditions with the help of diagram.

Q5. Discuss equilibrium of Firm and Industry under Different Cost Conditions for short period.

Q6. Explain equilibrium of Firm and Industry under Identical Cost Conditions for short and long period.

5.7 Suggested Readings

- H.L. Ahuja: Advanced Economic Theory (Microeconomic Analysis)
- A. Koutsoyiannis: Modern Microeconomics
- K.N. Verma: Micro Economic Theory

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

COURSE: MICRO ECONOMICS I

UNIT 6: IMPERFECT COMPETITION: MONOPOLY AND MONOPOLISTIC COMPETITION

STRUCTURE

6.0 Learning Objectives

After the completion of this unit, learner will be able to:

- Define the Monopoly and Monopolistic Competition.
- Determine the price and equilibrium under Monopoly and MonopolisticCompetition.
- Measure the Monopoly Power
- Determine the price under discriminating Monopoly
- Understand the selling cost and excess capacity
- Compare the Monopoly competition and Monopolistic Competition

6.1 Introduction

In economic terms, imperfect competition is a market situation under which the conditions necessary for perfect competition are not satisfied. The concept of imperfect competition was firstly explained by the Economist Mrs. Joan Robinson in 1933 in her book "Economics of Imperfect Competition". There are four types of imperfect markets. These markets are: Monopoly (only one seller), Oligopoly (few sellers of goods), Monopolistic competition (many sellers with highly differentiated product) and Monopsony (only one buyer of a product).

6.2 Monopoly: Meaning and Features

The word Monopoly is the combination of two words: Mono (single) and Poly (Control). It means Monopoly is that competition where there is only one or a single/producer seller of the commodity in the market and there is no close substitution of that commodity. For example, in Punjab, there is only one seller of electricity i.e., Punjab State Electricity Board and electricity has no close substitution in the market. In monopoly, difference between firm and industry does not exist.

According to Koutsoyiannis, “Monopoly is a market situation in which there is a single seller. There are no close substitutes of the commodity it produces, there are barriers to entry”.

Features

1. Single Seller: There is only one producer or seller of a particular product or service in the market. This single seller has complete control over the supply of the product. The firm and the industry are one and the same.

2. No Close Substitutes: The product offered by the monopolist have no close substitutes. Consumers have limited options and are forced to purchase from the monopolist, even if they are not entirely satisfied.

3. High Barriers to Entry: Significant obstacles prevent new firms from entering the market and competing with the monopolist.

These barriers can include:

- **Economies of scale:** The monopolist may have lower average costs due to large-scale production, making it difficult for new entrants to compete on price.
- **Legal barriers:** Patents, copyrights, and government licenses can restrict entry.
- **Control of resources:** The monopolist may own a unique resource essential for production.
- **Brand loyalty:** Strong brand recognition and customer loyalty can deter potential competitors.

4. Price-Setting Power: The monopolist has considerable control over the price of the product. They can set the price at a level that maximizes their profits, unlike firms in competitive markets that are price-takers.

5. Inefficiency: Monopolies often lead to allocative inefficiency, where resources are not allocated optimally. They may produce less than the socially optimal level of output and charge higher prices.

6. Potential for Price Discrimination: Monopolists may engage in price discrimination, charging different prices to different consumers based on their willingness to pay.

7. Limited Consumer Choice: Consumers have limited choices and may have to accept the monopolist's product and price, even if they are not entirely satisfied.

6.2.1 Nature of Demand and Revenue Under Monopoly Competition

Under Monopoly, firm’s demand curve constitutes the industry’s demand curve because there

no difference between firm and the industry. In this market, both average revenue (AR) as well as marginal revenue (MR) curves slopes downward from left to right. AR slopes downward, it means if producer fixes high price, then demand will decrease and vice-versa.

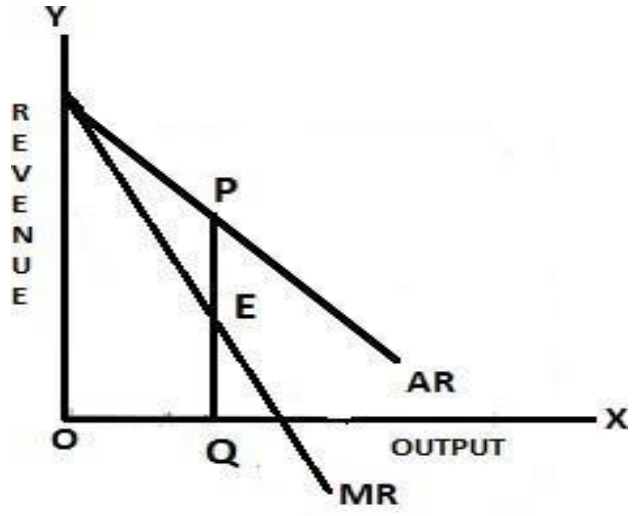


Fig 1

In Fig. 1, on the X-axis, output and on Y-axis, revenue has been measured. AR is average revenue curve and MR is marginal revenue curve. Both are sloping downward from left toright whereas MR is below the AR curve showing that at OQ output, average revenue (AR)or Price is PQ and marginal revenue (MR) is EQ. In other words,

AR>MR or PQ>EQ.

6.3 Determination of Price and Equilibrium Under Monopoly

Following are the two approaches to determine the price and equilibrium under monopoly competition:

6.3.1 Total Revenue and Total Cost Approach

With total revenue and total cost approach, monopolist will get maximum profit where the

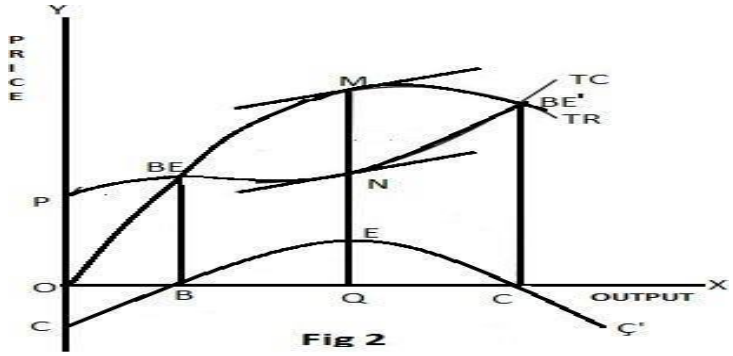


Fig 2

difference between the TR and TC is maximum and this is an equilibrium situation for him. This approach can be explained the help of figure 2. This shows that TC is total cost curve, TR is total revenue curve and CC' is profit curve. TR curve stars from the origin O (indicates that when output is zero, then TR is also zero) and TC starts from P (indicates that TC includes both FC and VC and if producer discontinues its output, he has to bear the loss offixed cost). CC' starts from C showing initially producer bears the losses but when producer starts production, TR increases. However, in the beginning, the rate of increase in TR is less than TC. Therefore, BC part of CC' curve shows that producer is incurring losses. At the point BE, total revenue is equal to total cost, it means producer is working on break-even point (Break-even point is that situation where producer has no profit no loss, here his TR=TC). When producer increases his output more than BE point, TR will be more than TC and CC'' slopes upward. It shows that firm is earning profit. When CC' curve will reach its highest point E, then the producer will be earning maximum profits. The amount of output i.e,; OQ will be called equilibrium output. If the producer will produce the output after equilibrium output, than his profits will go on diminishing and again he will reach at break- even point i.e. BE'. If the producer produces more than BE', then TR will be less than TC and producer will incur loss.

6.3.2 Marginal Revenue and Marginal Cost

According to this approach, monopolist will be in equilibrium and earn maximum profits when MC=MR and MC curve cuts MR from below. It can be explained with the help of diagram:

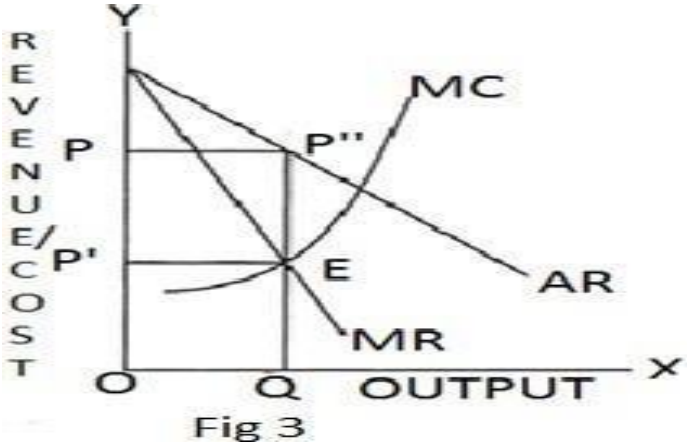


Fig 3

In fig 3, output is shown on X-axis and revenue/cost on Y-axis. MC is marginal cost; AR average revenue and MR is marginal revenue curves. At the point E, MC=MR and MC curve

cuts MR curve from below so this point is an equilibrium point and OQ is the equilibrium output.

Check Your Progress - I

Q1. Define Monopoly.

Ans._____

_____

Q2. Give any two features of monopoly.

Ans._____

_____

6.4 Price and Output Equilibrium in Short-run Period

Short run is that period of time when monopolist/producer cannot change the fixed factors like land, building etc. but can change the output with the help of variable factor like labour. Under short run period, monopolist can face following three situations:

A. Super Normal Profit: If the price/Average Revenue (AR) of the product is more than its Average Cost (AC), then monopolist will get the super normal profits. In other words: super normal profit=AR>AC. The producer will produce upto the level where MR (atthis point he will be in equilibrium situation).

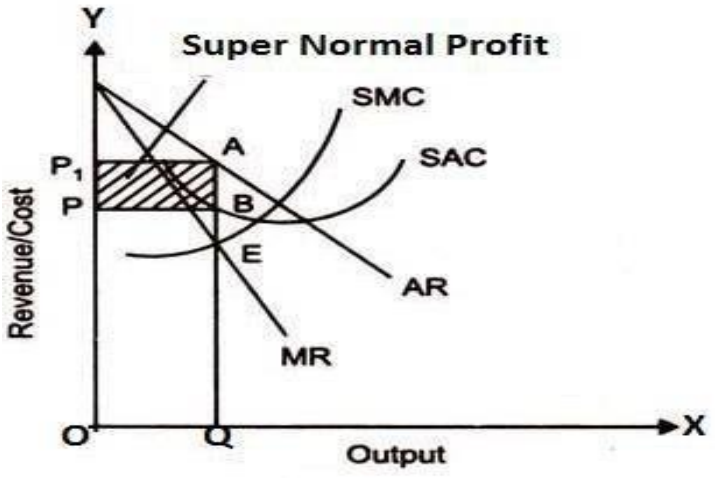


Fig 4

In fig 4, output is measured on X-axis and revenue/price is on Y-axis. SAC and SMC are short run average cost and short run marginal cost curves whereas AR and MR are average revenue and marginal revenue curves respectively. The monopolist is in equilibrium at the point E where MC=MR and MC cuts MR from below (at this point both conditions are fulfilled so

this is an equilibrium point). At this level, monopolist produces OQ output and sells it at AB price which is more than average cost BQ by AB (AQ-BQ). Thus, in this situation monopolist will earn super normal profits i.e. ABPP'.

B. Normal Profit: If the price/Average Revenue (AR) of the product is equal to its Average Cost (AC), then monopolist will get the normal profits. In other words: normal profit=AR=AC.

In fig 5, output is measured on X-axis and revenue/price is on Y-axis. SAC and SMC are short run average cost and short run marginal cost curves whereas AR and MR are average revenue and marginal revenue curves respectively. The monopolist is in equilibrium at the point E where MC=MR and MC cuts MR from below (at this point both conditions are fulfilled so this is an equilibrium point). At this level, monopolist produces OQ output. At this level of output, average cost touches average revenue curveat the point A (it means price OP is equal to the average cost AQ. Therefore, monopolist will earn normal profit at the point.

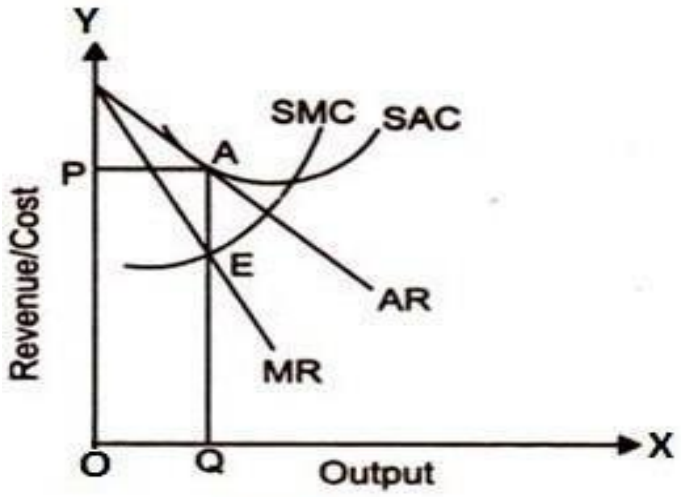


Fig 5

C. Losses: The monopolist may have to bear losses in the short run period if the price/Average Revenue (AR) of the product is less than its Average Variable Cost (AVC). Once the price falls below the AVC, monopolist will stop the production.

In fig 6, output is measured on X-axis and revenue/price is on Y-axis. SAC and SMC are short run average cost and short run marginal cost curves whereas AR and MR are average revenue and marginal revenue curves respectively. The monopolist is in equilibrium at the point E where MC=MR and MC cuts MR from below. The monopolist will produce OQ level of output and sells it at OP. At OP price, AVC touches the ARcurve at point B. It shows that

producer will cover only AVC from the prevailing price. At OP point, he will bear loss of fixed cost i.e. AB per unit and total loss ABPP'. If the price decreases below OP, the producer will stop the production.

Price and Output Equilibrium in Long Run Period

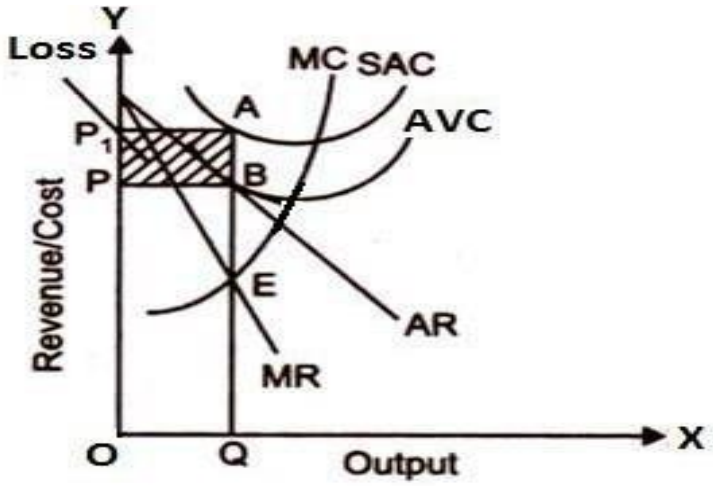


Fig 6

In long run, monopolist will be in equilibrium when long run marginal cost is equal to marginal revenue. In this situation, he will try to earn super normal profit and fix the price to get it. In other words: Super Normal Profit (Long run)=AR>LAC.

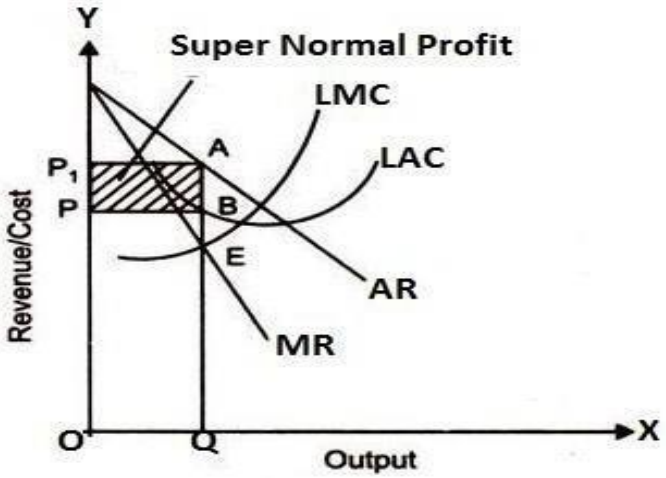


Fig 7

In fig 7, output is measured on X-axis and revenue/price is on Y-axis. LAC and LMC arelong run average cost and long run marginal cost curves whereas AR and MR are average revenue and marginal revenue curves respectively. The monopolist is in equilibrium at the point E where MC=MR and MC cuts MR from below (at this point both conditions are

fulfilled so this is an equilibrium point). At this level, monopolist produces OQ output and sells it at AB price which is more than average cost BQ by AB (AQ-BQ). Thus, in this situation monopolist will earn super normal profits i.e. ABPP'.

6.5 Monopoly equilibrium and Laws of Cost

There are three laws of cost i.e., law of diminishing cost, increasing cost and constant cost which effect the price of the product:

A. Diminishing Cost: This law is also known as law of increasing return. According to this law, production increases and cost per unit declines. In this situation, producer must sell his product at low price to increase its sales. In Fig 8 AC and MC are falling. The MC and MR cut each other at point E. So, the monopolist will produce OT unitsof commodity and sell the same at QT Price and gets PQRS profit.

