TEERTHANKER MAHAVEER UNIVERSITY MORADABAD, INDIA

CENTRE FOR DISTANCE & ONLINE EDUCATION

Programme: Bachelor of Arts (BA) Economics

Course: Micro Economics

Semester-I

Syllabus

Micro Economics

Objective/s and Expected Outcome: This course will cover the area of economics commonly defined as microeconomics which is concerned with the individual parts of the economy such as individual businesses or industries, individual consumers, and individual products. The course aims to provide a thorough introduction to economic theory. Starting from the basic concepts of microeconomics, utility functions, production functions, demand and supply, effect of market forces. The goal is to study whether the economy uses our limited resources to obtain the maximum satisfaction possible for society.

Unit-I (12 Hrs.)

Meaning, Nature and scope of micro economics, limitations of microeconomic theories. **Basic Concepts:** Marginal and incremental principle contribution, opportunity cost, equilibrium, basic problems of economy. **Utility:** Cardinal utility approach, diminishing marginal utility, law of equi-marginal utility, ordinal utility approach, indifference curve, marginal rate of substitution, budget line and consumer equilibrium

Unit-II (12 Hrs.)

Determinants of demand, law of demand, exceptions to law of demand, Measurement and degrees of elasticity of demand-Price, income and cross elasticity; Relationship between average revenue, marginal revenue and total revenue

Unit-III (12 Hrs.)

Short run and long run production functions, laws of returns, optimal input combination, classification of costs, short run and long run cost curves and their interrelationship, Planning curve and envelope curve, internal and external economics of scale, revenue curves, optimum size of the firm, factors affecting the optimum size

Unit-IV (12 Hrs.)

Equilibrium of the firm and industry- perfect competition, monopoly, monopolistic competition, discriminating monopoly, aspects of non-price competition; group equilibrium, excess capacity, selling costs, oligopolistic behaviour, characteristics of various factors of production, marginal productivity theory and modern theory of distribution, determination of rent; quasi rent; classical

and loanable funds theory, alternative theories of interest and wages.

Suggested Readings/ Books:

- D. Salvatore, Microeconomic Theory, Tata McGraw Hill.
- D N Dwivedi, Managerial Economics, Vikas Publishing
- R H Dholkia and A.N. Oza, Microeconomics for Management Students, Oxford University Press.
- P.L. Mehta, Managerial Economics, Sultan Chand.
- D Kreps, MicroEconomics for Managers, Viva Books Pvt. Ltd.
- L. Petersonand Jain, Managerial Economics, Pearson Education
- Koutsayiannis, Modern Microeconomics, Macmillan Publications

Meaning, Definition and Basic Concepts

1.1 OBJECTIVES OF THE CHAPTER

The objective of this chapter is to introduce the readers to the meaning and definition of economics. This chapter also explains the scope of economics explaining the different areas that are covered under the subject. It also aims at familiarizing the readers with the distinction between micro and macroeconomics and the basic concepts that are frequently used in discussions.

1.2 MEANING AND DEFINITION OF ECONOMICS

The genesis of economics can be traced back to the times of Aristotle. In this book „Politics", he discussed economics under the heading „homo oeconomicus" implying the science of household management. Thus, it indicates two things: firstly, economics was not regarded as a separate subject rather it was a part and parcel of politics and secondly its scope was restricted to just the peripheries of the household. Similarly, Kautilya"s „Arthshastra" also explained the principles of economics along with the art of politics. Gradually, the importance of the subject in the routine

affairs of the economy forced the thinkers to separate the subject from the shackles of politics and establish it as a separate branch of study. Economics has been defined differently by different economists and hence, the definitions and be discussed under different schools of thoughts. These are given below:

Different Definitions of Economics

➢ *Wealth – Oriented Definition of Economics*

➢ *Welfare- Oriented Definition of Economics*

➢ *Scarcity- Oriented Definition of Economics*

➢ *Growth-Oriented Definition of Economics*

1.1.1 Wealth- Oriented Definition of Economics

This group of thought is supported by the classical economists like Adam Smith, J.B.Say, J.S. Mill etc. Adam Smith, who is regarded as the father of economics, published a book, "An Enquiry into the Nature and Causes of Wealth of Nations" in 1776. In this book he defined economics as,

"the great object of political economy of every country is to increase the riches and power of that country"[1].

Likewise, economists like J.B.Say in his book, "Treatise on Political Economy" defined economics as,

"the science which treats of wealth"[2]

Thus, these economists believed in amassing more and more of wealth. The main features of this definition are:

1. **The primary objective of the economy is to amass wealth:** Amassing of wealth was regarded as the main aim of every economy. This group of thought placed wealth above everything. Even man was secondary to wealth.

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[1] H.L.Ahuja, (1980), Modern Economics, S.Chand and Company Limited, New Delhi.
[2] Ibid.

2. **Wealth implied material goods.** Thus, anything that can be physically seen or touched was a part and parcel of wealth. And every economy was to gather more and more of such material goods.

3. **To devise strategies to amass more wealth.** Since, the main aim of the economy was to collect wealth, thus, the economists were to devise strategies so as to increase the wealth of the economy. Thus, the economists pondered over the following questions: how can we increase our economy"s wealth? Why some economies are having more wealth than ours?

A Quick Look at the Features of Wealth-Oriented Definition:

> ➢ *Amassing of wealth*
> ➢ *Wealth mean material goods*
> ➢ *How to increase wealth*

Thus, these economists gave importance to wealth because of which this school of thought is regarded as wealth-oriented school of thought. Though these economists gave a strong definition of economics yet it is criticized on many grounds:

1. **High importance to wealth**: These economists have attached huge importance to wealth. The stress is so high that man is pushed to the background. Man is made to exist so as to gather more and more wealth. However, several critics pointed out that such a definition of economics implied that man existed for wealth but in reality wealth exists for man. Thus, man is primary and wealth is secondary.

2. **Ignores the importance of welfare:** This group of thought completely ignores the significance of welfare. Welfare is a broader concept which not only includes consumption of material goods but also the equitable distribution of income and wealth.

3. **Excludes services:** Wealth definition of economics covers the material goods only. Today service sector contributes heavily to an economy"s income and exclusion of this sector indicates narrowing the scope of the subject in the present context.

4. **Scarcity and choice:** This definition of economics does not talk of the scarcity of the resources and hence does not discuss the question of choice and sacrifice which is the fundamental economic fact of every economy.

5. **Excludes old and retired people:** Lastly, such a definition of economics does not cover the old and retired people who do not actively take part in the economic activity. Their exclusion from economics leads to underestimation of the demand.

Thus, this definition has its own lacunas. But such a definition of economics paved the way for further definitions put forward by other economists which then broadened the scope of economics.

1.1.2 Welfare- Oriented Definition of Economics

The shortcomings of the wealth-oriented definition paved the way for the welfare-oriented definition. This group of economists includes neo-classicals like Alfred Marshall, Pigou, Edwin Cannan etc.

Alfred Marshall defined economics as,

"A study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the use of material requisites of well-being"[3].

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[3] Sorbhi Sharma, (2009), Economics For Law Students, Central Law Publications, Allahabad.

The initial words of Marshall"s definition explicitly show that as per his opinion „mankind" is more important which refers to the welfare of human beings.

Edwin Cannan in his book, „Wealth" writes,

"The aim of the political economy is the explanation of the general causes on which the material welfare of human beings depends"[4].

A.C.Pigou in his book „Economics of Welfare" defines economics as,

"The range of our enquiry becomes restricted to that part of social welfare that can be brought directly or indirectly into relation with the measuring rod of money"[5].

The main features of the welfare-oriented definition are:

1. **Primary importance to welfare:** This group of economists believed that the welfare of the mankind was more important. They believed that wealth or goods were demanded because of man, so man was placed above wealth.

2. **Material requistes of well being:** These economists have included material requisties of well being which includes goods and even services. Thus, it is a much broader definition of economics.

3. **It covers only those goods which enter into the market:** Since these economists have specified that only those goods which can be measured in terms of money are included, therefore, only those goods which enter into the market for sale are included. The

> *A Quick Look at the Features of Welfare-Oriented Definition:*
> - *Welfare of mankind*
> - *Material requisites of well being*
> - *Goods that are measured*

> *Main Criticism of Welfare-Oriented Definition:*
> - *Ignores the concept of scarcity, choice and sacrifice*

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[4] Ibid.
[5] Ibid.

articles that do not enter into market and are meant for self-consumption are not included in this definition.

Thus, the welfare-oriented definition stresses on the welfare of the human beings. However, Robbins has criticized this definition as it does not highlight the role played by scarcity of economic resources.