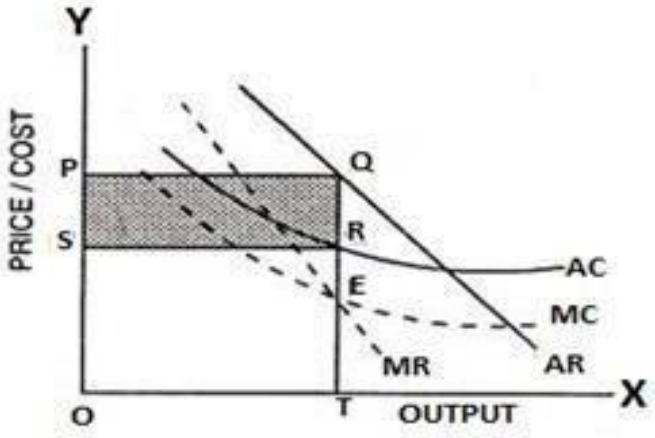


Fig 8

B. Increasing Costs: This law is also known as decreasing return to scale, under this

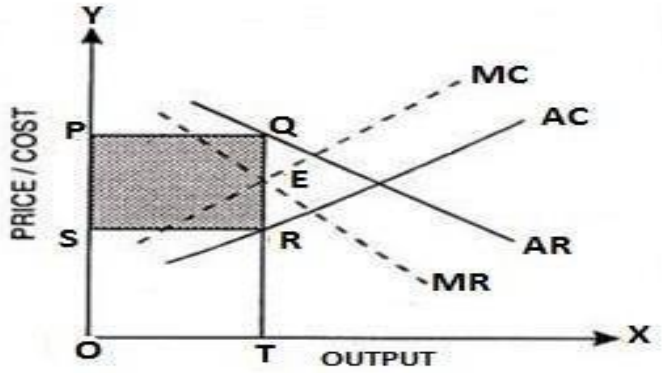


Fig 9

situation producer will get the maximum profit at point E (indicated in the fig 9), where

marginal revenue marginal costs are equal to each other (MR=MC). The producer will produce OT units of the commodity at QT price and will get profits of PQRS.

C. **Constant Costs**: In this situation, cost will remain the same whether production is less or more. In the fig 10, the AC curve will be parallel to OX and for all the levels of output AC will be equal to MC. AR and MR represent the average revenue curve and marginal revenue curve respectively. The equilibrium of firm is at point E where MC=MR and OTis the equilibrium output with QT Price. The monopoly profit will be equal to PQRE.

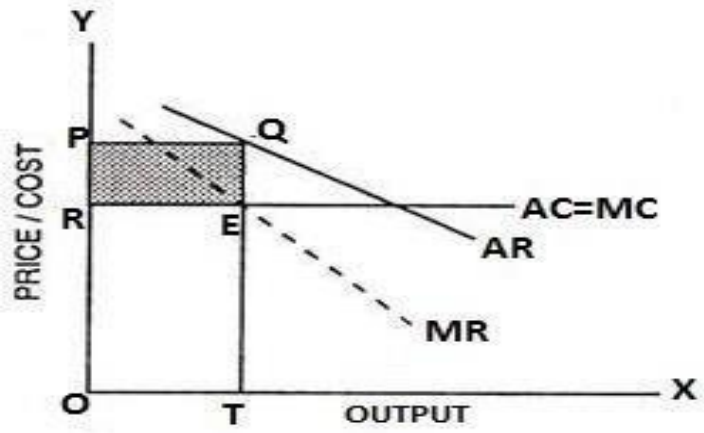


Fig 10

6.6 Degree of Monopoly Power

Measurement of monopoly power depends upon various factors but commonly there are two methods for measuring it:

A. **Lerner's Measure:** According to this, monopoly power is the difference between the price and the marginal cost. It means larger the difference between these two, larger the monopoly power and less the difference between these two, less the monopoly power. Following is the formula for measuring the monopoly power:

MP = Price-Marginal Cost

B. **J.S.Bain:** According Prof J.S.Bain, monopoly power is the difference between the priceand average cost.

Check Your Progress - II

Q1. Discuss the determination of price and output under monopoly long period.

Ans._____

_____

Q2. Define Monopoly Power?

Ans._____

_____

6.7 Price Discrimination/Discrimination Monopoly: Meaning and Types

Price discrimination refers to selling the same commodity or product at different prices to different buyers. In other words, if a monopolist charges different price from different consumers for the same commodity is called price discrimination or discriminating monopoly. For example, when a producer charges Rs. 1,000 for a chair from X customer and Rs. 800 from customer Y for the same chair, then producer is practicing price discrimination.

According to Robinson, "Price discrimination is charging different prices for the same product or same price for the differentiated product."

Types:

Price discrimination is of the following kinds:

A. Personal Price Discrimination: It refers to charging of different prices from different customers for the same product. For example, if a doctor charges different price/fee of his services from rich and poor patients than it is called personal price discrimination.

B. According to use: When different prices are charged for different uses to which the commodity is put, for example, rate of electricity for domestic use is costly than for commercial purposes.

C. Area-wise Discrimination: when the monopolist charges different prices at different places for the same product, it is called as area-wise or geographical discrimination. This type of discrimination is also called dumping.

6.8 Degrees and Conditions of Price Discrimination

Prof. Pigou has divided the degrees of price discrimination into three categories:

First Degrees: In the first degree of price discrimination, the monopolist is able to sell each separate unit of product at a different price. The seller charges exactly the price the buyer wants to pay. This means that the seller does not leave a discount/surplus to the consumer. This type of price discrimination is called perfect discrimination. This is the 'take-it-or-leave- it' price discrimination.

Second Degree: In this degree, the buyers are divided into different categories and from

different categories different price is charged which is the lowest demand price of that group.

Third Degree: In this degree, the market is divided into several smaller markets or sub markets, and from each market different price is charged. The price charged in a small market or sub market depends on production and the conditions of demand for that small market. Price discrimination is possible when following conditions exist in the market:

- **Single Seller or Producer of a Commodity**: Price discrimination is only possible under the monopoly market structure where there is a single seller or producer of a commodity orservice. In other types of market structure, it is not possible.
- **Two Separate Markets**: There should be two or more than two separate markets in which product or commodity is being sold. They shouldn't be close to each other.
- **Different Elasticity of Demand:** The price difference indicates that the demand for goods is different the two markets. The monopolist can set the highest market price w here flexibility is les and also the lowest market price where flexibility is more elastic. **Nature of the Product:** The nature of the product or service must be such that itcannot be resold. Otherwise, you cannot discriminate on the basis of price.
- **Ignorance of Buyers:** Price discrimination is possible if the buyer is lazy and does not know the market conditions, the monopolist will charge different buyers' different prices for their products or services. Sometimes customers are lazy and don't care about the slightest difference in product and service offerings.
- **Sale on Order:** Price discrimination is also possible when a single seller sells his product on order.
- **Legal Acceptance**: When a monopolist has legal sanction from the government to sell its product at different prices then the price discrimination is possible. For example, PSEB has legal sanction from the government to charge different prices for the use of electricity in agricultural sector and industrial sector.
- **Various uses**: Price differences can also occur when users of a service or product have different uses. For example, Indian Railways charge different freight rates for coal and silver.

6.9 Price and Output Determination Under Price Discrimination

We know that under price discrimination, monopolist charges the different prices from

different consumer for the same product. For that purpose, he will divide the entire market into sub-markets on the basis of the elasticity of demand for the product. Only if the elasticity of demand is different, price discrimination will be profitable. After dividing the market, the monopolist has to decide: (1) how much the total output should be produced? (2) How the total output should be distributed between the sub-markets? And (3) what prices should be charged in each of sub-market? In order to explain it, suppose there are two different markets i.e A and B having different elasticity of demand.

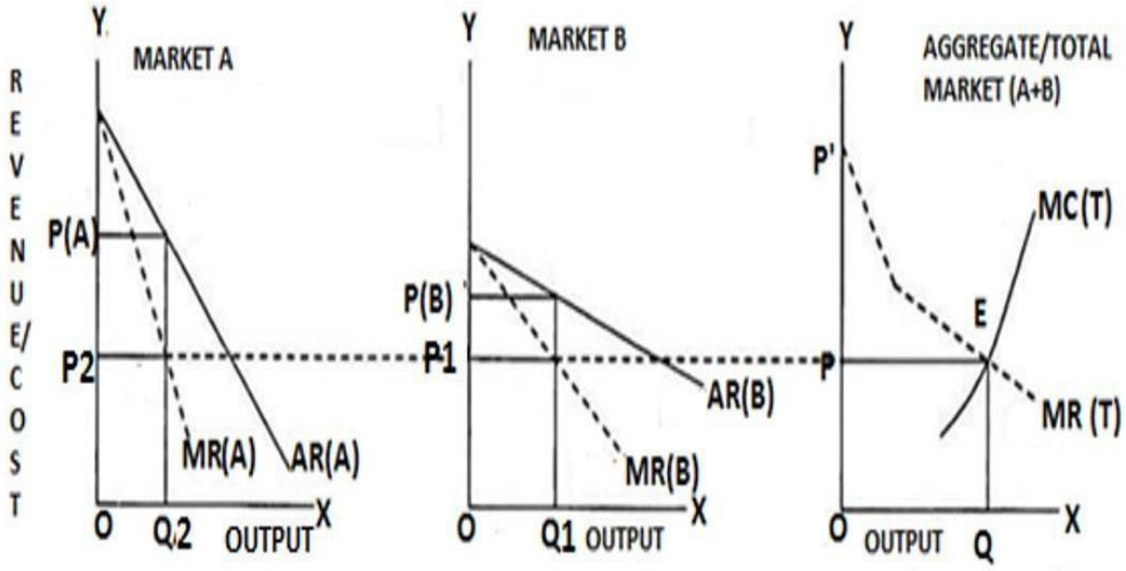


Fig 11

The monopolist has to decide at what level of output he should produce to get maximum profit, hence, he will be in equilibrium at output at which MR=MC and MC curve cuts theMR curve from below. It is assumed that the product is homogenous. In the above fig 11, marginal revenue curve of A market and of B market is expressed by MR(A) and MR(B) whereas average revenue curve of A market and of B market is expressed by AR(A) and AR(B) respectively. The total marginal revenue (MC(T)) curve includes marginal cost of market A and market B whereas MR(T) is the combination of marginal revenue of both A and B markets. Thus, the total output is fixed at that point where MC (T)=MR(T) and MC(T) cuts MR(T) from below. Therefore, the equilibrium of the discriminating monopolist is established at output OQ at which MC (T) cuts MR (T). In other words, he will produce OQ output. For dividing the total output (OQ) into two markets, the discriminating monopolist will distribute it in such a way that marginal revenue in each is equal to the marginal cost of

whole output (which is equal to OP). Therefore, he will sell output OQ2 in market A and OQ1in market B.

The elasticity of demand is different in each market, so monopolist will charge different prices in both the markets. It is also shown that in Market B in which elasticity of demand is greater, the price charged is lower than that in Market B where the elasticity of demand isless. So OQ2 output will be sold at price OP(A) in market A and OQ1 output at OP(B) in market B.

6.10 Price Determination Under Dumping

Dumping occurs when monopolist sells his product in domestic country at high price and in foreign country at low price. In other words, in this case of price discrimination, producer charges lower price in the foreign market and high price in the domestic country as he enjoys monopoly in domestic country and faces perfect competition in foreign market. The demand curve for the product will be perfectly elastic for him where he faces perfect competition, while demand curve will be sloping downward where he enjoys monopoly. This can be explained with the help of figure 12. In the domestic market in which the producer has a monopoly, average revenue curve AR (D) as well as marginal revenue curve MR(D) are sloping downward. In the foreign market,producer faces perfect competition so AR(F) curve

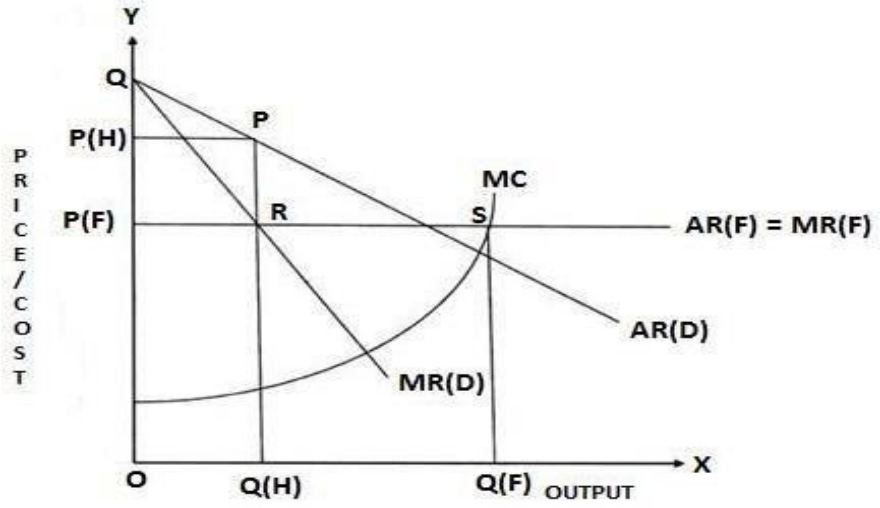


Fig 12

will be a horizontal straight line and the MR(F) curve will coincide with the AR(F) curve. MC is the marginal cost curve of output and the aggregate marginal revenue curve is represented as QRS.

The fig shows that the marginal cost curve MC intersects the MR curve at point S. Therefore,

an equilibrium output OQ(F) is determined. The total OQ (F) output is distributed between the foreign and the domestic market in such a manner that the Marginal revenue in each market is equal to each other. The producer will sell OQ(H) output at OP(H) price in domestic country and Q(H)Q(F) output at OP(F) price in foreign country. Here OP(H)>OP(F) but marginal revenue in both countries is equal.

Check Your Progress – III

Q1. Define dumping.

Ans._____

_____

Q2. What do you mean by price discrimination?

Ans._____

_____

6.12 Monopolistic Competition: Meaning and Features

The term monopolistic competition was given by Prof Edward H. Chamberlin of Harvard University in 1933 in his book Theory of Monopolistic Competition. The term monopolistic competition represents the combination of monopoly and perfect competition. Monopolistic competition refers to a market situation in which there are a large number of buyers and sellers of products. However, the product of each seller is different in one aspect or the other and these products have close substitutes. For example, there are many well-known brands in soap like Lux, Rexona, Dettol, Dove, Pears, etc.

According to J.S. Bains, "Monopolistic competition is market structure where there is a large number of small sellers, selling differentiated but close substitute products."

According to Baumol, "The term monopolistic competition refers to the market structure in which the sellers do have a monopoly (they are the only sellers) of their own product, but they are also subject to substantial competitive pressures from sellers of substitute products."

Features: Following are the features of monopolistic competition:

1. **Large Number of Sellers and Buyers:** The size of sellers and buyers is large in monopolistic competition. Each firm follows the independent price policy. The buyers do not have perfect knowledge about all the products, their qualities and prices.
2. **Differentiated Products:** Under monopolistic competition, the products of sellers are

different in many respects, like difference in brand, shape, colour, style, trademarks, durability, and quality. Therefore, buyers can easily differentiate among the available products in more than one way. However, under monopolistic competition, products are close substitutes of each other.

3. **Free Entry and Exit:** Under monopolistic competition, there are no restrictions imposed on firm for their entry and exit from the market. This is the same condition as prevailing under perfect competition.
4. **Restricted Mobility of Factors of Production:** Under monopolistic competition, the factors of production as well as goods and services are not perfectly mobile. This isbecause if a firm/producer is willing to move its factors of production or goods and services, it has to pay heavy transportation cost. This leads to difference in the prices of products.
5. **Price Policy:** Similar to monopoly, average and marginal revenue curves of an organization also slope downward in case of monopolistic competition. This implies that a firm can sell more only if the prices are low of those products. On the other hand, under monopolistic competition, if the prices of products are higher, then the buyers would switch to other sellers due to close substitutability of products.
6. **Selling cost**: Each and every firm tries to promote their product by spending on advertisements and publicity. The purpose of this cost is to maximise their profits.

6.12.1 Nature of Demand and Cost Curves Under Monopolistic Competition

Under monopolistic competition due to product differentiation, a firm faces a downward

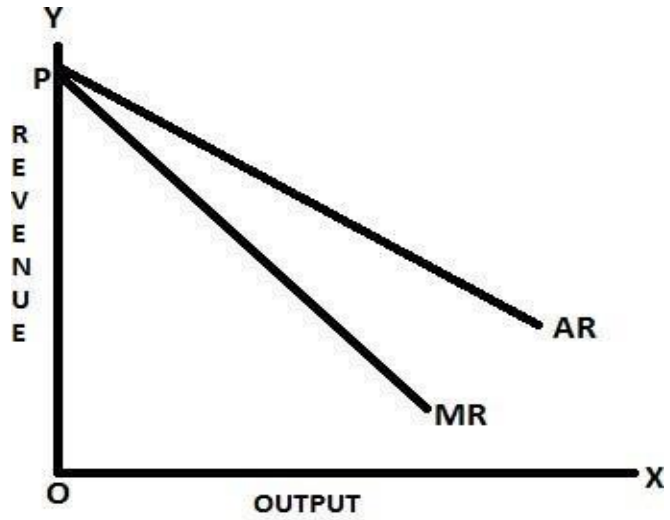


Fig 13

sloping demand curve. It is highly elastic but not perfectly elastic. The reason is that ifthe firm increases price of their product, then buyer will stop buying their product andshift to another firm who has not changed his price. On the other hand, if firm decreasesthe price of product, then he will attract new buyers. Under monopolistic competition, average cost, average variable cost, marginal cost and selling cost are of U-shaped. Due to differences in product, supply curve cannot be drawn. Fig 13 shows average revenueand marginal revenue curve under monopolistic competition.

Check Your Progress – IV

Q1. Define monopolistic competition.

Ans._____

_____

Q2. Give any two features of monopolistic competition.