1.2.3 Scarcity-Oriented Definition of Economics

Lord Robbins in his book in 1932, „An Essay on the Nature and Significance of Economic Sciences" criticized Marshall''s definition of economics. He said that although his definition includes goods and services and also talks of welfare but it does not include the importance of scarcity of resources and the because of which we are forced to make a choice and sacrifice. He defined economics as,

"A science that studies human behavior as a relationship between ends and scarce means which have alternative uses"[6].

Thus, in this definition Robbins has highlighted:

> *Main Features of Scarcity-Oriented Definition:*
> - *Unlimited wants*
> - *Scarce resources*
> - *Alternative uses of Resources*
> - *Choice and Sacrifice*
> - *Opportunity Cost*

1. **Unlimited Wants**: Robbins pointed out that human wants are unlimited. At a particular point of time the wants can be satisfied but human wants cannot satisfied over a period of time.
2. **Scarce Resources**: He points out that although human wants are unlimited but the resources required to satisfy these wants are limited in nature. He further explains that these resources are not only limited but they also have alternative uses which further multiplies their demand.

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[6] H.L.Ahuja, (1980), op.cit.

3. **Choice and Sacrifice:** Since human wants are unlimited and resources are limited and have alternative uses, therefore, we are forced to make a choice. While making a choice the most urgent want is satisfied first and others are postponed. Hence, we are forced to make a sacrifice.

4. **Opportunity Cost:** While making a choice the concept of opportunity costs comes into picture. Opportunitycost is the cost of the next best alternative foregone.

Thus, Robbins definition explains the fundamental economic fact of the economy. However, some economists pointed out that he does not talk of the future use of such scarce resources.

1.2.4 Growth-Oriented Definition:

Economists like Samuelson, R.G.Lipsey put forward the growth-oriented definition of economics. These economists believed that the efficient use of scarce resources is important but these resources should be so used that we leave good amount of resources for our next generation. They also believed that in economics we also discuss how to minimize the economic ills of the economy like: poverty, unemployment, inflation etc. Thus, apart from the efficient use of resources economic growth is also included in the definition of economics. Prof. Samuelson said,

"Economics is the study of how people and society end up choosing with or without the use of money, to employ scarce productive resources that could have alternative uses; it produces various commodities over time and distributes them for consumption, now or in future, among various persons and groups in society"[7].

R.G.Lipseydefined economics as,

1. "The ways in which a society uses its

> ***Features of Growth-Oriented Definition:***
> - *Efficiently using resources today to leave it for future use also*
> - *Removing/ reducing economic evils*

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[7] Sorbhi Sharma, (2009), op.cit.

resources and distributes the fruits of production to individual and groups in the society.

2. The ways in which production and distribution change over time.

3. The efficiencies and inefficiencies of economic systems."[8]

Thus, this school of thought believed in economic growth and development.

1.2.5. Conclusion

Thus, different economists have differently defined economics. On the whole economics is concerned with economic activities of man which aim at enhancing their welfare and also leading to economic growth through the efficient use of scarce economic resources having alternative uses in present and in the future.

1.3 SCOPE OF ECONOMICS

The scope of economics includes:

➢ The subject matter of economics
➢ The nature of economics

1.3.1 The subject matter of economics

The subject matter of economics includes the different economic activities like consumption, production and exchange which are performed in order to restore proper allocation of resources and efficient use of resources. Such objectives are attained by the different economic systems like capitalism, socialism, mixed economy through the formation of different economic policies and through the regular evaluation of such policies.

Following topics are covered under the subject matter of economics:

1. **Economic activities**
2. **Types of economic activities**
3. **Objectives of economic activities**
4. **Economic systems**

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[8] Salvatore, D. (2003), Microeconomcis: Theory and Applications, Oxford University Press, New York.

5. Framing of economic policies and constant evaluation of policies

These are explained in detail below:

1. Economic activities: Human being performs several social and economic activities. However, economics studies only the economic activities of a man. Economic activities are defined as those concerned with the efficient use of scarce economic resources so as to satisfy human wants. Human wants imply the wants for goods, services and for quality of life. Following are the main features of human wants:

➢ Such wants vary among different people over different periods of time and in different locations. For example: lower class aspires to shift to middle class, middle class aspires to shift to upper class etc.

➢ Human wants are always greater than the goods and services. Thus, human wants are unlimited in nature.

➢ Wants of an individual at a particular period of time in a particular income context can be satisfied but wants of an individual or of all the humans over a period of time can never be satisfied.

These human wants can be satisfied with the help of economic resources. Economic resources are the inputs or the factors of production or the means of producing the goods and services. It includes:

➢ Land refers to the fertility of land, the climate, the forests, the mineral deposits present in the soil. At any given time land for a country is given.

➢ Labour refers to physical efforts and mental efforts which are directed towards the production of goods and services. It also includes the organizational skills of the entrepreneur to combine other factors of production to produce new, better or cheaper goods and services. Two producers may have the same amount of inputs, same quality of inputs but may produce different amounts of outputs because of the organizational skills of the entrepreneur.

➢ Capital: In economics, capital refers to the machinery, factories, equipment, tools, inventories, irrigation, transportation and communication networks. Money is not a part of capital because it does not produce anything directly. But the rent that we earn when

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we lend our money to others is a part of capital because we are providing services to someone who is further producing goods and services.

➤ It also includes raw materials, time and information etc.

The economic resources are scarce in nature. Scarcity is the crux of economics. Scarcity leads to choice and sacrifice. We know that resources are limited in nature be it land, labour or capital. Although air is free but even clean air is not free because for having clean air we will have to install equipment. So this implies that scarce economic resources command a price. Because resources are generally limited the amount of goods and services that any society can produce is also limited. Thus, the society must choose which commodities to produce and which to sacrifice. However, with time nation"s ability to produce goods and services increases as with time the size and skills of labour force increases, new resources are discovered and new uses of existing resources are found. Nation"s stock of capital also increases and technology also improves with time. But human wants always move ahead of society"s ability to satisfy them. Thus, scarcity is the fundamental economic fact of every society.

Scarcity forces us to choose and thus, we come to the concept of opportunity cost. As explained earlier, opportunity cost is the cost of the next best alternative foregone. Due to the scarcity of economic resources not only the individuals make sacrifices but it also forces the economy to decide:

➤ What to produce?
➤ How to produce?
➤ For whom to produce?

In a free economy[9] these questions are answered by the price system. These are answered in detail below:

➤ What to produce?

No economy can produce all the goods and services it wants, so it must choose which to produce and which to forgo. Producers will produce only those goods and services for which consumers

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[9] Free economy implies an economy where government interference is minimum in the markets. Largely private sector is involved in the production, distribution and exchange of commodities and services.

are willing and able to pay a price which is sufficiently higher than the costs of production. If the price that the consumers are paying is less than the costs of production then the producers will have no incentive to produce that good because they would be suffering losses. As a result production of that commodity would go down. If, however, the consumers are willing and able to pay a higher price for a commodity then the producers would be lured by the increasing profits and they would increase the production of that commodity. This might also attract new producers into the market which will expand the market for this commodity. Thus, in a free economy price system decides, „what to produce?‟

➢ How to Produce?

This question implies how to combine and organize the different factor inputs like land, labour, capital, raw material etc. Thus, here we have to find out –how much of capital be combined with labour? Here the real question is whether to employ capital intensive techniques of production or labour intensive techniques of production. Should textiles be produced with a great deal of labour and little capital or with little labour and more capital? The answer again lies in the prices of the factors of production. The prices of the factors of production reflect their relative scarcity. So the resource or the factor of production which is scarcer as compared to others would be commanding a higher price than other factors of production. For example in India labour is in abundance and capital is scarce. So, capital is very highly priced than labour in India. So firms would combine these factors of production in such a way so as to produce with minimum costs of production and these would also maximize the use of that factor which is the costliest. Thus, firms would be choosing efficient methods of production. Efficiency implies the producing outputs with minimum inputs. For example table 1.3.1a shows the different combinations of labour and capital required to produce the same level of output (10 units of X). Out of all these the most efficient method of production is A as it is using less of labour and capital. Thus, a method is efficient if it is using less of one or more factors of production in the production of commodities.

Table 1.3.1a Efficient Method of Production

Combinations of Labour and Capital	Units of Output X	Units of Labour	Units of Capital
A	10	5	10
B	10	6	15
C	10	7	12

➤ For Whom to Produce?

This means that how output is distributed between different sections of the economy. In a free market economy this is decided by the price system. But since rich people have more purchasing power than the poor people, therefore, prices can cause unequal distribution of income. Therefore, here the economists have to explore whether the government should interfere in the markets so that the output is somewhat equally distributed among the different sections of the economy. If yes, then the economists have to devise the ways through which such objective can be achieved. Economists also have to study and compare the consequences of the government intervention with the consequences when government does not interfere in the markets.

The above stated questions fall within the purview of microeconomics. Under macroeconomics it is decided that whether the country‟s resources are fully utilized or not, is the economy‟s capacity to produce goods growing or remaining the same over time?

A Quick Revision of Economic Activities
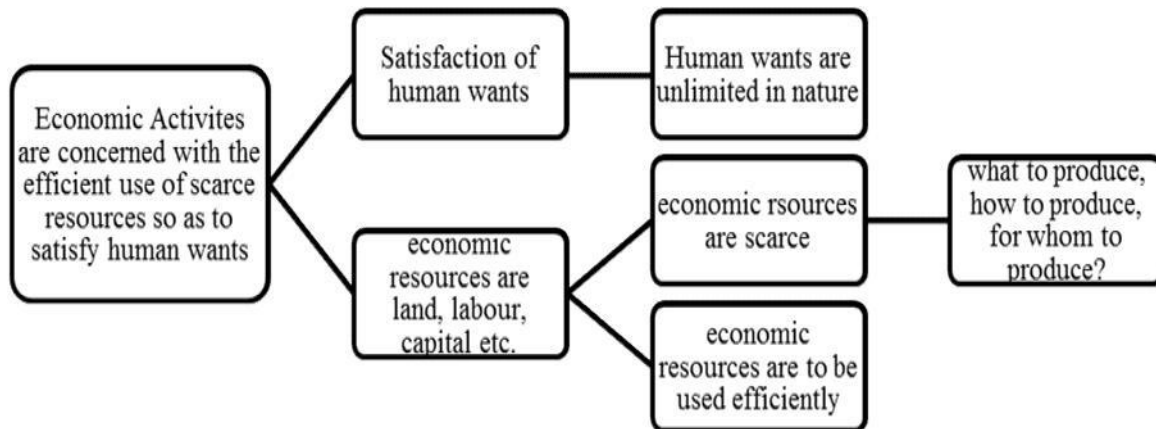
Thus, it is the task of the economists to study that the scarce resources are being efficiently used and allocated between different wants.

2 Types of economic activities

There are different types of economic activities that are carried out in the economy. These are:

➢ **Consumption**: Consumption is the basic economic activity. It is concerned with the use of economic goods and services for the satisfaction of human wants. For example: drinking water, eating fruits, wearing of tie, writing with a pen etc. We are consuming the economic goods and services through these activities.

➢ **Production:** Production is the addition made in the value of goods and services. It may also be defined as the act of transforming the inputs into outputs that are desired for

consumption and investment. Production is carried out with the help of different factors of production like land, labour, capital, raw materials, etc.

➤ **Exchange:** Exchange refers to the act of buying and selling of factors of production and/ or of a product. Exchange leads to the determination of prices. Two types of prices are decided under this type of economic activity:

    a) Product Pricing: It relates to the determination of the prices of the goods and services under the different conditions of market i.e. perfect competition, monopoly, monopolistic competition, oligopoly etc.

    b) Factor Pricing: Factor pricing refers to the determination of the prices of the different factors of production i.e. the determination of rent (price of land), determination of interest (price of capital), determination of wages (price of labour) and determination of profits (price of the entrepreneur).

Hence, the study of these activities is also a part of economics.

3 Objectives of economic activities

The above mentioned economic activities are carried out in order to achieve the following two objectives:

➤ **Proper allocation of resources**
➤ **Efficient use of resources**
➤ **Proper allocation of resources**: Proper allocation of resources is a subject of micro economics. It covers two types of markets: market for goods and services and the market for economic resources. Thus, micro economics studies the economic behaviour of individual decision-making units such as individual consumers and individual business firms. Under this the consumption of the households is considered at the individual level and not at the level of the economy. Likewise we also study how a particular firm behaves under different economic situations. Similarly, it explains how workers can best allocate their time to labour instead of leisure or how to choose between different jobs?

In a planned economy such allocation decisions are made mostly by the government. Firms are told what to produce and how to produce. So many tools of micro economics are of limited relevance in these economies. But in free market economies where there is

less intervention by the government, the different economic units have much more flexibility. In micro economics the interaction of its two main economic units i.e. of households and business firms in the market for goods and services and in the market for factors of production represents the core of the free market economy which can be explained with the help of the circular flow of economic activity in figure 1.3.1.3a. Households own capital, labour, land, natural resources etc. They supply these factors of production to the business firms who require these resources in order to produce goods and services. This is represented by the inner loop of the lower part of the circle. In return the firms pay to the households the different factor payments (like wages and salaries, interest, rent etc) represented by the outer loop of the lower part of the circle. Households then use their incomes received in terms of factor payments to buy the different goods and services which are produced by the different firms. This is represented by the inner part of the upper circle. The households make payments to the business firm which is represented by the outer loop of the upper circle. The firms then use this money to make payments to the factors of production. This is called as the circular flow of economic activity.

Figure 1.3.1a

Payment for goods and services

Goods Market

Goods and Services

Business Firms

Households

Factors of production

Factor Market

Factor payments
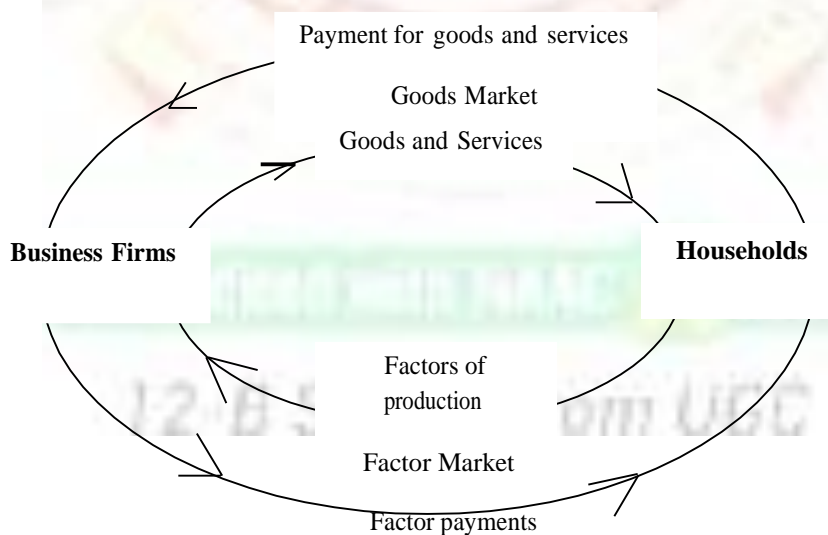
As can be seen in the figure, the upper part of the circle shows the market for goods and services and the lower part of the circle shows the market for factors of production. Thus, the prices of goods are determined in the goods market and prices

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of the factors of production are determined in the factor market. That is why micro economics is also called as price theory.

➤ Efficient use of resources: Efficient use of resources is a subject matter of macroeconomics. Macroeconomics is the study of aggregates i.e. this branch of economics deals with aggregate economic variables such as the level and growth rate of national income, output, interest rates etc.

Thus, under economics, we also study how to attain these objectives.

4 Economic systems

The above stated objectives of the economic systems have to be achieved and this cannot be done by the individual consumers or by the individual producers. This is done by the economic system operating at the top of the economy. Economic systems can be sub divided into the following categories:

➤ **Capitalism**
➤ **Socialism**
➤ **Mixed Economy**
➤ **Capitalism:** In this form of economic system, there is less interference by the government. Decisions pertaining to what to produce, how to produce, for whom to produce etc. are taken by the market forces of demand and supply. In such a system market forces are allowed to operate freely and the movement of the prices decides the allocation of resources.
➤ **Socialism**: Under this system there is complete control of the government. All the decisions relating to the consumption, production, exchange and distribution are taken by the government. There is no right to private property under this system.
➤ **Mixed Economy**: Mixed economy is that type of economic system in which both public and private sectors exist. This implies that government also participates in the market. In such a system certain sectors or commodities may be reserved exclusively for the public sector whereas in the remaining either the private sector operates or both public and private sectors compete with one another.

Thus, under economics, we also study the advantages and disadvantages of these systems in order to know out of all these which is the best system.

5 Framing of economic policies and constant evaluation of policies

Further, economics also covers the study of economic policies. These are the instruments through which the economic systems sought to attain the objectives of the economic policies. Every economy faces several economic problems like poverty, inflation, depression etc. Such problems are a characteristics of all the economic systems. The task of the economists is to frame policies for removing or reducing these problems. Such economic policies can be of many types: monetary policy, fiscal policy, foreign exchange policy etc. sometimes it so happens that while controlling the growth of one factor leads to the growth of another problem in the economy, for example: the trade-off between unemployment and inflation. Thus, the economists also have to devise ways to control such phenomenon. Further, after the implementation of the policies constant evaluation of the economic policies and their subsequent revision or replacement with a new policy is also covered. It, thus, covers the costs and benefits analysis also.