Ans._____

_____

6.12.2 Price and Output Determination Under Monopolistic Competition(Individual Equilibrium)

A. Short Run: The short-run equilibrium of a monopolistic competitive organization is the same as under monopoly. The firm will be in equilibrium at that point where marginal revenue equals marginal cost and MC cuts MR from below. In short run, a firm can get super normal profits, normal profits and losses:

i) Super Normal Profit: Under monopolistic competition, a firm will enjoy the super normal profits where MC=MR and MC cuts MR from below**.**

In Figure 14, output is measured on X-axis and cost/revenue/price is on Y-axis. AR is the average revenue curve, MR represents the marginal revenue curve, and SAC curve represents the short run average cost curve, while SMC signifies the short run marginal cost. It can be seen that MR intersects SMC at point E (E point is equilibrium point where MR=MC and

MC cut MR from below) which showed output OQ1and price is OP (which is equal to

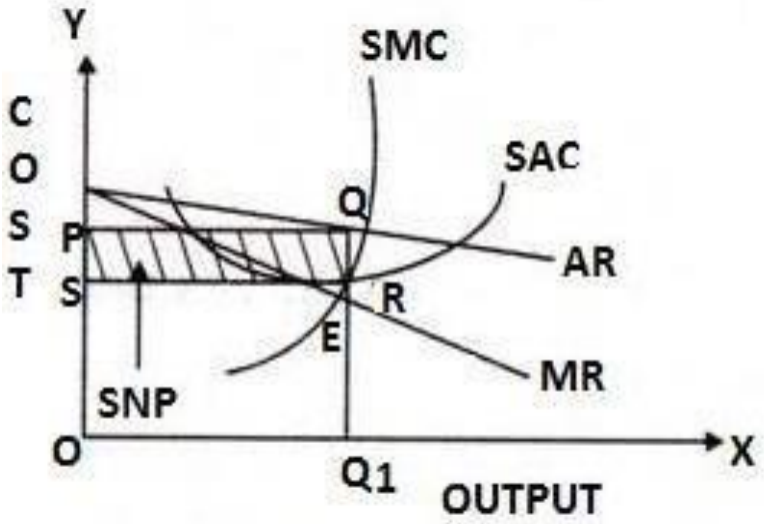


Fig 14

QQ1). Therefore, QR is the supernormal profit per unit of output as supernormal profit per unit of output is the difference between the average revenueand average cost And supernormal profit would be measured by the area of rectangle PQRS.

ii) Normal Profit: A firm will earn normal profits when the price of product is equal to average cost of the same product.

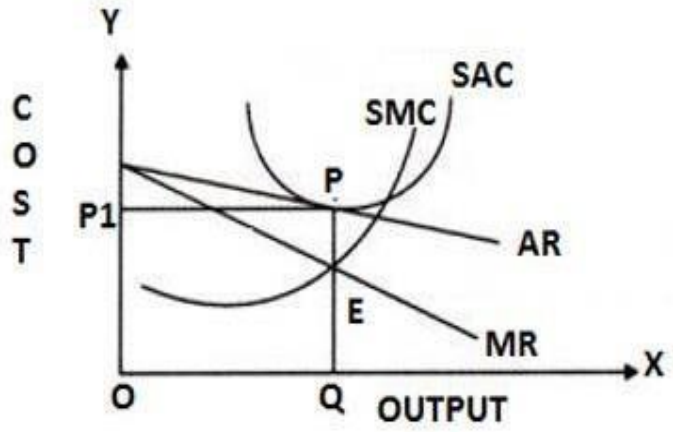


Fig 15

In Figure 15, output is estimated on X-axis and cost/revenue on Y-axis. SMC indicates short run marginal cost whereas SAC short run average cost. E is the equilibrium point where SMC intersects MR from below and SMC=MR. At this equilibrium point, the equilibrium output is OQ and price OP1. The curve AR touches SAC at point P (AR=SAC), thus this P point is

normal profit earning point for a firm.

iii) Losses: In short run period when short run average cost is greater than average revenue, a firm will incur losses, as shown in figure 16.

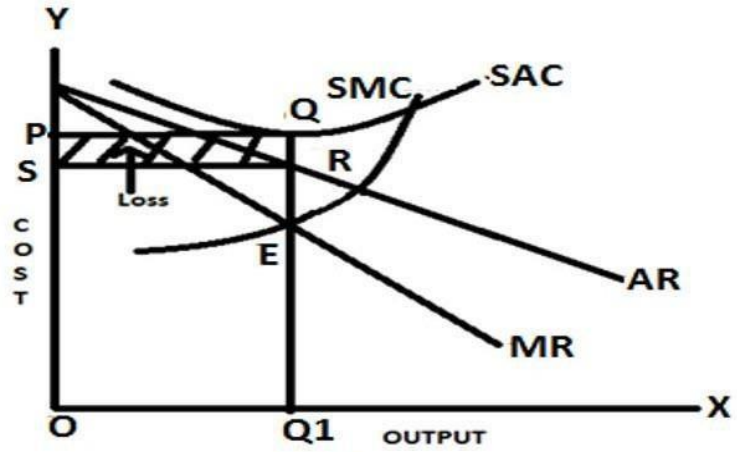


Fig 16

Figure 16, output is measured on X-axis and cost/revenue/price is on Y-axis. The firm is in equilibrium at point E, where MC=MR. At this equilibrium level the output is OQ1 at price OP. Corresponding to this, the average cost QQ1 is greater than average revenue RQ1. Hence revenue is less than cost; the firm will incur loss which is PQRS.

B. Long Run: Under monopolistic competition, in long run if existing firms are earning super normal profits, then new firms will enter in the industry. With the entering of new firms, production will increase as a result price will decline. Hence each and every firm will earn normal profit in long run period instead of super normal profits. Now profits are normal only when AR = LAC. It is further explained with the figure 17:

In Figure 17, output is estimated on X-axis and cost/revenue on Y-axis. LMC indicates long

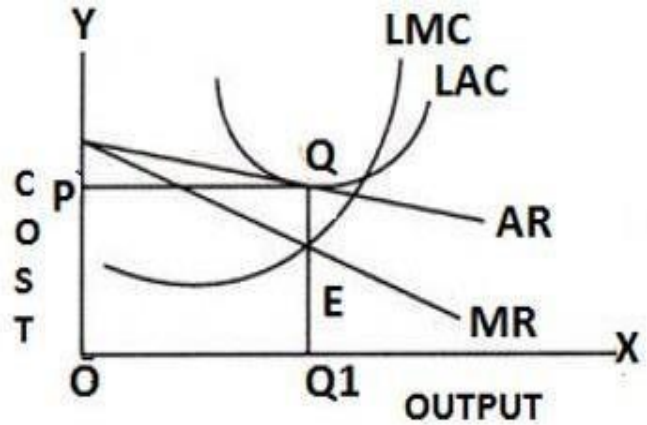


Fig 17

run marginal cost whereas LAC long run average cost. E is the equilibrium point where LMC intersects MR from below and LMC=MR. At this equilibrium point, the equilibrium output is OQ1 and price OP. The curve AR touches LAC at point P (AR=LAC), thus this Q point is normal profit earning point for a firm.

6.12.3 Price and Output Determination Under Monopolistic Competition (Group Equilibrium)

Generally, group is related with the industry. The industry includes all firms which are producing homogenous product. Whereas under monopolistic competition, group consists ofa firm producing differentiated product and have close substitute. For instance, soap making firms like Lux, Dove, and Pears are a group. Following is the assumption of group equilibrium:

- Demand and cost curve of all the firms are identical.
- No firm will affect the price and output of another competitive firm.

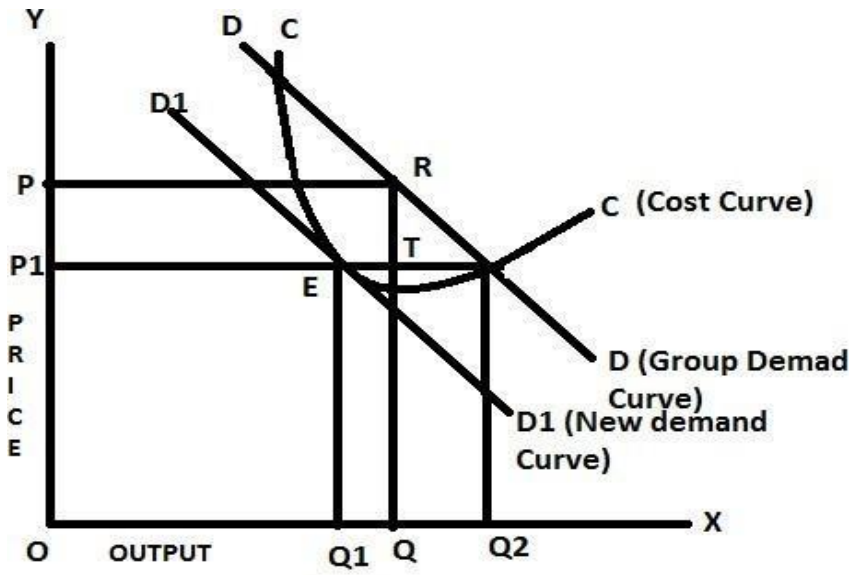


Fig 18

Figure 18, shows output is measured on X-axis and price is on Y-axis. If all firms fix OP price of the product, then they will earn supernormal profit i.e. PRTP1. This supernormal profit will attract the other firms to enter into the market. Then new firms will also start the output as a result production will increase in the market and the firm's new demand curve will be shifted to D1D1.The demand curve is tangent to the cost curve at E point (which is equilibrium point) and all firms will earn normal profits at this situation. Hence the equilibrium price is OP1 and output is OQ1.

6.13 Selling Cost

The curve of selling costs was propounded by Prof. Chamberlin. Under monopolistic competition, products are differentiated; therefore, producers have to push up the sales of their product. For this purpose, producers do the publicity regarding the products or try to promote their product. Such a sales promotion expenses are known as selling cost. This cost includes all the promotion expenses like advertisement on television, newspapers, radio and salaries of salespersons incurred by the producers to increase the demand of their product. The selling cost is different from production cost because production cost is related with the expenses incurred by the producer for the production of a product. The production cost includes all the expenses on manufacturing of a product like raw material, electricity, wages of labours and transportation cost (not included in selling cost as this cost do not increase the demand of a product) etc. Like the cost curves, selling cost curve is also U- shaped under the influence of the law of variable proportions.

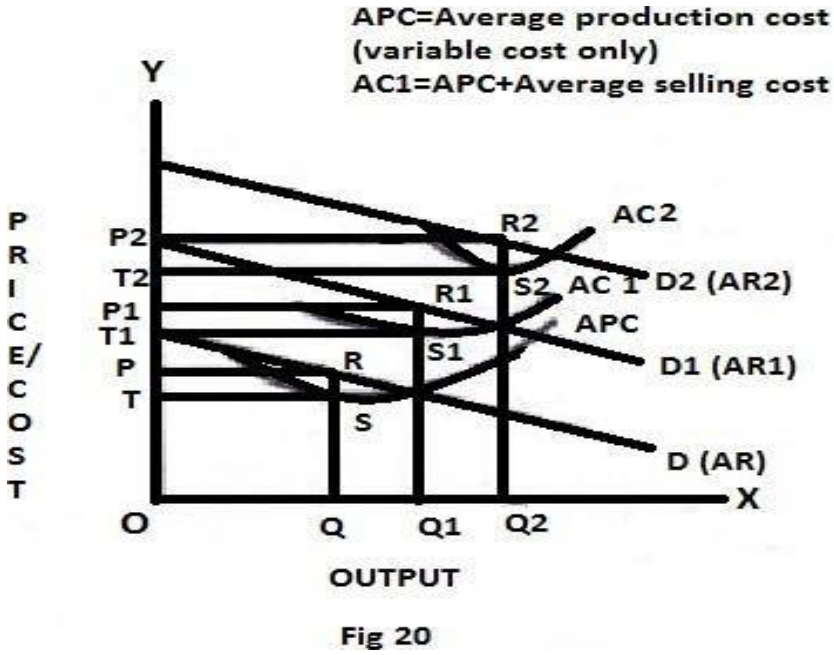


Fig 20

Figure 19, shows the slopes of ASC is average selling cost. In the initial stage, it falls because proportionate increase in sale is more than the increase in selling cost. Later, it starts rising as it indicates that after a point proportionate increase in sale is less than the selling cost. Under monopolistic competition, the selling cost also effect the price-output of a firm. Figure20 show that output is measured on X-axis and cost/revenue is on Y-axis. APC is initially average production cost and AC1 (average composite curve) includes average production cost and average selling cost whereas AC2 includes average composite cost and additional average

selling cost. The initially equilibrium position is when OQ output is sold at OP price. The firm earns PRST super-normal profits. Now, when selling costs are incurred in the first instance, the new equilibrium position brings $T_1S_1R_1P_1$ profits (after selling cost demandwill also increase and new demand curve will be D_1 (AR_1)) by selling OQ_1 output at OP_1 price. Again, if firm increases the selling cost, then demand curve will shift to D_2 (AR)and firm will get $P_2R_2S_2T_2$ super normal profits by selling OQ_2 output at P_2 price. The firm will, however, continue to increase the selling cost to maximise their profits. If the firmspends more on advertisement beyond this level, the addition to revenue will be less thancosts.

6.14 Excess Capacity

Initially, the excess capacity was outlined by Wicksell and Cairnes but later on it was propounded by Chamberlin in a systematic way. The doctrine of excess capacity is concerned with monopolistic competition in the long-run. It is defined as "the difference between ideal (optimum) output and the output actually attained in the long-run."

Under perfect competition, average revenue/demand curve touches long-run average cost curve (LAC) at its minimum point and two conditions i.e.

(i) LMC = MR and

(ii) AR (price) = Minimum LAC are fulfilled.

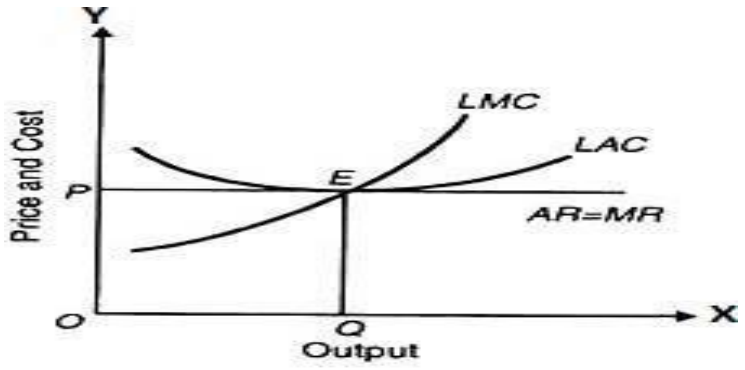


Fig 21

This means that in the long-run the entry of new firms forces the existing firms to make thebest use of their resources to produce at the lowest point of average total costs. Figure 21 show the firm will be in equilibrium situation at the point E (at this point conditions are where OQ is the ideal or optimum output and enjoys profits in long run.

Under monopolistic competition, average revenue or demand curve slopes downward and two conditions i.e., (i) LMC = MR and (ii) AR (price) = Minimum LAC are not fulfilled. Thus, under this competition, firms work under excess capacity means they are not producing optimum output.

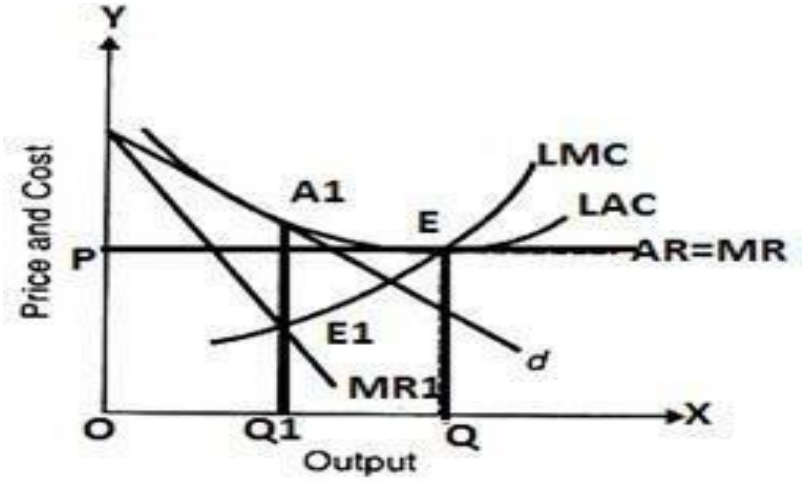


Fig 22

Figure 22 show that output is measured on X-axis and price/cost is measured on Y-axis. AR is average revenue, MR is marginal revenue, LAC is long run average cost and LMC is long run marginal cost. The demand curve is indicated by d and firm is in equilibrium at the point E1 and output is OQ1 but this is not the ideal output because d is tangent to LAC at A1 to the left of E. If firm want to produce beyond OQ1 then it will incur losses as LMC>MR1. Hence, excess capacity (QQ1) under monopolistic competition cannot be utilised.

Chamberlin's Excess Capacity: In previous concepts of excess capacity, it is discussed that under perfect competition, each firm produces at the minimum Point on its long run average cost curve and demand curve is tangent to it at that point.

This will be the ideal output and no excess capacity exits in perfect competition. Whereas under monopolistic completion, in long run demand curve slopes downward and equilibrium of the firm is to the left of the minimum point on long run average cost curve. Thus, firm cannot utilise its excess capacity. But according to Prof. Chamberlin under monopolistic competition there is a freedom of entry and price competition, the tangency point between the firm's demand curve and the long run average cost curve would lead to be the "ideal output" and no excess capacity.

Prof Chamberlin assumes (1) there is a large no of firms. (2) Each firm produces similar

product (3) there is a freedom to enter in the production process. (4) Long run cost curves are of U-shaped.