Thus, under the subject matter of economics the diverse economic activities are studied that are performed so as to achieve proper allocation of resources and efficient use of the same which is done by the different economic systems by devising diverse economic policies.

1.3.2 Nature of economics

Under the nature of economics, we shall study whether economics is a science or an art. If it is a science then whether it is a positive science or a normative science. Let us first of all study the meaning of science and then find out if economics is a science or not.

Science studies the relationship between causes and effects of a particular phenomenon for example: whenever two units of hydrogen are combined with one unit of oxygen will always give us water. In science we can observe the phenomenon like water, we can also measure such phenomenon and give explanations for their existence, for their behaviour. Thus, under science we can refute or verify laws.

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A Brief Outlook of Nature of Economics

Nature of Economics → Science, Art
Science → Positive Science, Normative Science
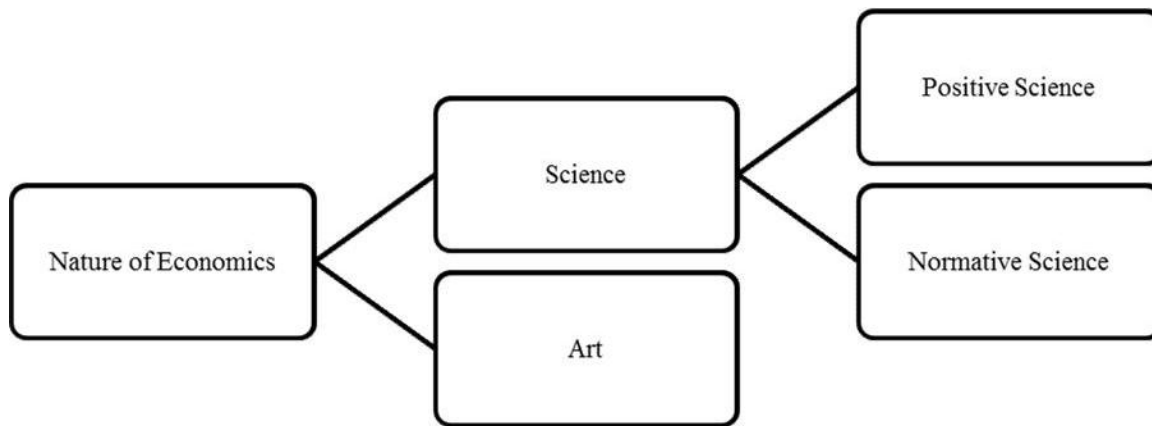
Likewise in economics we can observe economic phenomenon. For example, when we say that the food prices are increasing, this can be observed in the market. Secondly, we can also measure economic phenomenon, for example: the rise in the food prices can be measured. Lastly, we can also verify or refute economic laws by empirical analysis. For example: the law of demand, law of supply can be very easily measured. Thus, economics passes through all the features of being regarded as a science. But it cannot be regarded as a pure science as in science whenever two units of oxygen are combined with one unit of hydrogen always gives water. But in economics, laws are not universal i.e. a partiular law may or may not apply in a situation. For example: the law of demand is applicable only in certain situations while it fails in other situations. This happens because economics deals with human beings whose taste, preferences keeps on changing. Human beings are affected by many factors like the social, psychological, emotional factors etc which affects their economic decisions of consumption, production and exchange. Thus, economics cannot be regarded as pure science but it has some features of science.

Based on the type of statements, economics can be classified into:

➢ **Positive Economics:** Positive economics deals with statements that can be verified or refuted through data. Statements or phenomena of economics that are true today but may

not apply tomorrow are still a part of positive economics because they can still be rejected through data.

➢ **Normative Economics**: Normative economics deals with statements that could not be shown to be wrong by empirical data. For example: „we should have equitable distribution of wealth".

If economics is not a pure science then let us see if we can call it an art. Art has been defiend by Cossa as,

" the practical application of knowledge for achieving definite ends".

This implies that certain rules are applied in order to achieve well defined objectives in some specific situations. Thus, as the situations keep on changing , the rules also change. Since in economics we deal with human beings and the maximisation of their welfare, therefore, one rule cannot be generalized for all situations and for all human beings. Also, in economics we are concerned with quality of life i.e. about poverty, inequalities and the definition of „quality of life" keeps on changing from one person to another. Thus, economics has the feature of art.

Thus, economics has the feature of both science and art. It is neither a pure science nor a pure art. It is a combination of both.

1.4 LIMITATIONS

Economics is just a study of human beings. It does not cover other living beings. It discusses the maximization of the welfare of just human beings. A man carries out several activities in a day. However, in economics all the activities are not studied. Only the economic activties of the individuals are studied. While explaining the welfare of the mankind several economic laws and theories are given. However, these laws and theories are not applicable to all the individuals and in all the situations.

1.5 BASIC CONCEPTS

Some of the basic concepts used frequently in economics are discussed below:

1. **Marginal Principle**: The word marginal refers to very small changes. Marginal analysis implies studying the impact of a unit change in a particular variable on some other

variable. There are various cocepts under the marginal principle like: marginal costs, marginal product, marginal revenue. Whenever a firm is to take a decision pertaining to the price of the product, it compares marginal costs with marginal revenue.

2. **Incremental Principle**: Incremental principle is a generalization of the marginal principle. It studies the impact of the changes in output due to a change in policy decision. For example, studying the impact on output when new technology is introduced.

3. **Equilibrium**: Equilibrium refers to a situation when both the sides of balance are in similar state. In economics, it implies when the producers and the consumers agree on the said price of the commodity. Thus, both the sides are satisfied and no one has an incentive to move away from that decision untill or unless the equilibrium is disturbed by the outside forces.

4. **Opportunity costs**: due to the scarcity of resources, individuals are forced to undergo sacrifices. Thus, it gives rise to the concept of opportunity costs. It is defiend as the cost of the next best alternative foregone. For example: an individual A is earning Rs. 10, 000 per month by working in some company. If now he decides to leave his job and start his own business then these Rs. 10,000 per month would be his opportunity cost because this was the best alternative that he had foregone in order to start his business.

1.6 A QUICK REVISION

Now, let us quickly summarize this chapter:

Figure 1.6 A QUICK REVISION

Economics

Definition of Economics

Scope of Economics

Limitations of Economics
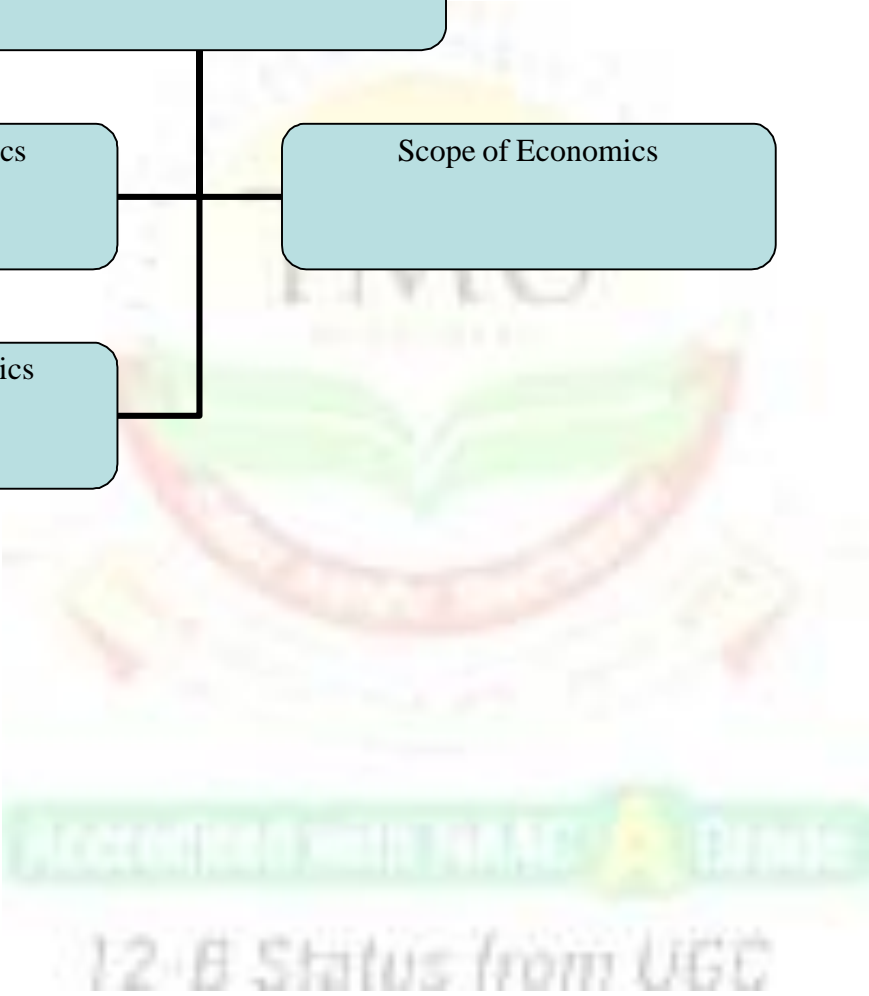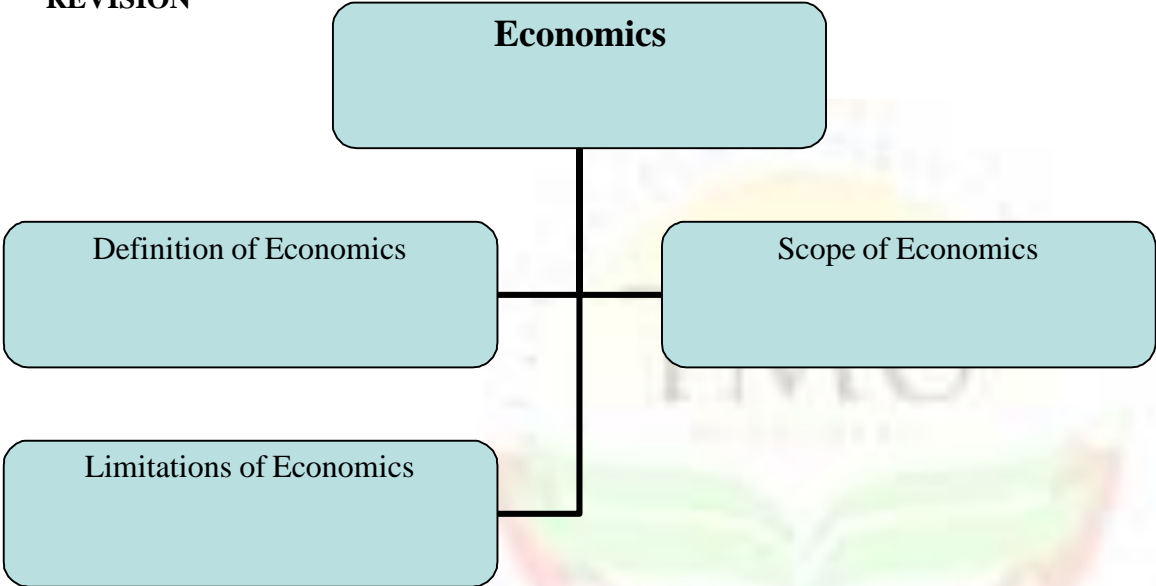
1.7 KEYWORDS

Wealthe definiton, welfare definition, scarcity definition, growth oriented definition, economic activity, economic systems, objectives of economic activities, policies, positive economics, normative economics.

1.8 ASSESS YOUR PERFORMANCE

Short Questions

Q.1 What is positive economics?

➢ Positive economics deals with statements that can be verified or refuted through data.

Q.2 What is opportunity cost?

➢ Opportunity cost is the cost of next best alternative foregone.

Q.3 What is consumption?

➢ Consumption refers to the use of economic goods and services for the satisfaction of human wants.

Q.4 What is capitalism?

➢ In capitalism, there is less interference by the government and the decisions pertaining to what to produce, how to produce, for whom to produce etc. are taken by the market forces of demand and supply.

Q.5 What is normative economics?

➢ Normative economics deals with statements that could not be shown to be wrong by empirical data.

Long Questions

Q.1 Discuss the different definitions of economics.

Q.2. Explain the nature and scope of economics.

Q.3. Critically discuss the wealth and welfare definition of economics.

Q.4. Scarcity is the fundamental economic fact of every economy. Comment.

Q.5. Is economics an art or a science?

1.9 Suggested Readings

Ahuja, H.L. (1980), Modern Economics, S.Chand and Company Limited, New Delhi.

Marshall, A. (1959), Principles of Economics, Macmillan, London.

Robbins, L. (1938), Nature and Significance of Economic Science, Macmillan, London.

Salvatore, D. (2003), Microeconomics: Theory and Applications, Oxford University Press, New York.

Sharma, Sorbhi. (2009), "Economics for Law Students", Central Law Publications, Allahabad.

Activity 1

What is the scope of economics?

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Activity 2

Define the nature of economics.

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Cardinal Utility Approach

Structure of the Unit

2.1 OBJECTIVES OF THE CHAPTER

The objective of this chapter is to introduce the readers to the concept of utility and how it was measured through the cardinal approach. This chapter unfolds the various laws of the cardinal school and also discusses the derivation of the demand curve based on the cardinal concept of utility.

2.2 CONCEPT OF UTILITY AND SATISFACTION

Economists have explored the dimensions of utility since long. Utility is the power of a commodity to satisfy the wants of the consumer. Strictly speaking, if we derive utility from a good it implies that we prefer that good to exist rather than not to exist. If we say that we derive more utility from a commodity say x and less utility from commodity say y then it implies that we prefer x to y. Utility is sometimes confused with satisfaction. If a commodity has utility it does not imply that it is useful or pleasant. For example: smoking is injurious to health but it has

utility for a smoker. Medicines are useful but taking medicines is not a pleasant activity as these are bitter. Utility varies from one individual to another. Satisfaction is the end result of the commodity. Utility is the quality of a commodity that makes you buy a particular commodity and satisfaction is what we derive from the consumption of that quality of that commodity. So utility is the cause and satisfaction is the result.

2.3 INTRODUCTION OF CARDINAL APPROACH

Economists like W. Stanley Jevons, Leon Walras and Alfred Marshall in nineteenth century believed that utility can be measured in cardinal numbers. Cardinal numbers are: 1,2,3,…etc. They measured utility by the amount of money the consumer is willing to pay for the additional units of a commodity. As per these economists there are two concepts of utility:

1. **Total Utility:**

   It is the aggregate or the sum total of the utilities derived from the consumption of all the units of a given commodity. If a person A consumes six oranges at a time then the sum total of the utilities derived from the consumption of all the oranges is called as total utility. Thus, total utility is dependent on the units of a commodity consumed.

   $TU = f(Q_x)$

   Where, TU stands for total utility

   f stands for function

   Q_x stands for the total amount of commodity x.

2. **Marginal Utility:**

   Marginal utility is the utility derived from the consumption of one additional unit of a commodity. If after consuming six oranges, individual A consumes seventh orange then the utility he will derive from the seventh unit will be called as marginal utility.

   $MU = \Delta TU / \Delta Q_x$

   Or, $MU = TU_n - TU_{n-1}$

Figure 2.3 and table 2.3 explains the concepts of total and marginal utility and it also explains their relationship. When total utility is increasing marginal utility is positive but it is declining. Till the second unit of x total utility is increasing at an increasing rate. During this time marginal utility is still positive. But after that total utility increases at a decreasing rate. When the consumer consumes the fifth unit of x total utility reaches its maximum. At this unit marginal utility becomes zero. If the consumer still consumes commodity x then total utility starts to decline and marginal utility becomes negative.