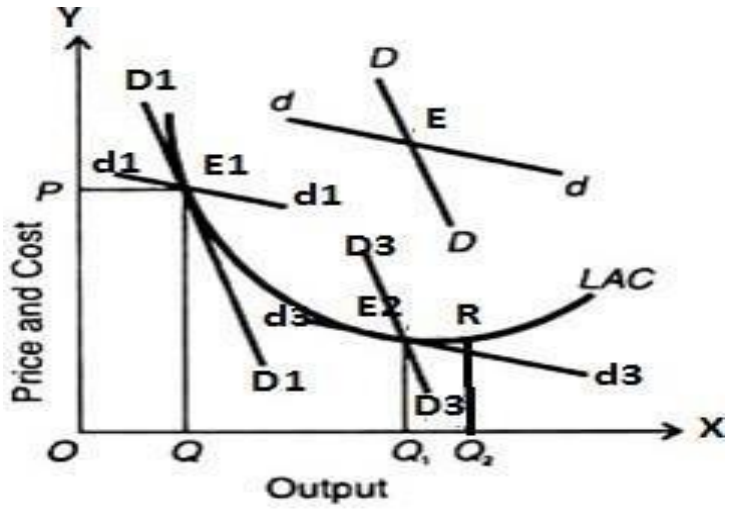


Fig 23

Figure 23 show due to no price competition dd curve has not any importance whereas DD is a group demand curve. Further, this fig shows that at E point firms are earning super normal profits in short run period. The super normal profits attract new firm to enter in the market resulting DD shifted to D1D1 where it is touches the LAC at the point E1. At the point E1, firms earn normal profit without price competition and selling OQ output at price OP. According to Chamberlin due to non-price competition under monopolistic competition each firm in the group producing OQ output but OQ1 is the ideal output or the excess capacity.

6.15 Comparison Between Monopoly and Monopolistic Competition

Following is the main point which shows there is difference between these two competitions:

1) **Number of buyers and sellers**: Under monopoly there is only single producer/seller whereas in monopolistic competition, there are many sellers/producers. Both competitions have many buyers.
2) **Product:** Product may or may not be homogenous under monopoly on the other hand; there is always a product differentiation.
3) **Barriers to entry:** Monopoly is characterized by the existence of barriers to entry. There are no barriers to entry in monopolistic competition.

4) **Degree of knowledge:** The buyers and sellers have perfect knowledge about market; onthe other hand, under monopolistic competition the sellers and buyers have not perfect knowledge about market.

5) **Revenue curves:** Under monopoly AR and MR curves are less elastic whereas these are more elastic in monopolistic competition.

6) **Profits:** Under both competitions in short run period, a firm can earn super normal profits, normal profits and losses whereas in long run period, under monopolistic competition, a firm can earn normal profits and monopolist earn super normal profits.

Check Your Progress – V

Q1. Define selling cost.

Ans._____

_____

Q2. Define Excess capacity.

Ans._____

_____

6.16 Summary

In this Unit, monopoly competition as well as monopolistic competition is discussed. Here, Monopoly competition is that competition where there is single producer of the product and product has no close substitution; on the other hand, in Monopolistic competition there are many sellers but product differentiation exits. The monopolist will be in equilibrium and earn maximum profits when two conditions are fulfilled. These conditions are (1) MC=MR and (2) MC curve cuts MR from below. In short run, monopolistic earns super normal profit, normal profit and losses where are in long run, he enjoys super normal profits. Monopolist can charge different price for the same product from different consumers under discriminating monopoly. It may be due to personal, geographical or different uses of product. Price discrimination is possible only if the elasticity of demand in one market is different from elasticity of demand in other market. Dumping is a special case of price discrimination where monopolistic charge high price in domestic country and low price in foreign country for the same product. The reason behind it is that in domestic country monopolist enjoys monopoly and in foreign country he faces perfect competition. Under monopolistic competition, average cost, average variable cost, marginal cost and selling cost are of U-shaped. Due to differences

in product, supply curve cannot be drawn. A firm can earn supernormal profits, normal profits and losses in short run period whereas in long run period, it can earn normal profits only.

6.17 Questions for Practice

A. Short Answer Type Questions

Q1. Define Monopoly. Give its assumptions

Q2. Explain the term Monopolist is a price maker.

Q3. Explain the concept of total revenue and total cost under monopoly.

Q4. What do you mean by price discrimination? Give example

Q5. Explain the shapes of AR and MR under monopoly and why?

Q6. Discuss the degrees of Price Discrimination.

Q7. Explain the concept of excess capacity in detail.

Q8. Discuss Price and Output Determination Under Monopolistic Competition(Group Equilibrium)

Q9. Explain the nature of Demand and Cost Curves Under MonopolisticCompetition.

B. Long Answer Type Questions

Q1. Explain the term monopoly and how price determination under short and longperiod.

Q2. What is price discrimination? Explain its degrees and conditions.

Q3. Explain the price and output determination under price discrimination.

Q4. Explain the meaning and features of monopolistic competition.

Q5. Explain price and Output Determination Under Monopolistic Competition(Individual Equilibrium).

Q6. Compare and contrast monopoly and monopolistic competition.

6.18 Suggested Readings

- H.L. Ahuja: Advanced Economic Theory (Microeconomic Analysis)
- Koutsoyiannis: Modern Microeconomics
- K.N. Verma: Micro Economic Theory

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

COURSE: MICRO ECONOMICS I

UNIT 7: THEORIES OF DISTRIBUTION: MARGINAL PRODUCTIVITY THEORY AND THE MODERN THEORY

STRUCTURE

7.0 Learning Objectives

After studying this unit, Learner will be able to:

- Describe the meaning, types and aspects of distribution of income
- Know about the marginal and average productivity
- Understand the various basic concepts related to the theory of distribution
- Explain the theories of distribution

7.1 Introduction

For the production of goods, various types of factors of production like land, labour and capital are used. In other words, output is the result of coordination of these factors of production. As a result, what is so ever is produced that is distributed among different factors of production in the shape of rent, interest and wages as a reward of their services or contribution in the production? Thus, theory of distribution in economics is related with the allocation of total production among various factors of production. In this Unit, we will discuss about theories of distribution and the purpose of this Unit is to make you understand the concepts and theories of distribution.

7.2 Meaning and Types of Distribution

In simple words, distribution means giving each person a portion of their work. The theory of distribution deals with the pricing of factors of production. Production materials such as land, labour, capital, buildings and entrepreneur are used to produce certain goods and services. As a result of these factors, the product is distributed to these production factors. For example, workers receive wages, land lord receive rent, and entrepreneurs receive profit. Thus, distribution in the economy refers to activities related to the distribution of production between production factors over a period of time. In other words, the theory of distribution means division of income among the factors of production in terms of rent to landlords, wage to labourer, interest to capital and profit to entrepreneurs.

According to Professor Chapman has defined, "The economics of distribution accounts for the sharing of wealth produced by a community among the agents or the owners of the agents which have been active in its production." As per Professor Seligman, "All wealth that is created in society finds its way to the final disposition of the individuals through certain channels or sources of income. This process is known as distribution."

Types of Distribution

There are two types of distribution:

A. **Personal Distribution**: It refers to the income sharing between different people or individuals in the country. It's not about income sources for different people in the country, but about their size. It only means questions about inequality in the distribution of income and wealth and how to reduce inequality?

B. **Functional Distribution:** This means dividing national income between various factors of production, such as land, labour, and capital, depending on the contribution of production. It is concerned with the problem of pricing of the productive factors.

Aspects of the Price of Each Factor

In general, the price of each item has two sides:

A. **Price Aspect:** Price aspect refers to the amount paid by the company or firm for the services of different factors of production used in the production process. For example, payment of wages to labours, interest to capital, rent to land is related with price aspect.

B. **Income Aspect:** Income aspect is related with the income of each and every factor of production for their services. For example, labour gets wages, employee gets salaries etc.

7.3 Theory of Factor Pricing and Need of Separate Study of Factor Pricing

Theory of factor pricing is concerned with the determination of prices of the services of different factors of production. These factors are known as inputs like labour, land, capital etc. In other words, the theory of factor pricing is known as theory of distribution. But factor pricing theory is separate from product pricing. The prices of a commodity are determined by the interaction of supply and demand but this interaction is not applicable on the factors of production. The reason behind it is that the nature of demand and supply of factor services in the factor market is entirely different from the nature of demand and supply in the commodity market. Professor Alfred Marshall has emphasised that there is a need for a separate theory of factor pricing because the characteristics of commodities and factors of production are different:

1) The demand for a factor of production is not a direct demand as it depends on the demand for the goods and services in which they are employed. Whereas, the demand for a commodity is a direct demand because it directly satisfies the want of a consumer.
2) The demand for a factor of production is a joint demand because two or more than two factors are jointly demanded for production.
3) The factors of production like labour, entrepreneur etc are affected by the economic factors as well as the non-economic factors.

Thus, we come to the conclusion that though the value of the commodities and the prices of the factors of production are determined by demand and supply yet, due to some differences of the factors of production on the side of supply, there is a need for a separate theory of distribution.

7.4 Productivity of the Factor: Productivity means contribution of a factor in the total output.

1) Marginal Productivity

Marginal productivity of a factor refers to additional product as a result of applying additional unit of a factor, keeping other factors as constant. It can be used as:

A. **Marginal Physical Productivity:** It may be defined as the addition to the total production resulting from employing one more unit of a factor of production. It refers to the difference made to total product by applying one additional unit of input.

$$MPP_n = TP_n - TP_{n-1}$$

MPPn:- Marginal physical productivity of n unit

TPPn:- Total physical productivity of n units.

TPPn-1: - Total physical productivity of n-1 units.

B. **Marginal Revenue Productivity:** It is defined as the addition to total revenue resulting from the applying of one more unit of a factor of production. It is calculated by multiplying the marginal physical productivity with marginal revenue.

MRP=MPP*MR

C. **Value of Marginal Physical Productivity:** It is calculated by multiplying MPP with average revenue.

VMP=MPP*AR

2) Average Productivity

It refers to per unit productivity of a variable factor. Average physical productivity is measured by dividing total physical product by the number of units of the variable factor.

APP=Total Physical Product/Units of the variable factor**.**

Average revenue productivity is calculated by dividing total revenue product by the number of units of the variable factor**.** ARP= Total Revenue Product/Units of the variable factor.

3) Cost of the Factor

It refers to expenses incurred on hiring the factor of production. It has two aspects:

Average factor cost: It refers to per unit cost of the factor.

AFC= Total factor cost/Units of the factor employed

Marginal factor cost: It refers to additional cost of hiring one more unit of factor of production.

Check Your Progress I

Q1. What is the meaning of marginal productivity?

Ans._____

_____

Q2. What do you mean by average productivity?

Ans._____

_____

7.5 Theories of Distribution or Factor Pricing

7.5.1 Marginal Productivity Theory (Under Perfect Competition)

Marginal productivity theory is the oldest theory of distribution or factor pricing. It was developed by German economist T.H. Von Thune in 1826. But later on, many economists like Walras, Edgeworth and Clark contributed for the development of this significant theory of distribution. According to this theory every factor of production gets remuneration equal to its marginal revenue productivity. This theory shows that how the prices of different factors of production are determined. According to this theory every factor of production gets remuneration equal to its marginal revenue productivity.

A. Assumptions

The marginal productivity theory under perfect competition is based on the following assumptions:

1) There is perfect competition both in the factor market and product market.

2) All units of the factor are homogenous and factors of production are perfectly mobile.

3) Every entrepreneur aims at maximising the profits.

4) The law of variable proportions in applicable in the economy. It means output can be changed by changing the proportion of factors.

5) Factors of production can be substituted for each other. It means capital can be used in place of labour.

6) There is full employment of factors.

7) There is no change in technique of production.

8) This theory is applicable only in the long-run.

B. Explanation of the Theory

Every producer uses factors of production like labour, land, capital due to their productive in nature. The producer pay for the factor depends upon its productivity. The greater the productivity of a factor, the higher will be its reward. If the price of a factor of production is less than its marginal revenue product, the producer will use more of this factor. When more of a factor is employed, its marginal revenue product diminishes. The producer will stop giving further employment as soon as the marginal revenue product of the factor is equal to its price. This theory can be explained:

From the View Point of the Industry

Under the perfect completion from the view point of an industry, marginal productivity theory studies the price of each factor of production is determined by the equality of demand and supply. But according to this theory, it of assumed that there is full employment in the economy, therefore the supply of the factor is constant. Hence, price of factor is determined by its demand only.

In fig 1, supply and demand of labour is measured on X-axis whereas wages and MRP is measured

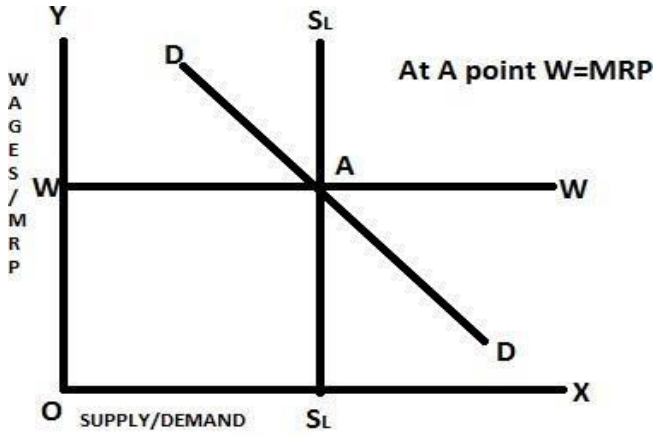


Fig 1

on Y-axis. The supply of labour is shown by SL which is constant and parallel to OY, on the other hand WW indicates the wages of the labour and DD is the demand curve of labour. The equilibrium point is A where supply and demand curve of labour cuts each other and price of factor is determined by OW.

From the View Point of Firm (Perfect Competition)

Under perfect competition, in order to get maximum profits, the firm will employ that number of factors where marginal factor cost is equal to marginal revenue product (MFC=MRP). If the MRP is less than their price, the firm will bear the losses. It can be explained with help of following

table:

Table 1: Factor Demand by a Firm

Units of a factor	MPP	Price/AR=MR (₹)	MRP=MPP*MR (₹)	Price of factor (₹)
1	8	4	32	16
2	6	4	24	16
3	**4**	**4**	**16**	**16**
4	2	4	8	16

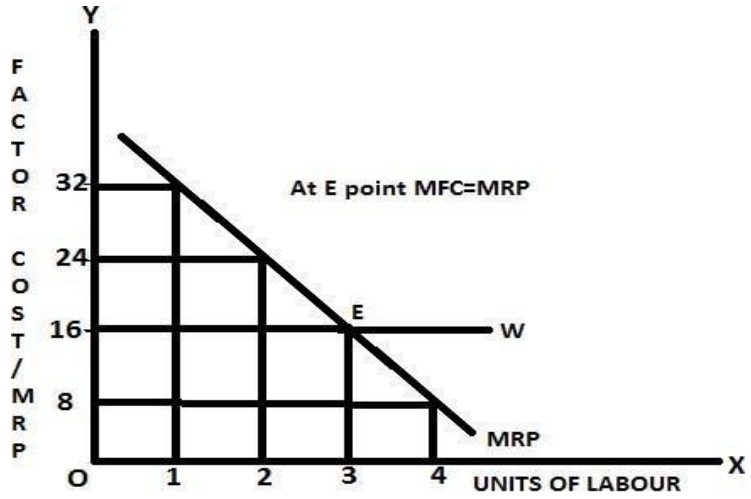


Fig 2

Table no 1 showed that factor cost is ₹ 16 and price/AR of produced product is ₹ 4. When firm increased units of a factor, the Marginal revenue productivity (MRP) of factor is declining. Marginal revenue productivity of first unit is ₹ 32, second of ₹ 24, third of ₹ 16 and fourth of ₹ 8. Thus, to earn maximum profit, the firm use a factor up to the point where its MRP is equal to marginal factor cost. Hence, the firm is in equilibrium stage when it employs 3rd unit of factor where factor cost (₹ 16) is equal to MRP (₹ 16). In fig 2, units of a factor are measured on X-axis and factor cost/ MRP are shown on Y-axis. MRP is marginal revenue productivity curve and W indicates price of a factor. At point E, W line cuts MRP so this point is equilibrium as MRP=W.

C. Criticisms: Marginal productivity theory has the following drawbacks

1) **Unrealistic assumptions:** This theory is based on many assumptions like perfect competition, homogenous factor, perfect substitutability, perfect mobility etc. But in reality, these

assumptions do not exist. Because imperfect competition exits in reality, full employment is a rare phenomenon, all the factors of production are heterogeneous and it is difficult to move factors from one place to another.

2) **Constant technology**: This theory assumes that there is no change in technology of production but in reality, it is not constant as we face dynamic changes in an economy.
3) **One sided**: This marginal productivity theory is one sided theory as it takes into consideration only the demand side and ignores supply. This theory assumes supply is constant but supply can be changed in long period.
4) **Based on long period:** This theory is based on long run period and ignores short run period. But Lord Keynes stated that in long period we all are dead. So problems of short period are important than that of long run period.
5) **Difficult to measure MPP:** According to Hobson it is difficult to measure the MPP of a labour. Because if producer wants to measure the MPP of labour than he has to increase the units of labour along with other factors like raw material, machinery etc.
6) **Difficult to measure marginal productivity of one factor**: The producer uses various factors of production like land, labour, capital etc to produce the goods and services and it's difficult to find out the contribution of a single factor in the process of production.

7.5.2 Marginal Productivity Theory (Under Imperfect Competition)

There is a drawback of marginal productivity theory as it assumes perfect competition, but in reality, it is unrealistic and imaginary. Economists like Robinson, Chamberlin analysed the determination of factor pricing under imperfect competition. There are many types of imperfect competition like monopolistic, oligopoly, monopsony etc., but here only monopsony is analysed. A monopsony is a market in which there is only one buyer. In monopsony market, there is perfect competition in product market (means MRP=VMP) and imperfect competition in factor market (means one buyer of the factors). In this market, the payment paid to a factor of production will be less than its marginal revenue productivity (W<MRP). So, there will be exploitation of the factors of production.