Table 2.3 Relationship between Total and Marginal Utility

Units of x consumed	Total Utility	Marginal Utility
1	5	-
2	16	11
3	24	8
4	30	6
5	33	3
6	33	0
7	30	-3

Figure 2.3 Relationship Between Total and Marginal Utility
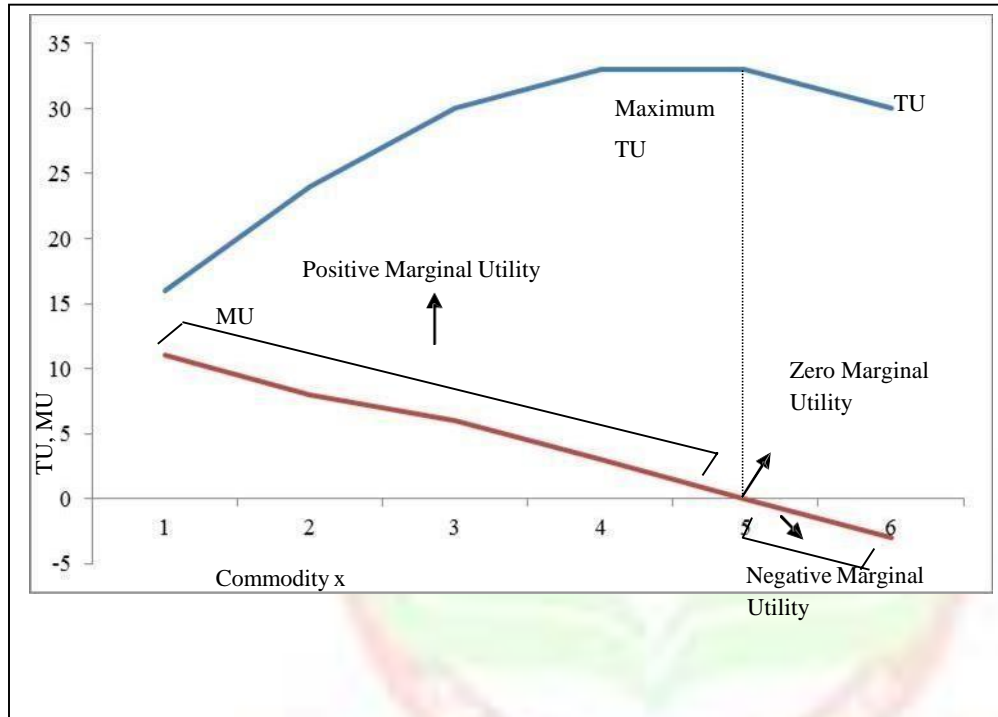
Based on these concepts of utility, cardinal school framed two laws which are explained in the next section.

2.4 LAWS OF CARDINAL APPROACH

The cardinal school propounded two main laws based on the cardinal concept of utility. These are:

1) Law of Diminishing Marginal Utility

2) Law of Equi-Marginal Utility

2.4.1   Law of Diminishing Marginal Utility

Law of diminishing marginal utility is the fundamental law of cardinal school. It is called also called as the law of eventually diminishing marginal utility. Since, this law was given by Gossen,

therefore, it is also called as Gossen's first law. It is based on certain assumptions these are discussed below:

1) **Rationality**: The consumer is assumed to be rational i.e. he seeks to maximize the satisfaction derived from the given income. There is no scope for irrational consumer in this theory.

2) **Cardinal measurement of utility**: Utility is assumed to be a cardinal concept. This implies that utility can be measured in cardinal numbers. Thus, utility is measured in terms of the money that the consumer is willing to pay in order to have another unit of a commodity.

3) **Constant marginal utility of money**: If we are using money as a measuring rod then it is essential that its own value remains constant. The essential feature of a measuring unit is that it should be constant. So if the marginal utility of money changes as income increases or decreases then the measuring rod of utility becomes like an elastic ruler. This then becomes unfit for measurement. Therefore, it is assumed that the marginal utility of money remains constant.

4) **Utility function**: The total utility of a basket of goods depends on the quantities of the individual commodities. This can be expressed as,

$U = f(x_1, x_2, ...x_n)$

Where, U is utility

$x_1, x_2, ...x_n$ are the amounts of the different commodities.

5) Every unit of a commodity consumed is assumed to be of the same size and quality.

6) There should be no change in the income of the consumer.

7) The tastes and preferences of the consumer and prices of the other commodities remain constant.

2.4.1.1 Statement of the Law

According to Marshall,

"the additional benefit that a person derives from a given stock of a thing diminishes with every increase in the stock that he already has"[1].

This law can be explained with the help of an example. Suppose, if you are hungry and you drink a glass of milk. The utility that you would derive from the consumption of first glass of milk would be very high. Then again if you take another glass of milk, the utility that you would derive from this glass of water would still be high but would be less than the utility derived from the first. Let us assume further, that your hunger is totally satisfied now. But if you are forced to have third glass of milk then the utility that you would derive from the third glass of milk would decline or even reach zero. If then you are again forced to have another glass of milk then the utility that you would derive from this glass would be negative. This implies that, as you go on consuming more and more units of a commodity the marginal utility derived from that commodity goes on decreasing. This is called as the law of diminishing marginal utility. This law is based on Weber Fechner"s psychological law. This law states that with the increase in the quantity of a commodity, the significance of its additional units goes on decreasing. This law can be explained with the help of table 2.3 and figure 2.3. It is revealed that as the consumer goes on consuming more and more units of a commodity, his satisfaction level goes on increasing and hence, the additional utility that he derives from the consumption of an additional unit of that commodity also decreases. Therefore, the marginal utility curve is initially positive but declining then, it becomes zero and lastly, it becomes negative.

2.4.1.2 Exceptions to the Law

Following are the exceptions to this law:

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[1] Chopra,P.N. (1992), Micro Economic Theory and Welfare Economics, Kalyani Publishers, Ludhiana.

1) **Small quantities:** If we take small quantities of a commodity then the law may not be applicable. For example: if we take drop of milk instead of a glass of milk then the law will not work. Thus, this law is very sensitive to the units of commodity.

2) **Articles of distinction:** This law is not applicable in case of articles of distinction. Articles of distinction are those commodities that are highly priced and hence, their possession increases utility. For example: jewelry, old paintings, cars etc. In such cases the marginal utility increases with the increase in the consumption of a commodity.

3) **Curious and rare things:** This law is also not applicable in case of curious and rare things like stamp collection, old coins collection. In such cases as the individual obtains an additional unit of that commodity then his marginal utility increases instead of decreasing. Thus, this law does not apply in such cases.

4) **Addictions:** The law of diminishing marginal utility also does not apply in case of commodities to which an individual is addicted. For example: alcohol consumption, smoking cigarettes. In such cases the individuals derive more and more utility from the consumption of additional units of that commodity.

5) **Large use of a commodity:** Sometimes the utility from a commodity start to increase when large number of people consumes it. For example: if you have a mobile connection but none of your friends have it. Your utility will increase as more and more of your friends obtain mobile connections. In this case the additional utility derived from this commodity also increases.

6) **One's utility is dependent on others consumption:** Professor Pigou pointed out that the utility of a commodity sometimes depends on the amount of the commodity which other people possess. If in a posh area, all the households have two mobile phones and three cars but there is one household in which there is one mobile phone and just two cars. Then the consumption of additional phone or car would give the latter household more utility.

2.4.1.3 Importance of the Law

Given below are the different points of importance of this law:

1) **Foundation stone:** This law is regarded as the foundation stone of the different laws of economics like the law of demand, law of substitution. This is because the law of diminishing marginal utility explains the slope of the demand curve. It also explains the working of the law of substitution.

2) **Value in use vs value in exchange:** This law helps in explaining the paradox of value. Value in exchange is the price of the commodity whereas value in use is the total utility that is derived from the consumption of a commodity. The paradox of value is that although water has more total utility i.e. its value in use is high yet its value in exchange i.e. price is low. Whereas diamonds have low value in use i.e. total utility but its value in exchange i.e. its price is high. Adam smith had put forward this paradox but he could not explain the reason behind it. It was explained by Jevons. He resolved this paradox with the help of the law of diminishing marginal utility. He said as we consume more and more units of water its additional utility goes on declining i.e. the law of diminishing marginal utility starts to work. When we consume additional units of diamonds the additional utility starts to increase. This is why water is priced lower than diamonds. Thus, goods having more value in use have less marginal utility and goods having more value in exchange are short in supply and so their marginal utility falls but slowly. So, their price remains high.

3) **Determination of prices in the economy:** If the seller wants to sell the additional units of a commodity then he reduces his price. This is because of the operation of the law of diminishing marginal utility. The consumer derives less marginal utility from the additional unit as compared to the first unit so they will be prepared to have additional units only when their prices are reduced.

4) **Progressive taxation:** progressive taxation implies that as the income increases the taxes also increase. The law of diminishing marginal utility is the base for progressive taxation. As the income increases the marginal utility of money derived from the additional units

of money goes on diminishing. Therefore, in any economy rich people are taxed more than the poor people. So this law helps in framing taxation policy.

2.4.2 Law of Equi-marginal Utiliy

Law of equi-marginal utility is the second law of Gossen. It was given in nineteenth century by Gossen. Therefore, it is also called as the "second law of Gossen". However, different economists have given different names to this law. Marshall called it as the "Law of Equi-Marginal Utility", Leftwitch called it as the "General Principle For Maximization of Consumer"s Satisfaction". Professor Hibdon called it as the "Law of Rational Consumer". Some others also called it as the "Law of Substitution". Law of diminishing marginal utility focuses on one commodity but this law focusses on the issue of more than one commodity. When a consumer, who aims to get maximum satisfaction from the purchase of goods, buys more than one commodity then law of equi-marginal utility provides the answer.

The assumptions of this law are similar to the law of diminishing marginal utility. The only additional assumption is:

1) **Operation of law of diminishing marginal utility:** This law assumes that as the individual goes on consuming more and more units of a commodity then the additional utility derived from the consumption of additional units of that commodity goes on declining. Thus, the operation of the law of diminishing marginal utility is a must for the law of equi-marginal utility.

2.4.2.1 Statement of the Law

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 the same marginal utility in all".[2]

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[2] Marshall, A., (1920), Principles of Economics, Macmillan and Company, London.

This implies that in order to maximize his satisfaction level, a consumer should spend his given income on the purchase of commodities in such a way that the last rupee spent on each commodity yields him equal marginal utility in all. Since, man''s income is limited and his wants are unlimited. Therefore, he cannot satisfy all his wants. So he will try to spend his income in such a way so as to obtain the greatest amount of satisfaction. For this purpose he will arrange the different goods as per the utility derived from them. Then he will first of all spend money on the purchase of that commodity which gives him highest utility and lastly on the purchase of that commodity that gives him lowest utility. If a man spends his money strictly in this order, then in the end the utility of the last unit of money spent on various commodities gives him equal utility. This is essence of law of equi-marginal utility.

2.4.2.2 Explanation

This law can be explained with the help of table 2.4.2.1. The consumer has income of Rs 10 and he spends it on the purchase of x, y and z. The table shows the different levels of marginal utilities derived from the consumption of commodity x, y and z. if the consumer is to spend first unit of rupee and his objective is to maximize the level of satisfaction. Then he will spend it on commodity y as it gives him maximum utility. Then the next unit of money will be spent on y commodity as it will give him 19 utils of utility. Then the third unit of rupee will be spent on commodity z as it gives him 12 util of utility. Then the fourth unit of money will be spent on commodity x as it gives him 11 utils of utility. If the consumer spends his income this way then the last unit of money spent on x, y and z gives him equal marginal utility i.e. 5 utils.

Thus, in more than one commodity case if a consumer spends his income as per the law of equi-marginal utility then the consumer would be maximizing his level of satisfaction. This way he will get 103 units of utility. But if he does not go by this principle then he will not maximize his satisfaction. He will derive maximum satisfaction from the consumption of goods only if he goes by the principle of equi-marginal utility. Moreover the utility derived from the last unit of money spent on each commodity is also equal i.e. 5. So the law says that if we want to derive maximum satisfaction from our given income then we should spend our income in such a way that the utility derived from the last money spent on each head is equal. This is the essence of law of equi-marginal utility.

Table 2.4.2.1 Law of Equi-Marginal Utility

Unit of Rs 1/-	Marginal Utility derived from Rs 1/- spent on		
	Commodity x	Commodity y	Commodity z
1	11 (4)	20 (1)	12 (3)
2	7 (7)	19 (2)	9 (6)
3	5 (8)	10 (5)	5 (9)
4	3	5 (10)	2

Figure 2.4.2.1 Diagrammatic Explanation of the Law of Equi-Marginal Utility
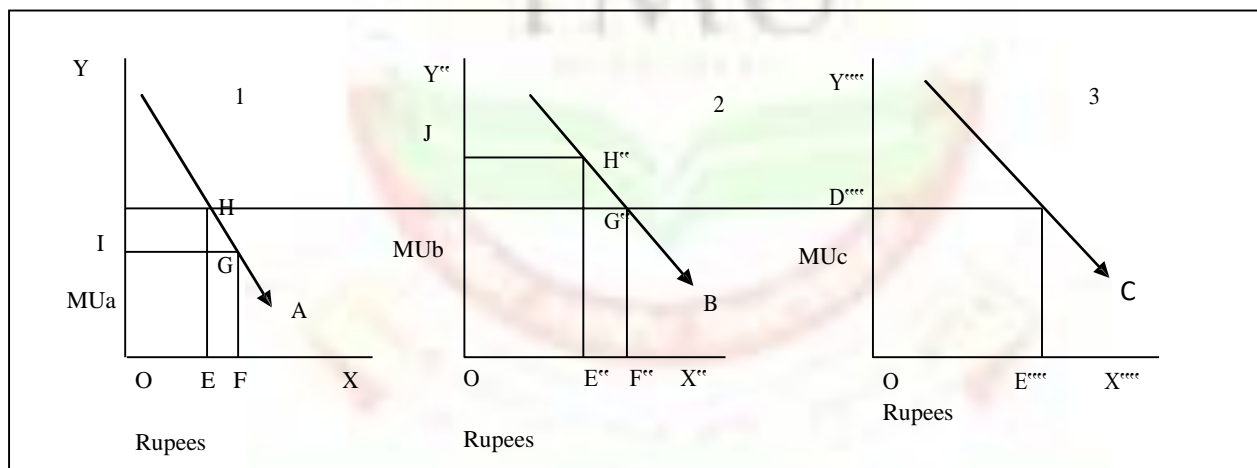
Part 1 shows marginal utility of x, part 2 shows marginal utility of y, part 3 shows marginal utility z. At D utilities are utilized are equalized. DD''''' shows equal marginal utilities. If he spends one more unit on x and one unit less on y i.e. he does not follow the principle of equi-marginal utility then the gain in utility (HGFE) by consuming one more unit of x is less than the loss in utility (H''G''F''E''). So if the consumer does not follow the principle of law of equi-marginal utility then he will be at a disadvantage. This law is also called as the law of substitution because the consumer goes on substituting the good having more utility to the good having less utility.

Modern economists attached the mathematical explanation to it and called it as the „law of proportionality". As per this law utility is maximum when the ratio of marginal utilities of commodities and their respective prices are equal i.e.

$$MUx / Px = MUy / Py = MUz / Pz = MUn / Pn$$

Utility is a function of quantities of x i.e.

$$U = f(qx),$$

The consumer seeks to maximize the difference between his utility and his expenditure (pxqx) i.e.

$$U- px\ qx,$$

The necessary condition for maximization is that the partial derivative of the function with respect to qx be equal to zero. Thus,

$$\partial U / \partial qx - \partial\ (pxqx) / \partial qx = 0,$$

$$\partial U / \partial qx - px = 0,$$

$$MUx - px = 0,$$

$$Mux = px,$$

$$MUx / px = 1,$$

For y and z commodities we will have,

$$MUx / px = MUy / py = MUz / pz\ ,$$

Or it can be written as,

$$\textbf{MUx / px = MUy / py = MUz / pz = 1.}$$

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2.4.2.3 **Significance of the law**

1) **Helpful to consumers:** This law is helpful to the consumers in allocating his limited resources or income between two or more goods so that his satisfaction is maximum, so with this law he chooses the best combination of goods which gives him maximum possible utility.

2) **Helpful to producers: P**roducers spends their income on land, labour, capital etc. These can be substituted for one another to some extent. So as per this law, producers have to see that the last unit of investment brings equal productivity from all the factors of production.

3) **Helpful to the government:** Government has limited resources. These resources have to be distributed among the different heads of expenditure i.e. on education, health, industry, commerce etc. This distribution has to be done in such a way that the last unit of expenditure incurred brings equal welfare and satisfaction to the people.

4) **Helps in fiscal policy:** Each taxpayer pays taxes in such a manner so that the marginal sacrifice of each taxpayer is equal. Then only it will have least burden on all the tax payers. For this purpose government goes on substituting one tax for another till the marginal sacrifice of all the taxpayers is equal.

5) **Guiding principle for investment:** This law helps a person while planning investment in different assets. Investment should be made in such a way so that the last unit of money invested in each asset gives him equal marginal utility.

2.4.2.4 Criticism of the law

This law has the following points of criticism:

1) **Consumers are not so rational**: Consumers are not so rational or mathematical or objective that they prepare list in their mind and go on substituting goods till your

satisfaction is maximum. Sometimes you move away from this principle because of the lazy behavior or irrational.

2) **Other factors play a dominant role:** Other factors like fashion, taste, preferences, custom etc affect the rationality of the consumer in many ways. This then affects the choice of the commodities as per the law of equi-marginal utility.

3) **Substitution may not be possible in some commodities**: Certain goods like television, refrigerators, cars etc are not bought in limited amounts. One may buy one unit of such commodities and it may not be possible for them to buy other units of these commodities. As a result, substitution may not be possible.

4) **Cardinal measurement of utility is not real**: Cardinal measurement of utility is not possible. It may not be possible for the consumer to explain in cardinal numbers the utility derived from a commodity.

5) **Marginal utility of money**: Marginal utility of money does not remain constant. However, this law assumes the constancy of marginal utility of money. As a person spends the money, the marginal utility of the remaining money changes.