In fig 3, units of labour are measured on X-axis and wages on Y-axis. AFC is Average Factor Cost curve and MFC is marginal factor cost. Both AFC and MFC are rising, but MFC lies above AFC. At the point E, MFC = MRP so at this equilibrium point, producer will employ ON units

of labour and OP wages. But wages are less than MRP, it means there is exploitation of labour and producer is earning super normal profits i.e. PP1EM.

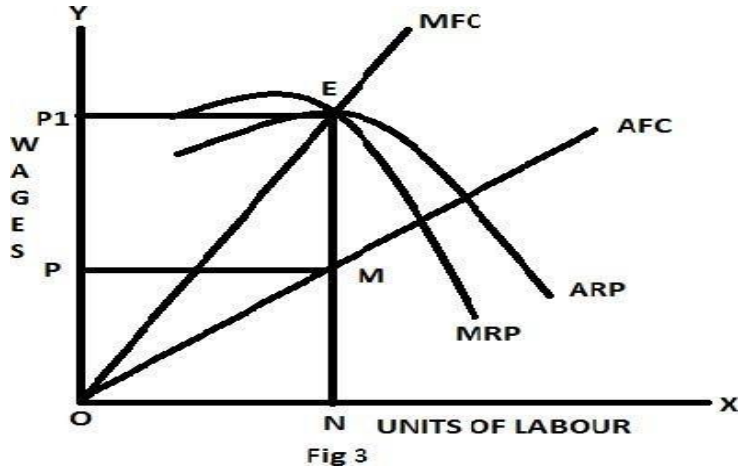


Fig 3

7.5.3 Modern Theory of Factor Pricing

The marginal productivity theory is defective because it deals only with demand side of the factor and ignores the supply side of the factor. The modern theory of distribution also known as the supply and demand theory of distribution states that the price of the factor is determined by the interaction of the forces of demand and supply of the concerned factor. Prices paid for factors of production are basically determined by demand and supply conditions.

A. Assumptions: Following are the assumptions of modern theory of factor pricing:

1) Every producer tries to maximize their profits.
2) The producers have perfect knowledge about MRP.
3) Competition exists in factor market and in different units of factors.

B. Demand for Factors of Production

The demand for factors of production and demand for goods are different because the demand for goods is direct and the demand for factors of production is derived demand as their services are required for the production of other goods and services. The demand for the factor is determined by its marginal revenue productivity. Following are the factors which affecting demands:

1) If a factor of production has substitute in the market, then its demand will be fairly elastic. But if substitute is not available, the demand will be inelastic.
2) If the demand for final product is expected to be high, then the demand for all the

factors which produce the product will also increase.

3) If a factor of production is very important in the production of a commodity, then its demand will be high.

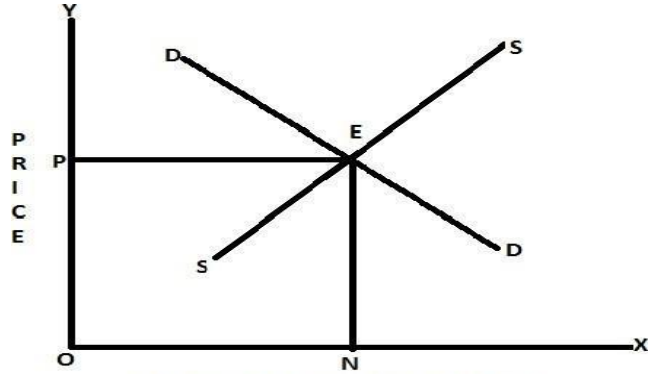
C. Supply of Factors of Production

Supply of factors of production also differs from the supply of goods. There is a direct relationship between the supply and price of good. In other words, the supply of goods increases with the increase in price on the other hand there is not direct relation between the prices of services offered by the factors of production and their cost of production. But it is assumed that there is a positive relation between supply and price. It cannot be unrealistic because higher the price of a factor of production, other things remaining the same, higher will be its supply and if price declined than supply also declined. The supply curve of a factor of production is positively inclined, i.e., its slopes upward from left to right.

In a perfect competition, there are large number of firms which demand the services of a factor of production and large number of buyers. In such a factor market, the price of a factor (like labour) is determined where demand and supply of labour is equal to each other. In other words, it can be stated in long period labour will get the payment/wages equal to its MRP.

Supply depends upon the following factors:

1) For a country, supply of land is perfectly inelastic but if the opportunity cost of it increases than its supply curve will be upward sloping.
2) There is no relation between supply of labour and wage rate.
3) There is a direct relation between rate of interest and supply of saving.
4) Supply of entrepreneur depends upon many non-economics factors.



DEMAND AND SUPPLY OF A FACTOR

Fig 4

In this fig 4, DD is the demand curve and SS is the supply curve of a factor, the demand and supply curves intersect at point E. The equilibrium factor price is OP. The price of a factor cannot be stable at the level higher than or lower than OP. For example, the price is more than OP, then the supply will be greater than the quantity demand therefore, the competition between the owners of the factor will force down the price to OP level. Similarly, the price of factor cannot be determined below the OP because at lower price, the supply of a factor is less than demand. The competition among the producers demanding the factor of production will push the price to OP level. Hence, the price of a factor of production is determined by the interaction of the forces of demand and supply.

D. Criticism: This theory is criticised on the basis of following points

1) The theory is based on the assumption of perfect competition in both the product and factor markets. But in reality, imperfect competition exists in both the markets.
2) The theory assumes that all the unit of a factor are homogenous. But in reality, factors are heterogeneous.
3) It assumes that produces main motive is to maximise their profit, but sometimes their motive can be to increase the sales not to increase the profit.

Check Your Progress II

Q1. Give any two assumptions of marginal productivity under perfect competition

Ans._____

_____

Q2. At what point equilibrium factor price exist?

Ans._____

_____

7.6 Summary

In this Unit we have discussed various aspects of distribution including theories. The theory of distribution in economics is related with the allocation of total production among various factors of production. There are two types of distribution which are Personal Distribution and Functional Distribution. The value of the commodities and the prices of the factors of production are determined by demand and supply yet, due to some differences of the factors of production on the side of supply, there is a need for a separate theory of distribution. However, productivity

means contribution of a factor in the total output. It has two aspects i.e., marginal productivity and average productivity. According to Marginal Productivity theory every factor of production gets remuneration equal to its marginal revenue productivity. The marginal productivity theory is defective because it deals only with demand side of the factor and ignores the supply side of the factor. The modern theory of distribution also known as the supply and demand theory of distribution which states that the price of the factor is determined by the interaction of the forces of demand and supply of the concerned factor.

7.7 Questions for Practice

A. Short Answer Type Questions

Q1. What do you mean by the term productivity, give example?

Q2. Explain the concepts of

a. Marginal Physical Productivity

b. Marginal Revenue Productivity

Q3. Define marginal productivity under imperfect competition.

Q4. Explain the theory of marginal productivity under perfect competition from the point of view of industry.

Q5. What are the assumptions of modern theory of factor pricing?

B. Long Answer Type Questions

Q1. State and explain the marginal productivity theories of distribution.

Q2. Explain the theory of marginal productivity under perfect competition from the point of view of firm and industry.

Q3. Explain the modern theory of distribution in detail.

Q4. Critically evaluate marginal productivity theory of perfect competition.

Q5. Critically evaluate modern theory of factor pricing.

7.8 Suggested Readings

- H.L. Ahuja: Advanced Economic Theory (Microeconomic Analysis)
- Koutsoyiannis: Modern Microeconomics
- K.N. Verma: Micro Economic Theory

MASTER OF ARTS (ECONOMICS)

SEMESTER-I

MAEC24101T -MICRO ECONOMICS I

UNIT 8: THEORIES OF RENT AND PROFIT

STRUCTURE

8.0 Learning Objectives

At the end of this unit, learner will be able to:

- Define the meaning of rent
- Describe the types of rent
- Determination of rent under Ricardian theory of rent and modern theory of rent
- Know the meaning of Quasi rent
- Know about the nature of Profit
- Understand the determination of Profit under different theories
- Describe the Functions of profit

8.1 Introduction

The services of factors of production are needed to produce goods required for the satisfaction of

human wants. No entrepreneur possesses all these factors in requisite quantities. He has, therefore, to hire them. Since the persons supplying these factors are themselves consumers and, thus, have to spend on goods and services, they will not supply these factors free of charge. Eachfactor, therefore, expects a price for the services that it will render like rent for the land, wages for labour, interest for use of capital and entrepreneur wants profit. In this lesson remuneration given for the use of land i.e., rent will be studied.

8.2 Meaning of Rent

Rent is the price of the services or use of the land. e.g., rent of house, a machine, a car, etc. But in economics, it refers to the price paid for the uses/services of land and other free gifts of nature. According to classical economics, the only land is paid the rent which is the payment for an original productivity of the soil. The modern economics says that other factors like labour, capital and organization are also paid the rent based on their scare supply.

A. Economic Rent

Economic rent is the minimum amount of money that an owner of land, labour or capital must receive in order to let someone else use that land, labour or capital. In economics, the rent under discussion is always the economic rent. It is defined on the basis of the minimum amount of return that the owner of the factors excepts from its use.

According to the classical economists, economic rent is that payment which is made for the use of land alone. It is determined by the fertility of the land. It is also called net rent. Modern economist uses the term rent as payment made on land and free gift of nature which are scarce in the short run. Many factors earn some income over and above their minimum earning in the shortperiod which is rent. Economic rent is the positive difference between the actual payment made for a factor of production (such as land, labour or capital) to its owner and the payment level expected by the owner, due to its exclusivity or scarcity.

B. Contract Rent

It is the total lease amount, which tenant is ready to pay for the property as per his agreement. It includes the minimum opportunity cost of the owner along with all the other payments like tax, insurance, maintenance, utilities and other service charges which otherwise are paid by all owner. The tenant pays the amount as specified in the written agreement. It is also called gross rent. Contract rent refers to that rent which is agreed upon between the landowner and the user ofthe

land. It is the payment done according to the contract to the landlord. It is determined by the forces of demand and supply of assets in the market. In economic, it includes the interest on the capital invested and labour charges wages.

Contract rent means the total rent that is or is anticipated to be, specified in the rental contract as payable by the tenant to the owner for rental of a dwelling unit, including fees or charges for management and maintenance services and those utility charges that are included in the rental contract. In determining contract rent, contract rent is not decreased by any rent concessions. In everyday usage, the term rent is used to denote any periodic payment made for the use of a house, a machine or a transport vehicle, say a taxi. In that sense, this term is synonymous with a hiring charge. The payments made by tenants to the landlord are also usually termed as rent. But this is not rent in the economic sense. Since this payment includes a payment for the use of land, a return on the capital invested on the land, a payment for the risk borne by the landlord which is made for the use of land only. When a farmer hires a piece of land, he usually settles the payment which he would make to the landlord. This amount is known as contract rent and depending on competition for land.

Contract rent may be higher or lower than economic rent. It must, however, be remembered that whereas the contract rent involves the payer and the payee, the economic rent need not necessarily be paid to someone else, e.g., if a farmer cultivates his own land. Economic rent may emerge due to reason to be studied later on, but there is no question of any contract rent in this case. In this lesson, the term rent will be used in the sense of economic rent, though the adjective'economic' may often be dropped in the next part of the lesson.

Since economic rent does not result from any effort on the part of the landlord, it is also called producer's surplus. This view that rent is reward for the more ownership of a factor of production, and not a payment for efforts spent on it is quite important in economics. Following this idea, the concept of economic rent may be widened to include any surplus (of return over cost) obtained by any factor of production if its supply is less than perfectly elastic and this is thecase with most of the factors with land as the main example.

8.3 Ricardian Theory of Rent

Ricardo was among the pioneers of modern economics; he presented the theory of rent in 1817 in the aftermath of the high rise of corn and land prices after the Napoleonic wars. He analyzed

the increase in both land and corn price and interrelated the both in his theory as, “Rent is a portion of the produce of the earth that is paid to the landlord for the use of the original and indestructible powers of the soil”.

The land rent arises because of the soil fertility ratio or the location of a piece of land. Ricardo considered land as a gift of nature, all the earnings from it are surplus revenues as it has no supply price or cost of production. Also, Ricardo stated that the land price increases with the scarcity factor that is inversely proportional to the cost of land. The second important point was the degree of productive capacity or fertility of the land, some lands are more productive than other hence cost more.

In very simple words we can say Ricardo defined rent as that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil. He based his theory on these points that Land is heterogeneous in quality i.e., all plots of land arenot equal in fertility; the differences in fertility of land are due to original and indestructible powers of the soil and there exists no-rent land which just meets the cost of cultivation.

8.3.1 Assumptions of the Theory

Ricardian Theory of rent is based on certain assumptions which are as follows:

1. The land has no alternative use as it is used only for farming.
2. Fertility of land differs from land to land so, some pieces of land are more fertile while comparing.
3. Law of diminishing returns applied in agriculture. Therefore, the output will not increaseat the same rate at which labour and capital have been increased.
4. The population of the country rises continuously in geometrical progression.
5. The Ricardian theory of rent is based upon a long term.
6. The Ricardian theory assumes the existence of no-rent land which does not enjoy anyrent.
7. The Ricardian theory assumes that the supply of superior grade of land is limited.
8. The Ricardian theory rests upon the fundamental assumption that land possesses some original and indestructible powers.
9. The theory assumes the existence of perfect competition in the market.
10. The theory assumes that the most fertile and most favourably situated land will be first

cultivated.

Now the question arises how does rent arise, farmer has only two ways of increasing production to meet the rising of demand. i.e., extensive cultivation and intensive Cultivation. In both these cases, as he uses more and more labour and capital, output increases but less than proportionately. Different piece of land produces different amount of production due to difference in level of fertility. Farmers will prefer to cultivate the most fertile lands first,production as well as income will be more than that of less fertile land. The difference in production of a piece of land over the less fertile land brought under cultivation is rent. Similarly rent arises on the intensive cultivation side also. As more and more units of labour and capital areapplied to a land, law of diminishing returns will be applied. Initial units of labour and capital will produce more than the marginal units, earlier units will earn surplus which is rent.

8.3.2 Explanation of the Theory

Keeping the basic point in mind, the Ricardian theory can be easily understood by taking a simple, but hypothetical example.

Rent under Extensive Cultivation

Extensive cultivation is the type of farming under which production is increased by using more of land. With the help of given assumptions, Ricardo has taken example of an island, where people go to settle, nobody is living there before that. Land is in abundance, free gift of nature sonothing has to pay for the use of land. There are four grades of land in the country and that each grade differs from the other in fertility. The area covered by each grade is fixed. The land is best suited for the production of a particular crop say, wheat. According to Ricardo, in a civilization when there is less population, the food requirements can be met by the cultivation at only the superior grade land. As the population increases people will be forced to take up the cultivation of second grade or less fertile pieces of land. Similarly, as thenumber of people increase the grade of the land decreases for the cultivation of food production. There are four grades of land i.e. A, B, C and D in diminishing order of their fertility means A is more productive and D is least productive. People will use A grade land which produces 50 quintals of foodgrains per acre. When demand for food grains will rise due to rise in population, all the grade A land is fully utilised, people will move to grade B land which produces 40 qts of food grains. Ricardo calls it marginal land as it is the last to be used and generates rent of 10 qts (50qts-40 qts).

Land A is called intra-marginal land, difference of produce between intra- marginal and marginal and is called rent. For the same reason now land C has been used which produce 30 qts and rent will be calculated from C because it is marginal land and A and B are intra- marginal land. With increasing demand of food grains now land D will be used and produces 20 qts, as now this is last land so it is marginal land, rent will be calculated from D as other lands are intra marginal lands.

Table 1 Rent under Extensive Cultivation

Grade of Land	Production in qts	Rent in qts
A	50	50-20=30
B	40	40-20=20
C	30	30-20=10
D	20	20-20=0

Table 1 shows grade A, B and C will earn rend 30,20 and 10 respectively. The land D will earnno rent i.e., zero. It is called marginal land

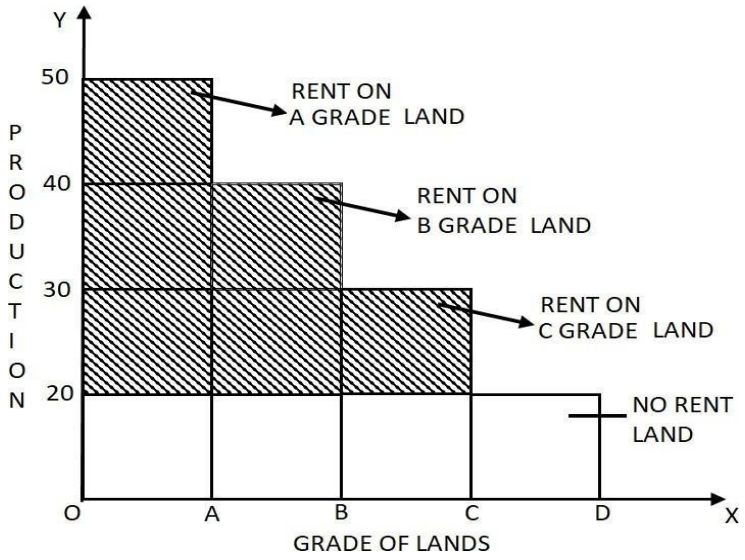


Figure 1

Rent under Intensive Cultivation

This is second type of farming where on the same piece of land more and more units of labour and capital is used for cultivation. Law of diminishing returns will operate so less rise in production with more units of labour and capital. Four units of labour and capital are there. The supply of labour and capital is variable and comes in units which cost Rs. 500 each, the law of diminishing returns operates on each grade of land as indicated in the table below.

Table 2: Rent under Intensive Cultivation

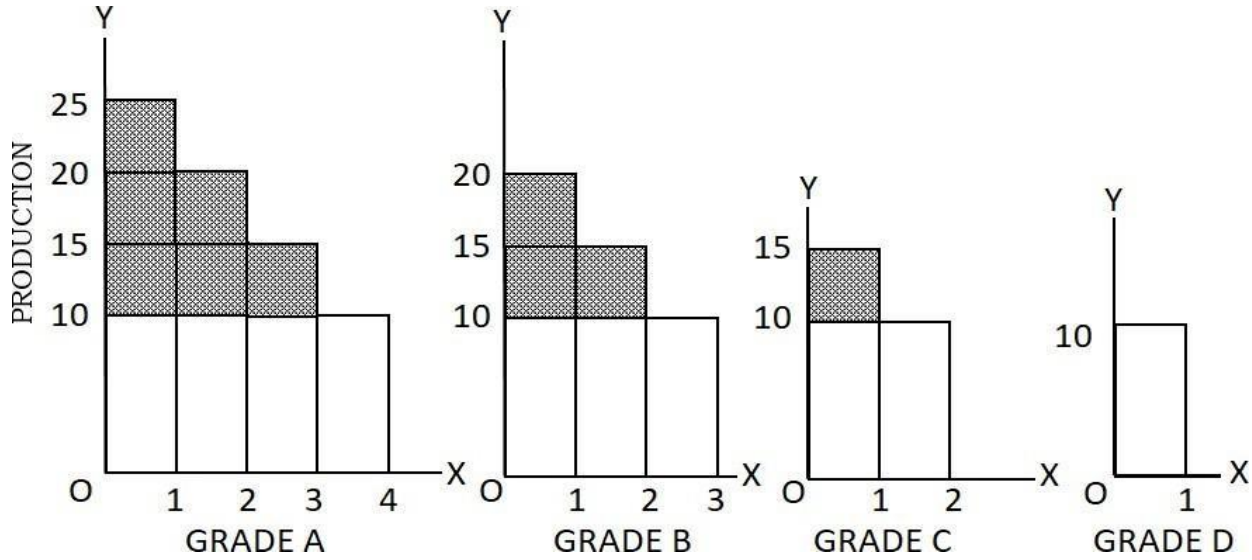
Unit of Labour and Capital	Grades			
	A	B	C	D
1	25	20	15	10
2	20	15	10	5
3	15	10	5	0
4	10	5	0	-5

New settlers in this country will find A grade land freely available. Since one unit of labour and capital yields 25 qts of wheat, it must sell at Rs. 20 per qt, to cover expenses of production. Clearly there is no surplus here. Receipts from sale of wheat are just equal to cost of cultivation.

When demand for wheat increases, say due to increase in population, and if the whole of A grade land has already been brought under cultivation, supply of wheat cannot be increased unless the price rises sufficiently to make cultivation of inferior grade land worthwhile.

Rise in price will provide the incentive and cultivators can either turn to B grade land or cultivate the A grade land more intensively, neither of the two alternatives will be possible unless the price has risen to Rs. 25 per unit. For only then value of the marginal product in each case coversthe cost of labour and capital. If the decision is to use B grade land, this is the extensive marginof cultivation because cultivation cannot by extended to the C grade and B grade land is no rent land. If it is decided to apply another unit of labour and capital to A grade land then we can say that the intensive margin of cultivation has been reached because it is not worthwhile to apply the third unit to labour and capital even to the A grade land. In either case there will be a surplus of Rs. 125 on A grade land. In the same manner, we can calculate that neither C grade will be used nor A and B grades will be used more intensively unless the price of wheat rises to Rs. 5per unit. The situation can be illustrated by Fig. 2. Each diagram indicates the yield expected from application of various units of labour and capital to one of the four grades of land. In a populous country all type of land is used and the best ones will be utilised more intensively. Thus, on the A grade four

units of labour and capital are used and the successive increments of yield resulting there from are



shown by the blocks of decreasing size.

Figure 2

As is clear from the figure three units of labour and capital on B grade, two on C grade, only one on D grade lands are used. In each the total area of the block represents the total yield which, multiplied by price gives the total value product obtained. Now the cost of applying four units of labour and capital on A grade land is Rs. 500 × 4 = Rs. 2000. The total value of product resulting from these units is (25+20+15+10) =70 qt

70 qts × Rs. 50 per qt = Rs. 3500. Total cost is 2000. Thus, economic rent on this is equal to Rs. 3500- 2000= Rs.1500.

Similarly, on B (20+15+10) =45 is equal to Rs. 2250 - Rs. 1500 = Rs. 750Production on C is 25*50 =1250, Cost is 1000 units so rent is Rs. 250

8.4 Criticisms

- **Fertility of Land Is Not Original:** It has been pointed out that there are no "original and indestructible powers of the soil." Even good lands, after they have constantly been cultivated, lose fertility to a considerable extent. If farmers continue to manure their land to save them from complete exhaustion, it becomes difficult to decide which powers of theland are 'original' and which are not. This is what makes Stonier to say, "the concept ofthe original power of the land is to say the least nebulous." Coming to indestructible powers, he says, "in these days of nuclear physics and atomic energy it is very dangerous to assert that anything is indestructible."

Ricardo was not altogether wrong becausecertain factors like the climate, sunshine, rainfall, situation etc. associated with a particular piece of land are in fact fixed by the nature and man cannot alter them.

- **Use of Land in Order:** Carey and Roscher have pointed out that people do not always cultivate the best land first and hence the order of cultivation laid down by Ricardo is wrong. They have argued that which is most conveniently accessible are the first to be cultivated. This criticism can also be considered irrelevant because the necessary point in the Ricardian theory is that there must be differences in the yield from different lands and not the order of cultivation.
- **Wrong Assumption of no Rent Land:** The Ricardian theory, as pointed out in thebeginning assures that there exists no rent land, which just repays the cost of cultivation. The critics say that land has a variety of uses. If a plot of land does not yield any rent when wheat is sown, it may do so when jute or some other crop is sown. Further, if that plot is put to some other use, say for constructing a building it may yield still higher earning.
- **Neglects the Scarcity Principle:** Another charge levelled against this theory is that even ifall lands were equally fertile, rent will be paid so long as the total supply of land falls short of demand for it. This rent is known as scarcity rent.
- **Rent Enters into the Price:** Ricardo was of the view that, since rise in price proceeds emergence of rent, it does not enter into price, this is not always acceptable as a valid proposition.
- **Wrong Assumption of No Rent Land:** Ricardo's opinion that the marginal land, which just meets the cost of cultivation, is no rent land. However, modern economics say that even the marginal land is paid rent because it can give more productivity in case if alternative crops are cultivated.
- **Rent for Different Fertility of Soil:** According to Ricardo rent is paid in relation to the difference in fertility of the soil. The modern economist says that the rent will arise evenif the land has same fertility.

Check Your Progress- I

Q1. Explain Ricardian theory of rent.

Ans._____

Q2. Differentiate between rent under extensive and intensive cultivation.

Ans._____

_____

Q3. Critically examine Ricardian theory of rent.

Ans._____

_____

8.5 Modern Theory of Rent

The modern theory of rent is the concept of lending a piece of land for the sake of production of anything like goods and services or for residential purposes. The payments are made in return for the allotment of land, it is the surplus payment made by the borrower in return of rented property.

The theory of rent dates back to 1817. The modern economists Joan Robinson, Stigler, and Pareto in succession later refined his views and definitions on the rents and payments. The Ricardian theory was developed with the addition of other important factors other than a mere piece of land. Before taking up Ricardian theory we noted the reason why rent is usually associated with land and all that rent can be earned by any other factor of production, if its supply is less than perfectly elastic. We come back again to this point in order to understand the modern theory of rent.

As the theory of Ricardo was related to a piece of land, which too was free of cost and was considered a gift of nature ignoring the fact of its value over the period of time, capital spent on shaping the land, labour, and other factors of production applied to it. Mrs. Joan Robinson redefined the economic rent from an industrial perspective.

She said that from an industrial point of view, when an industry is manufacturing a product relates to the land acquired for the production facility and the difference between earnings actually received and its price is called its rent from an industrial point of view.

Benham defined rent as the sum paid to the factors that need not be paid in order to retain the factors in the industry. Stigler defined it as the excess of its return in the best use over its possible return in other uses as a modern theory of rent. All the above-stated theories definedrent as not merely a surplus payment factor but a combinational payment made in return for labour, capital, entrepreneurial idea, and production factor.

8.5.1 Features of Modern Rent Theory

Some of the major features of modern rent theories are:

- Rent is a type of income produced through a difference in actual earnings and transfer earning.
- Rent comes from the income of all the production factors.
- Rent is increased due to the scarcity of land in a particular area; the demand also increases due to labour and overall economic conditions. Rent arises when the supply of the factor is inelastic or partially elastic. More land means lesser rent and vice versa; if anindustry needs more land, it will have to pay lesser rent compared to the already acquired space.

Urban land is most expensive due to the scarcity factors i.e., lesser land available in a locality. Here, the term commercial rent is introduced along with rent for residence. The competition is tougher and the land is scarce for homes, offices, industry so the best available option is to erect multi-story buildings in a smaller piece of land to meet the needs. The rents are higher, multi- fold times higher than agricultural lands in competitive commercial and residential urban areas.

Definition and Explanation

The modern economists like Pareto, Mrs. Joan Robinson, Boulding, Sligler, Shepherd, have tried to simplify and generalize the Ricardian theory. According to them, the Ricardian theory of rent is too closely related to land. This creates an impression that rent is a peculiar earning of land only. The fact, however, is that other factors of production i.e., labour, capital and entrepreneurship may also be earning economic rent. The modem economists say, rent can be determined in the same manner as the reward of other factors, i.e., by demand and supply forces.

8.5.2 Demand and Supply Analysis

A. **Demand for a Factor:** The demand for a factor which may be land, labour or capital is a derived demand. Land, say for instance, is demanded for its produce. The higher the produce, the greater is the demand for land. A firm will pay rent equal to the marginal revenue productively of land. The rent diminishes as more land is used due to the operation of law of diminishing returns. The demand curve of a factor is, therefore, negatively sloped which means more land will be used only at lower rents, other things of course remaining the same.

B. **Supply of a Factor:** The supply of land to a particular use (say industry) is quite elastic. It can be shifted to other uses by offering higher rent than that being earned by it now. The supply of a factor (to an industry) is, therefore, rent elastic. If higher rent is paid, the supply of a factor

can be increased by withdrawing it from other uses. The supply curve of a factor (industry) slopes upward to the right.

Determination of Rent: The economic rent is determined by the intersection of demand and supply curves for a factor. In this figure 3, the demand curve for a factor say labour in a particular industry is DD/ and the supply curve of workers is SS/. The wage rate or factor priceof labour as determined by the market forces is OW. The total workers employed in a particular industry at OW wage rate is OL. The total earning of the workers employed is equal to the area OWEL. At wage rate OW, there are workers who would work, at lower pay but they are also paid at OW wage rate. Those workers whose transfer earnings are less than this wage rate will be getting economic rent. The total economic rent earned by all the intra marginal workers is equal in the area WES. The marginal worker i.e., Lth worker is notobtaining any rent or surplus.

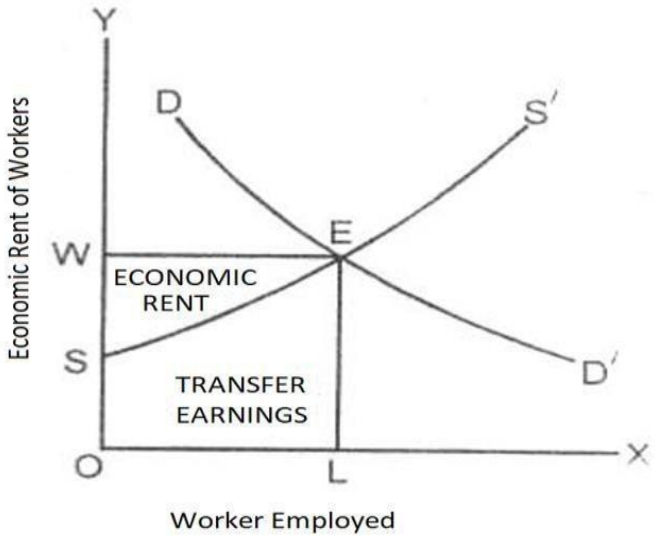


Figure 3

8.5.3 Rent is a Surplus Return

The modern economists are also of the view that rent as a surplus can be earned by other factors also. It is not peculiar to land alone as explained by Ricardo. The *modern theory of rent* is that itis the difference between the actual earning of a factor unit over its transfer earnings. The transfer earnings of a factor of production is the minimum payment required for preventing thatfactor for transferring it to some other use. It is called the factor supply price in its present occupation. For example, a worker earns Rs. 6000 per month in a factory. In the next best employment, hecan get Rs. 5000 only per month. The surplus or excess of Rs. 1000, which a worker is earningover and

above the minimum payment necessary for inducting him to work in the present occupation is the economic rent.

The proposition that rent is a differential advantage, enjoyed by superior land over the marginal land due to some factors like fertility and location, ignores the fact that the same plot may have alternative uses and some of these may be more paying than others and fluctuations in prices of different crops may make the cultivation of one crop more profitable than that of another. There will, thus, be a tendency of land be transferred from one use to another in search of higher earning. However, this is true not only for land, but for other factors of production also. Thus, in order to retain a factor (or a unit of it) in a particular use, we must pay it at least that much as it would get in its next best use. This brings out to us the concept of transfer earnings, which Lipsey defines as any payment which must be made to a factor to keep it in its present use i.e., a payment necessary to prevent the factor from transferring to some alternative employment. The concept of transfer earnings has a close bearing on the theory of economic rent because modern economists define economic rent as the difference between a factor's actual earnings andits transfer earning. Benham says, "In general excess of what unit gets over its transfer earning isthe nature of rent." Thus, we can say that:

Actual earning of factor = Its transfer earning + Economic rent, but in limited cases this equation gives rise to two equations, viz.

Actual earning = Transfer earnings and; Actual earning = Economic rent.

8.5.4 Economic Rent and Elasticity of Supply

Economic Rent Depends on the Elasticity of Supply of the Factor of Production. The proportion of the income of a factor that consists of economic rent depends on the elasticity of supply of the factor of production which may be perfectly elastic supply perfectly inelastic supply and less than perfectly elastic supply

A. Perfectly Elastic Supply: The first of these equations holds when the supply curve of a factor of production is perfectly elastic, i.e., horizontal in shape as indicated in Fig 4. and industry using this factor can take anynumber of units of this factor at the going price. When the supply of a factor of production is perfectly elastic, then none of its income is economic rent. Its entire income is transferring earnings.

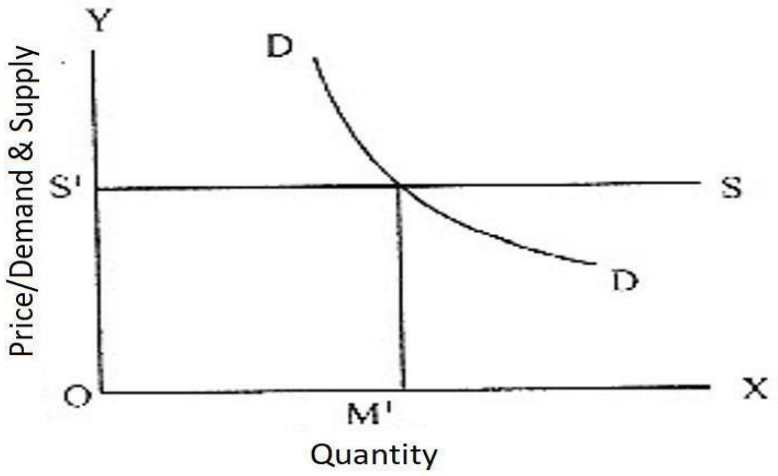


Figure 4

B. Perfectly Inelastic Supply: The second equation signifies a situation, where the supply curve of factor is perfectly inelastici.e., vertical in shape, as indicated in Fig. 5. This diagram shows that the factor is fixed in supply. The first equation represents the general situation between the two extremes, with a supply curveneither completely horizontal nor completely vertical in shape, as is shown in Figure 5. When thesupply of a factor is totally inelastic, then its transfer earnings is zero. The entire income is economic rent.

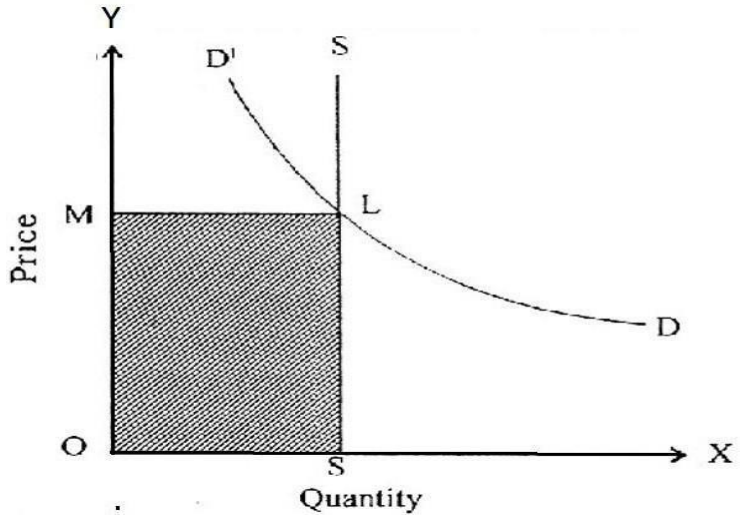


Figure 5 The figure indicates the equilibrium price will be OM.

C. Less Than Perfectly Elastic Supply: If the supply of a factor of production is neither perfectly elastic nor perfectly inelastic as illustrated in fig.6, then some part of the factor income is economic rent and the other part istransferring earnings.

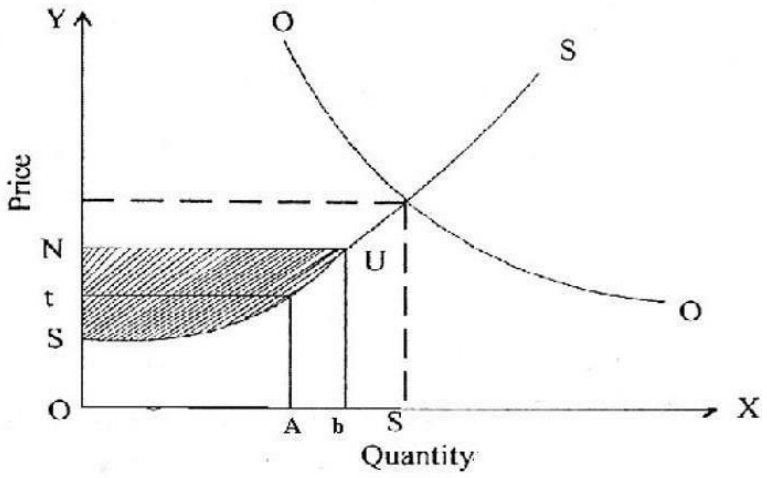


Figure 6

If only OA units of a factor were needed, they will be available at price Ot. If this price rises to ON additional Ob units will be available for use. Thus, each point of the supply curve indicates the price that must be paid in order to keep the corresponding units in use i.e., its transfer earnings. If it is decided to employ of units of a factor, the total earnings of the units are ObUN, But the area of this rectangle consists of two parts i.e., white and black parts. The white part indicates the transfer earnings and the black part indicates the economic rent earned by these units. We can, thus, conclude this section by emphasizing the point that the more elastic the supply curve of a factor, the more will be element of transfer earning in the payments made to it and hence, the less will be element of rent included in these payments.

Ricardo expressed rent in too simple way and if all lands were equally fertile (and equally favourably situated), obviously there would be no economic rent. The differential principle can explain only why a more fertile plot of land commands higher rent than a less fertile land, it does not explain how rent arises. This theory simply ignored the existence of scarcity rent.

Modern economists define economic rent in a wider sense to denote producer's income i.e., all income earned by a factor in excess of income necessary to keep it in its present use (or its transfer earnings). Looking from the point of view of an entrepreneur, the income earned by a factor is the price paid by the former. Now at the particular price only a limited supply of a factoris available. If more units of this factor are required, they will be available either at the same orat a higher price depending on whether the supply of that factor is perfectly elastic or relatively inelastic. We have already noted that if the supply curve of a factor is horizontal in shape, i.e., perfectly elastic,

an increase in demand for it will not lead to any increase in its price. We can simply recollect that price paid for various units of such a factor does not include rent. If, however, additional units of a factor can be had only at an enhanced price, all units of the factor under competitive conditions will have to be paid the same price. The units already in use will now earn more than their transfer earnings and this excess is nothing but rent. Some writers are of the view that mere inelasticity of a factor is not enough to entitle it to this surplus. Another point emphasized by them is that this factor should be indispensable i.e., it should not be replaced by some other factors.

Now the question arises: Can we explain rent of land by this more general approach? The answer is yes. From the point of view of the economy as a whole, the supply of land is perfectly inelastic and hence the transfer earning of land from the point of view of the economy as a whole will be zero and all earnings of land are rent. Since the inelastic supply of land reflects its scarcity, the rent earned in this situation is often known as scarcity rent. From the point of view of a particular industry; the supply of land may beperfectly elastic and as already shown in Fig. 2; land in such cases may get a price just equal to its transfer earnings i.e., rent in this case will be equal to zero. There is, thus, no justification in treating rent of land by a special theory not applicable to the case of other factors which may alsoearn more than their transfer earnings and, if they do, wages, profits and interest may also contain element of rent.

Check Your Progress- II

Q1. What are the features of modern rent theory?

Ans._____

_____

Q2. Explain rent is a surplus return.

Ans._____

_____

8.6 Rent and Price

The relation between rent and price must be clearly understood because it often causes aconfusion. According to Ricardo, rent of land is a surplus above the cost of production and does not, therefore, enter into price of the produce of land. The logic offered in support of this argument is simple. Since the price of the agricultural produce tends to be equal to the cost of production of the marginal or no rent land, rent does not enter into the price of the produce. Again, since the price

of the produce in question must rise to make cultivation of the inferior grade land possible, rent is the result of price. Rent is, therefore, price determined and not price determining. This is why we come across the statement; "Corn is not high because rent is high, but rent is paid because corn is high." This was the view held by Ricardo and this still holds so long as land, regarded as a free gift of nature, requires no payment to maintain its total supply.

Most of the land is capable of being put to alternative uses, if more of it is required for one use, less of it will be available for other uses. In order to attract more land for one particular use, people will have to offer at least the amount which a plot of land would have earned in its most profitable alternative use. This price is called the 'transfer price' or 'transfer cost' of land. Now the transfer cost will constitute a plot of the cost of produce raised on that plot of land. Thus, from the point of view of the supply of land for any particular use rent to be paid is not surplus, but a part of the cost of cultivation of a particular crop and hence it does enter into price.

Davenport, however, has settled this controversy by arguing that rent neither determines price nor is determined by price and that both of them are governed by the relative scarcities of the produce of land.

8.7 Quasi Rent

Ricardo associated rent only with land. The peculiarities possessed by land that are responsible for emergence of rent are possessed by some other factors also, temporarily at least; if not permanently. One important characteristic of land is that its total supply is almost fixed i.e., almost inelastic. The case is similar with other instruments, of production like machines, buildings and means of transport. For example, if demand for buildings in a particular town goes up, it will take a number of months if not years to construct new buildings in a particular town.In the meanwhile, the existing buildings will enjoy a kind of surplus income, due to the fact that their rent will exceed the returns expected on their investment. Marshall attached a great importance to the analysis of such man-made durable goods and appliances of production. He coined special term known as Quasi Rent to denote such earnings. Since then, this term has been used in a variety of related but not identical senses. Such earnings are called rent because supply of such goods is fixed, but at the same time is quasi because their supply is only temporarily fixed. Whereas Marshall, called the whole of such income, quasi rent, while Flux and others,used the term to mean income in excess of the normal earnings. Samuelson says, "The return to any factor in temporarily fixed supply, is

sometimes call quasi-rent."

Quasi-rent can be earned by human beings also. For example, if demand for doctors' increases say during a war, their supply cannot be immediately increased. Hence their earnings will be of the nature of quasi-rent. In the long-run, however; when the supply of doctor's increases, quasi-rent will disappear.

8.8 Distinction between Rent, Quasi-Rent and Interest

The rent is usually related to land and quasi-rent to manmade assets. Interest is associated with loanable funds. Evidently all the three terms denote a return on assets the elasticity through time in case of which is different. The supply of land is fairly inelastic, both in the short period and in the long period. Manmade machines have a more elastic supply in the long period, but a less elastic one in the short period. Loanable funds can be quickly increased or decreased, whereas the supply of fixed assets is fairly inelastic in the short period. Thus, the difference between rent,quasi-rent and interest is a matter of degree and not that of kind.

8.9 Important difference between the Ricardian Theory of Rent and the Modern Theory of Rent are as follows:

1) Ricardian theory of rent is the return for the original and indestructible powers of the soil. The modern theory of rent is surplus earned by any factor of production not necessarily land,over and above the minimum earnings necessary to induce it to do its work.
2) In Ricardian theory, rent is due to differences in fertility and situation. While in modern theory it is due to scarcity or specificity.
3) In Ricardian theory, Rent is a surplus above the marginal or no rent-land. While in modern theory it is the difference of actual earnings and transfer earnings.
4) Ricardo says, rent does not enter into price while modern economists are of this opinion that rent enter into price.
5) In Ricardian theory, production of land is the important basis of determination of rent while in modern theory power of demand and supply plays an important role.
6) Ricardo theory is based on various assumptions while modern theory is not based on any assumptions.

Check Your Progress- III

Q1. Define Quasi Rent.

Ans._____

_____

Q2. What is the relation between Rent and Price?

Ans._____

_____

Theories of Profit

There are four factors of production i.e., land, labour, capital and is organisation. The fourth factor i.e., organisation plays a significant role in the production of goods and services. In the present-day industrial set up, an overwhelming importance has been assigned to the entrepreneur.He is expected to play an important role in modern production. The entrepreneur pioneers the project, organises the productive effort, hires other factors of production and mixes them in the most profitable way, coordinates their activities and also undertakes the most vital responsibility of risk taking and uncertainty bearing. For all these functions, he expects a reward from the society. Whatever the society pays him, in return for his services, comprises his profits, gross profits. In simple words, profits constitute for his services comprises his profits, gross profits are entrepreneur's reward for the functions performed by him for the society. It may be mentioned in the very beginning that the whole of his share may be called gross profits. Pure (or net) profits are strictly the reward for risk-taking and uncertainty-bearing (More of this distribution shall be explained subsequently).

8.10 Nature of Profit

8.10.1 Pure and Gross Profit

As already mentioned above, total receipts of an entrepreneur, in lieu of his total services rendered to the society, constitute his gross profits. The surplus of total sale receipts over the total cost of production represents his gross profits. Pure or net profit is the amount that occurs to the entrepreneur for assuming the risk which is inseparable from all business under the system of production in anticipation of demand. Pure profits are, thus, the payment exclusively for the bearing of the risk which cannot be shifted to any other factor of production. This distribution between the two terms could be clearer by stressing the constitutes of gross profits. Thefollowing

elements which constitute the gross profits are given below:

A. **Pure Profit:** Pure profits constitute receipts which are for the entrepreneur's unique function of risk-taking. This is an important ingredient of gross profits.

B. **Element of Wages:** Besides the function of risk-taking the entrepreneur might be managing the business and putting in a lot of labour. All these duties could have been performed by a paid manager, had he employed him or had he himself got employment somewhere else, he would have got wages as a manager. These wages, thus, appear to the part of profits.

C. **Element of Rent:** Similarly, the building where the project is located might be his own. In case it had been rented to some other concern, it might have fetched him some rent. But now the gains on this property are included in his gross profits.

D. **Monopoly Gains:** Gross profits may also include certain gains to the entrepreneur as he happens to enjoy monopoly right in a market. Chance occurrence of monopoly markets swells his profits.

E. **Windfall Gains:** Sometimes unexpected events may multiply his profits. For instance, outbreak of a war, sudden changes in demand and supply and some fiscal measures adopted by the Government may increase his gross profits.

These gains influence the gross profit. Thus, all such factors influence the gross profits. Pure profits could be measured if all these elements are excluded from gross profits.

8.10.2 Net Profit

The balance which remains after deducting the above three items from gross profit is called Net profit. This includes rewards for three important functions performed by the entrepreneur:

A. **Reward for Coordination**: The entrepreneur not only organises but also coordinatesbetween activities, departments and factors of production in his business.

B. **Reward for Risk Taking**: The entrepreneur takes all types of foreseeable and unforeseeable risks in business.

C. **Reward for Innovation**: The entrepreneur may introduce a new production technique or a new product and earn huge profits.

Hence, we can say that Net profit is only one of the constituents of gross profit. It may be defined as the excess of an entrepreneur’s receipts over his total costs including both explicit as well as

implicit costs. Profit is the only reward of a factor of production which can be negative, where it is called 'loss' while rewards of other factor of production like rent, wages and interest are always positive.

Check Your Progress- IV

Q1. Define Net Profit.

Ans._____

_____

Q2. What are the elements of gross profit?

Ans._____

_____

8.11 Determination of Profit under Different Theories

It may be mentioned at the very outset that various economists have explained these theories. For instance, Mr. Hawley and the uncertainty-bearing theory by F.H. Knight have given Risk-taking theory of profit. Innovation theory by Schumpeter, Rent theory of profit by Walker. Dynamic theory of profit by Clark, Monopoly power theory of profit, Labour exploitation theory of profit by Karl Marx and Marginal productivity theory of profit. Let us examine these theories one by one.

8.11.1 Risk Taking Theory of Profits

According to Hawley, risk-taking is the special function of an entrepreneur and is the basis of profits. The expectations of profits will lure the entrepreneurs to venture into new field and start new projects. Some of the businesses are speculative and uncertain to a great extent, the new ones are even more so. Only the cost adventurous entrepreneurs would dare to take risk in such lines. Greater the risk, according to Hawley, greater would be the margin of profit. In case the line of production is old and long-exploited by all types of entrepreneurs, risks, being eliminated to almost zero level, the profits would be less. Thus, the degree of risk inherent in a market project would determine the rate of profits. Implicitly, according to Hawley, the degree of risk influencing the supply of entrepreneurs, would determine the profits. Further, Hawley maintains that assumption of risk and risk alone ensures a margin of profits to the entrepreneurs.

Though this theory underlines the most important factor that gives profit and also explains the profit differentials in various industries; yet the theory is not free from many objections, some of

which are given below:

A. Profits arise not because the risks are undertaken, but because efficient entrepreneurs reduce the risks.

B. Like other theories this theory, too, ignores important factors viz. productivity innovations, dynamic factors etc. which influence the rate of profits.

C. According to Knight, not all risks give rise to profits. There are certain risks, which can be easily insured and are, thus, borne by the insurance companies. Such risks do not entitle the entrepreneur to profits. Only those risks, which are economic uncertainties such as changes in demand and supply, give rise to profits.

D. The entrepreneurs are never the risk-bearers. They are rather the innovators; risks being borne mostly by the capitalist.

Thus, the theory fails on more than one count. Knight tried to modify the theory by introducing the idea of uncertainty - bearing in place of risk-taking.

8.11.2 Uncertainty Bearing Theory of Profit

As already mentioned above, Knight divides the risk into two types:

- Risks which are certain and known and could be insured against,
- Risks which are unknown and uncertain and could not be insured against, as no insurance company insures them.

Knight calls the latter risks economic uncertainties and they are caused by changes in the techniques of production, changes in demand etc. The former risks, on the other hand, are insurable and easily ascertainable, for instance, loss of property on account of fire, theft or dishonesty. The expenses on the insurance of these risks make an important part of the cost of production.

According to Knight, only the non-insurable risks of modern business, which are difficult to ascertain and calculate, give rise to profit. When these risks are borne by them, only then they are rewarded. Thus, profit is a payment of uncertainty bearing and not for risk-taking. Further, Knight categorised these non-insurable risks i.e., uncertainties into the following groups:

A. Competition risks which arise from the development of some new products.

B. Technical risks, which arise from the possibility of machines becoming obsolete;

C. Risks of government action arising from frequent changes in the policies viz., fiscal and

monetary, which alter the costs and prices, and

D. Business cycle, which simply reduce effective demand etc.

Thus, these uncertainties borne by the entrepreneurs lead to profit. The theory brings out the truth that profit is the result of uncertainties. So far, the explanation is valid. The theory is inadequate on many points, which need clarification and hence expose this theory to criticism.

Criticisms

1. Economic uncertainty is not the one factor that gives rise to profits. Many other factors that limit the supply to entrepreneur may also be responsible for profits.
2. Uncertainty bearing is not the only function of the entrepreneurs. They might be rewarded for many more functions e.g., pioneering, initiating and coordination the business etc.
3. Like many other theories, this theory seems to be one sided. It elevates the uncertainty to the status of factor of production, which is something unwarranted.

Check Your Progress- V

Q1. Explain the risk bearing and uncertainty theory of profit. How far this theory explains the profit determination?

Ans._____

_____

Q2."An entrepreneur's role is limited to the extent that he faces the non-insurable risks and uncertainty." Explain this statement.

Ans._____

_____

8.11.3 Clark's Dynamic Theory of Profit

According to J.B. Clark "Profits arise in a dynamic economy and not in static economy." The static economy is one in which the things do not change significantly or remains unchanged. Such as, the population and capital remain stationary, goods continue to be homogeneous, production process remains unchanged, and the factors of production enjoy freedom but does not

move because the marginal product in each industry remains the same. Also, there is no uncertainty and risk.

On the contrary, the dynamic economy is characterized by the generic changes such as an increase in population, improvement in production techniques, change and increase in the consumer demands, changes in the organizational forms, increase in capital. The major function of an entrepreneur is to work in a dynamic economy to take the advantage of these changes and promote his business, reduce costs, and expand sales.

Clark believed that those entrepreneurs who successfully takes the advantage of these changes in the dynamic economy make the pure profit, which is in addition to the normal profit. Pure profits are short lived because, in the long run, the competitors imitate the changes initiated by the leader. As a result, the demand for the factors of production increases, thereby increasing the factor prices and the overall cost of production. On the other hand, with an increase in the output,the price of a product declines for a given level of demand as a result of which the pure profits disappear. A static economy and the firms under it, has the following features:

1. Absolute freedom of competition.
2. Population and capital are stationary.
3. Production process remains unchanged over time.
4. Homogeneous goods.
5. Factors of production enjoy freedom of mobility but do not move because their marginal product in very industry is the same.
6. There is no uncertainty and risk. If there is any risk, it is insurable
7. All firms make only normal profit.
8. The following features characterize a dynamic economy:
9. Increase in population.
10. Increase in capital.
11. Improvement in production techniques.
12. Changes in the forms of business organization.

According to J.B. Clark, The major function of entrepreneurs or managers in a dynamic economy is to take the advantage of all of the above features and promote their business by

expanding their sales and reducing their costs of production. “Profit is an elusive sum, which entrepreneurs grasp but cannot hold. It slips through their fingers and bestows itself on all members of the society”. This result in rise in demand for factors pf production and therefore rises in factor prices and subsequent rise in the cost of production. On the other hand, because of rise in cost of production and the subsequent fall in selling price of the commodities, the profit disappears. Disappearing of profit does not mean that profit arise in dynamic economy once only, but it means that the managers take the advantage of the changes taking place in the economy and thereby making profits. The Clark’s dynamic theory of profit is based on a notion that emergence, disappearance, and re-emergence of profits is a continuous process.

Criticism

The dynamism is urgently necessary for the social and economic progress of a society. If the society is dynamic, the entrepreneurs would earn profit and, if they can earn profit, the supply of entrepreneurship increases and, consequently, production in the society increases. The dynamic theory of profit is also not a complete theory. Because, this theory does not explain all the causes of the emergence of profit. This theory does not mention that profit may also arise due to other factors as well.

8.11.4 Schumpeter’s Innovation Theory of Profit

Prof. Schumpeter propounds this theory. This theory is more or less similar to that of J.B.Clark’s Dynamic theory of profit. Instead of five changes mentioned by Clark, Schumpeter explains the change caused by innovations in the production process. According to this theory, profit is the reward for innovations. He uses the term innovation in a sense wider than that of the changes mentioned by Clark.

Innovation refers to all those changes, in the production process with an objective of reducing the cost of commodity so as to create gap between the existing price of the commodity and its new cost. Innovation may take any shape like introduction of a new technique or a new plant, a change in the internal structure or organizational set up of the firm or change in the quality ofraw material, a new form of energy, better method of salesmanship, etc.

Schumpeter makes a distinction between invention and innovation. Innovation is brought about mainly for reducing the cost of production and it is cost reducing agent. Profit is the reward for

this strategic role. Innovations are not possible by all entrepreneurs. Only exceptional entrepreneurs can innovate. They are capable of tapping new resources, technical knowledge and reduce the cost of production. Thus, the main motive for introducing innovation is the desire to earn profit. Profit is therefore the cause of innovation.

Profits are of temporary nature. The pioneer who innovates earns abnormal profit for a short period. Soon other entrepreneurs, "swarm in clusters", compete for profit in the same manner. The pioneer will make another innovation. In a dynamic world innovation in one field may induce other innovations in related fields.

The emergence of motor car industry may in turn stimulate new investments in the construction of highways, rubber, tires and petroleum products. Profits are thus causes and effects of innovation. The interest of profit leads entrepreneur to innovate and innovation leads to profit. Thus, profit has a tendency to appear, disappear and reappear.

Profits are caused by innovation and disappear by imitation. Innovational profit is thus, never permanent, in the opinion of Schumpeter. Therefore, it is different from other incomes, such as rent, wages and interest. These are regular and permanent incomes arising under all circumstances. Profit on the other hand is a temporary surplus resulting from innovation.

Prof. Schumpeter also explained his views on the functions of the entrepreneur. The entrepreneur organizes the business and combines the various factors of production. But this is not his real function and this will not yield him profit. The real function of the entrepreneur is to introduce innovations in business, which yield him profit.

Criticisms of the Theory

This theory has criticized on the following grounds:

1. This theory concentrates only on innovation, which is only one of the many functions of the entrepreneur and not the only factor.
2. This theory does not consider profit as the reward for risk-taking. According to Schumpeter it is the capitalist not the entrepreneur who undertakes risk.
3. This theory has ignored the importance of uncertainty bearing which is one of the factors that determines profit.
4. This theory attributes profit only to innovation ignoring other functions of entrepreneur.

5. Monopoly profits are permanent in nature while Schumpeter says that profits (resulting due to innovation) occur temporarily.
6. This theory has presented a very narrow view of the functions of the entrepreneur. He not only introduces innovation but he is equally responsible for proper organisation of the business. As such profit is not merely due to innovation. It is also due to organizational work performed by the entrepreneur. As it is well known, not every entrepreneur innovates and yet he must earn profit, if he is to stay in business.
7. It is an incomplete theory because it has failed to explain all the factors that influence profit. 'Innovation' is an important element and determinant of profit. Prof. Schumpeter's theory, like the other theories of profit, does not provide a comprehensive explanation of emergence of profit and hence it is also an inadequate theory of profit.

Check Your Progress- VI

Q1. 'Innovation' is an important element and determinant of profit.". comment.

Ans._____

Q2. Critically evaluate dynamic theory of profit.

Ans._____

8.11.5 Rent Theory of Profit

An American economist, Francis A. Walker (1840-97), is the exponent of the rent theory of profit. Walker says that an entrepreneur acquires profit because of his ability to perform. Walker argues like this. In a certain production process, if an entrepreneur uses land, labour and capital owned by his own self, then the residual part of his revenue, after payment is made to all these factors of production, is profit. Now, at any particular price of the product, some entrepreneurs may have this profit equal to zero. They are called the marginal entrepreneurs. Any such marginal entrepreneur can have nothing in excess of the wage, interest and rent earned by his own labour, capital and land.

Therefore, if an entrepreneur's ability to perform is more than that of a marginal entrepreneur, then his cost of production would be smaller, and he would be able to earn a positive profit. In

fact, the greater the efficiency of a particular entrepreneur than that of a marginal entrepreneur, the more would be the amount of profit earned by him.

There is some similarity between profit and rent. For, in the Ricardian theory of rent also, we have seen that rent is zero on marginal land and the less the cost of production and more the productivity on a plot of land, the more would be the rent enjoyed by its owners. Due to this similarity between profit and rent, Walker's theory is called the rent theory of profit.

Criticisms

Like the other theories of profit, Walker's theory cannot satisfactorily explain as to why the firm and its entrepreneur should get profit. However, the theory attracts our attention to the similarity between profit and rent. It should be remembered that rent is not the only element of profit. Walker has argued that profit of the marginal entrepreneur is zero and the profits earned by an intra-marginal entrepreneur are all rent.

This contention of Walker may be correct if:

(i) An entrepreneur may supply his services only in his present business and he has no alternative employment to go to; and

(ii) The supply of entrepreneurial services or the number of entrepreneurs is completely fixed.

However, in the real world, we always see that the entrepreneurs can supply their services to many alternative areas and from the point of view of a particular business, supply of entrepre- neurial services is not completely fixed—the supply can increase if the reward increases. There- fore, in any particular business, the minimum supply price of entrepreneurial services is not zero.Loosely speaking, the minimum supply price of an entrepreneur in his present business would beequal to the maximum amount of reward that he may avail of in an alternative field of engagement, other things (i.e., risk or harassment factors) remaining the same. The minimum supply price of the entrepreneur's services in his present engagement is called his normal profit.

If an entrepreneur is able to earn profits in excess of his normal profit, then this excess is a surplus and this surplus is called pure or economic profit. The amount of pure profit an entre- preneur may earn would depend upon the efficiency of his performance. The more his efficiency,the more he would be able to earn as pure profit. Therefore, pure profit which is the excess over normal profit, is of the nature of the rent of ability. However, we have to remember here that the

profit of a firm also includes what is known as windfall or chance income. Therefore, the pure profit is a surplus, which includes the rental surplus as also the surplus due to the windfall or chance factors. Therefore, pure profit is a mixed surplus.

8.11.6 Monopoly Power Theory of Profit

If there is perfect competition in the markets, there cannot be any profit, because absence of competition creates opportunities in the markets to acquire profit, many economists are of this view. As we know, under perfect competition, the buyers and sellers are assumed to possess full knowledge about the conditions prevailing in the markets.

That is why if the firms in an industry happen to earn more than normal profit in the short run, then in the long run, number of firms will enter into industry. The supply of the product would be increasing and the price of the product would be decreasing till all the existing firms would earn just the amount of normal profit. A firm under perfect competition is one of a large number of firms. That is why it can sell more or less any amount of its product at the market-determined price. The entrepreneur, here, is not required to take an individual initiative to increase the demand for his product and his sales. Therefore, here the entrepreneur performs his routine activities and for this he gets no more than the normal profit.

On the other hand, if the entrepreneur possesses monopoly power in the market, then he would have to exert individual initiative in giving leadership in the market. He will act as price maker as well as price taker. Now, in order to maintain his monopoly power and to increase this power, he would have to exercise necessary efforts. The entrepreneur here has to bear risk and uncertainty, and he would have to expand the dominance of his firm in the market through innovations. If the entrepreneur can perform his job successfully, then he can increase the demand for his product and get a higher price. Consequently, the amount of pure profit earned byhim may increase.

Criticisms

This theory has rightly emphasised the role of monopoly power in the emergence of profit. But this also cannot be a complete theory of profit, as a monopolistic firm can earn less than normal profit or negative pure profit, i.e., we may have $p < AC$ at his $MR = MC$ point. Therefore, the existence of monopoly elements in the market may be a necessary condition for the emergence of profit but it is not a sufficient condition, as monopoly cannot be found in all production processes.

8.11.7 Labour Exploitation Theory of Profit

According to the great philosopher and classical economist, Karl Marx (1818-1883), labour is the only factor of production, which can produce surplus value. The capitalists acquire profit by expropriating this surplus value. Marx has said that labour is the only productive factor. Labour is given a rate of wage which is much smaller than the net value produced by it with the help of machines, raw materials, etc. The capital surplus value is defined as the difference between the net value produced by labour and what it actually gets as wage.

This surplus value is the profit of the entrepreneur who represents the capitalists. There would be an increase in the productivity of labour when this profit is converted into capital and reinvested for now the labour would be able to use more of capital goods or machines.

As the productivity of labour increases, the capitalist surplus created by labour also increases for the rate of wage of the workers generally does not increase, or, increases at a much smaller rate. Thus, exploitation of labour goes on increasing at an increasing rate and, along with it, the stock of capital also increases.

Criticisms

In the labour exploitation theory of profit, the role of labour in the creation of surplus value and the subject of labour exploitation have taken into consideration. Many economists think that, like labour, the other factors of production, like land and capital, are also productive.

Besides, Marx has said, that it is the capitalists that acquire profit, i.e., he thinks that capitalists are identical with entrepreneurs, although, in modern economic system, entrepreneurs and capitalists may be separate persons. Marx does not consider the fact that sometimes the entrepreneurs may have to bear risks and uncertainties. Therefore, Marx's theory, too, cannot be considered as a complete theory of profit.

8.11.8 Marginal Productivity Theory of Profit

Marginal Productivity theory is a bold attempt to explain the determination of rewards of various factors of production. The marginal productivity (MP) theory of factor pricing may be applied to the determination of the rates of wage and interest. We shall now see how far the theory is

relevant in determining the rate of profit. The MP theory says that the price of a factor would be equal to the value of its marginal product (VMP).

Assumptions of the Theory:

1) All the factor units are identical.
2) Perfect competition in the factor market.
3) Variable input coefficients means that the proportion in which different factors arecombined to produce a commodity can be changed.
4) Given stock of each factor and their full employment (called stationary condition).
5) Given state of technology (called stationary condition).
6) This theory holds good in the long run.

Therefore, according to the MP theory, the rate of profit would be equal to the VMP of entrepreneurship or entrepreneurial services. According to definition, the MP of entrepreneurship is the increment in total output obtained as a result of use of the marginal unit of entrepreneurial services. It may be noted here that if we talk of one marginal unit of entrepreneur in place of one marginalunit of entrepreneurial services, then there would be confusion since a business firm may have one, or, at best, a few entrepreneurs, and entrepreneur is not a continuous variable. Therefore, while examining the relevance of the MP theory in the area of profit, we should talk not of entrepreneurs, but of entrepreneurial services, the quantity used of which may be measured, say, in units of time as quantity used of labour is expressed in hours.

Then we would be able to say: if the VMP of entrepreneurial services is greater than the rate of profit determined in the market, then the entrepreneur would go on increasing the amount of entrepreneurial services used till the VMP of these services diminishes owing to the law of diminishing returns, to become equal to the rate of profit.

Criticisms

In the above discussion, we have seen that the MP theory may be applied to the determination of the rate of profit (of course, the demand side). But this theory also has defects like those of the other theories. Some-of these defects we shall mention below. The MP theory, in general, assumes that there is perfect competition in both the product and the factor markets.

Therefore, the theory assumes that there is perfect competition in the market for entrepreneurial

services. That is, the buyers and sellers of these services are large in number and the sellers are selling homogeneous entrepreneurial services.

However, this assumption is not realistic at all. First, services of all the entrepreneurs cannot be homogeneous. Some of the entrepreneurs may be more efficient and some may be less. Second, the sellers of these services are not large in number in the real world. Also, the existence of perfect competition in the market for these services implies that the price or the rate of profits determined by the market forces of demand and supply. But, by definition, there is nothing like apredetermined rate of pure or economic profit. This profit is a residual earning. A major defect ofthe MP theory is that it does not determine the price of a factor. It only analyses the demand side of the market and enables us to obtain only the demand curve for the concerned factor of production. This defect of the theory does equally apply in the case of profit also. That is, the theory explains the demand side of the market for entrepreneurial services, not the supply side.

Lastly, another defect of the MP theory as applied to profit is that the theory cannot explain all the elements of profit. For example, windfall profit, as we know, is an element of profit. Sincethe windfall profit has no relation whatsoever with the productivity of entrepreneurial services, this element of profit is beyond the scope of the MP theory to explain.

8.12 Functions of Profit

As already stressed above, profits are assigned an important role to play in the various economies. Sometimes, it is said that profits arise at the expense of consumers of society even though they benefit the entrepreneurs. A conflict is said to exist between private and social ends. This may be particularly true. But generally; the two may coincide and benefit the private and the social interests alike. For instance, proper allocation of resources and their optimum utilisation by the entrepreneurs may not only benefit the entrepreneur, but also the society. In the pursuit of successful new ventures, the entrepreneurs also develop the economy. In short, whatever, may be the form of economy, profits discharge the following function.

1. In their battle for survival, it is the duty of the entrepreneurs to cover current costs of business.
2. To cover the future costs of staying in the market arising out of risks, uncertainty, obsolescence and replacement etc.

3. To cover the losses of unsuccessful ventures by the efficient management of other ventures;
4. To cover the costs of certain social services such as education, medical and sanitation facilities through contribution to tax-receipts of Government.
5. To provide a ready basis for allocation of productive resources in various industries and sectors. Magnitude of profit in the various sectors of economy would indicate the need for inflow and outflow of productive resources in these avenues. A rising rate of profit indicates the need for large allocation and a declining rate the need for withdrawal of resources from a particular use.

Therefore, Profits perform all these functions and have come to be relied upon increasingly for realising the ideal allocation of resources. But to set the record in correct perspective it may be added that profits, particularly for personal gains at the cost of society should be controlled. A regulated profit policy on the part of the government may go a long way in harmonizing the private and social end in allocating the resources on an optimum basis and curbing the wrong tendencies toward inequitable distribution of wealth and income.

Check Your Progress- VII

Q1. Write short notes on monopoly power theory of profit.

Ans._____

_____

Q2. Give any two functions of Profit.

Ans._____

_____

8.13 Summary

Ricardo expressed rent in a simple way and if all lands were equally fertile (and equally favourably situated), obviously there would be no economic rent. The differential principle can explain only why a more fertile plot of land commands higher rent than a less fertile one, it does not explain how rent arises. This theory simply ignored the existence of scarcity rent. Modern economists define economic rent in a wider sense to denote producer's income i.e., all income earned by a factor in excess of income necessary to keep it in its present use (or its transfer earnings). In spite of the various shortcomings of the Ricardian theory, it cannot be discarded as Stonier and Hague remarked “The concept of transfer earnings helps to bring the simple Ricardian theory of rent into

closer relation with reality." Profit is the amount of factor earning enjoyed by the entrepreneur class. Hawley is of the view that entrepreneur's profit is reward of risk taken by him, higher the risk under taken, the more will be the profit earned. Prof. Knight develops the uncertainty bearing theory of profit and according to that profit is the reward for bearing uncertainty. This non-insurable risk triggers uncertainty and the entrepreneur receives profit as reward for undertaking this uncertainty. J. B. Clark suggests that profit is generated in a society which is dynamic in nature. According to the innovation theory the innovator derives profit by utilizing commercially the newly invented products. The profit earned by the entrepreneur is considered as a reward for his efficiency and ability according to the rent theory of profit. Marginal productivity theory suggests that any factor input is paid according to their marginal revenue productivity, it may be stated that profit determination is yet an unexplored field. No complete explanation for determining profit has been given so far. Only this much could be said that all these theories provide us the knowledge about the nature of profit and they collectively explain the factor which determine profits.

8.14 Questions for Practice

A. Short Answer Type Questions

Q1. What is rent? Explain its types

Q2. Discuss the features of Ricardian theory of rent

Q3. Briefly explain the concept of rent under extensive and intensive cultivation.

A. Quasi-rent

B. Interest

Q4. Discuss demand and supply analysis under modern theory

Q5. Explain the term rent is a surplus return.

Q6. Explain the nature of profit.

Q7. Discuss the functions of profit.

Q8. Briefly explain Risk-taking theory of profit.

Q9. Explain the criticisms of uncertainty bearing theory of profit.

Q10.What are the features of dynamic economy?

Q11.Innovation is an important element of profit. Comment.

Q12. Explain labour exploitation theory of profit.

B. Long Answer Type Questions

Q1. Explain the determination of rent under Ricardian theory.

Q2. Critically evaluate Ricardian theory of rent.

Q3. Explain the features determination of rent under modern theory.

Q4. Define economic rend and elasticity of supply under modern theory.

Q5. Discuss the concept of rent under Ricardian Theory of Rent and the Modern Theoryof Rent. Also, explain the important difference between both.

Q6. Explain the risk bearing and uncertainty theory of profit. How far this explainsthe profit determination.

Q7. Critically explain the dynamic theory of profit.

Q8. Explain the determination of profit under innovation theory. Give criticisms too.

Q9. Discuss the rent theory of profit and monopoly power theory.

Q10. Explain the marginal productivity theory of profit.

Q11. What are the types and functions of profit?

8.15 Suggested Readings

- Koutsoyiannis: Modern Microeconomics
- Baumol, W.J. Economic Theory and Operations, Analysis
- Hicks, J.R., Value and Capital, 2nd Edition., Oxford University Press
- Robinson, Joan, The Production Functions Eco. II, 1955.
- Samuelson, P.A. Foundation of Economic Analysis, Cambridge, Harvard University Press, 1974.