6) **Not applicable in complementary commodities**: This law does not apply in case of complementary commodities. Complementary goods are those goods which are used in fixed proportions or with one another. For example: pen and ink, car and petrol etc. If a person buys a car he will have to buy petrol. Thus, the demand for the complementary commodities is a derived demand and a person has to buy, it if he wants to consume petrol.

2.5 EQUILIBRIUM OF THE CONSUMER IN ONE COMMODITY CASE

The aim of the consumer is to maximize his utility. He can maximize his utility by striking a balance between limited income and utility derived from the goods purchased. If he does so he is said to be in equilibrium. If a consumer is buying only one commodity say x and has a given income then the consumer will be in equilibrium when:

MUx = Px

If marginal utility of x is greater than the prices of x, then the consumer can increase his welfare by purchasing more units of x. Similarly if marginal utility of x is less than the price of x then the consumer increases his satisfaction by cutting down the quantity of x. This is explained in figure 2.5.1. On OX axis we have commodity x and on OY axis we have price of x and marginal utility

Figure 2.5.1
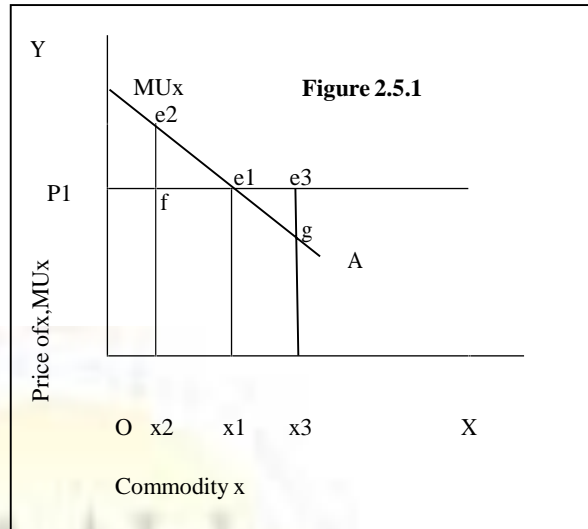
of x. Price of x is represented by line p1 which is assumed to be same for all units of x. Curve A shows the marginal utility curve of x commodity. It is sloping downwards which indicates that as the consumer consumes more and more units of a commodity, the additional utility derived from the consumption of a commodity goes on declining. Equilibrium is at point e1. When the consumer is at e2, his marginal utility is more than the price of x so he can increase his purchase of x. Therefore, he will move towards point e1. When the consumer is at point e3, marginal utility of x is less than the price of x, so he will cut down the consumption of x and move towards point e1. In the diagram e2e1f is the gain in utility and e1e3g is the loss in utility. So wherever marginal utility curve cuts price that will be the point of equilibrium. At the point of equilibrium, he is consuming ox1 amount of x at op1 prices.

2.6 EQUILIBRIUM OF THE CONSUMER IN CASE OF MORE THAN ONE COMMODITY

If there is more than one commodity, the condition of equilibrium is equality of ratios of the marginal utilities of the individual commodities to their prices i.e.

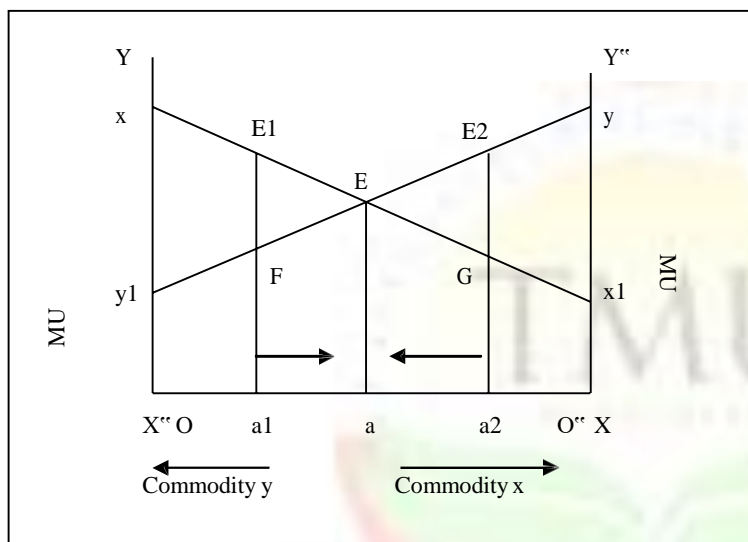$$MUx/Px = MUy / Py = MUz / Pz = …….. = MUn /Pn ……………… (1)$$

Thus,in more than one commodity case the principle of equi-marginal utility works. If we assume that the prices of the different commodities are equal i.e.

$$Px = Py = Pz = …………… = Pn = 1.$$

Therefore, equation 1 will become,

$$MUx = MUy = MUz = ... = MUn.$$

Figure 2.6 Equilibrium in More Than One Commodity Case

In figure 2.6 on OX axis we are measuring commodity x and on O"X" axis we are measuring commodity y. On OY and O"Y" axis we are measuring marginal utilities. The xx1 curve shows the marginal utility curve of commodity x and yy1 curve shows the marginal utility curve of commodity y. If the consumer is at E1 then the consumer is deriving E1a1 as marginal utility by spending his income on Oa1amount of x and Fa1 marginal utility by spending his income on O"a1 amount of y. Since, prices are equal to one therefore, the consumer is deriving more utility from x and less from commodity y but he is buying less of x and more of y. So he will prefer to have more of x and less of y. So they will move towards point E. If the consumer is on point E2, it shows that the consumer is having E2a2 level of utility by spending his income on O"a2 of commodity y and he can derive Ga2 marginal utility by spending his income on Oa2 of commodity x. Thus, he is deriving more utility from y but he is buying less of commodity y and he is deriving less utility from x but he is buying more of x. Thus, he can maximize his utility by buying more of y and less of x. so he will move towards point E. Point E is the point of equilibrium as the marginal utilities of x and y are equal and he will spend his income on Oa amount of x and O"a amount of commodity y.

2.7 DERIVATION OF THE DEMAND CURVE THROUGH THE CARDINAL APPROACH

In this section we shall discuss the derivation of the demand curve of the consumer through the cardinal measurement of utility.

Figure 2.7 Derivation of Demand Curve through the Cardinal Measurement Approach
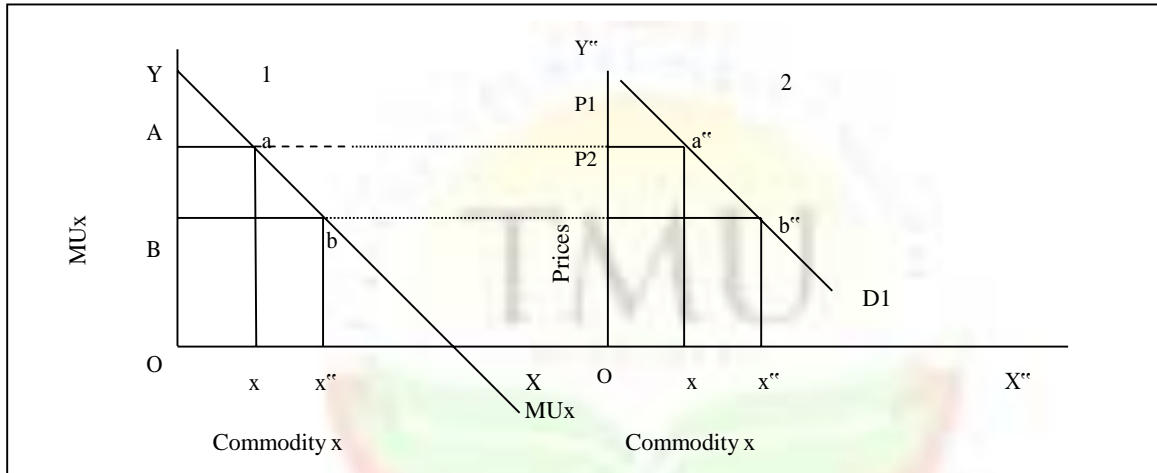
In figure 2.7 the derivation of the demand curve through the cardinal approach is shown. The individual demand curve can be derived from the marginal utility approach by the law of diminishing marginal utility. However, we are not concerned with the negative part of the marginal utility curve MUx. The demand curve will be derived from the positive parts of MUx only. In the first part of the figure when consumer is consuming ox amount of x then he is deriving OA amount of utility. However, we know that:

$$MUx = Px$$

Therefore, the line Aa can be extended to the second part of the figure, where prices are measured on OY" axis. Thus, Ox amount of commodity x can be had at OP1 prices and giving OA level of marginal utility to the consumer. Likewise, when the consumer is having Ox"amount of commodity x then the consumer is deriving bx" level of marginal utility. This can be extended to the second part of the figure, which shows that consumer will have Ox" amount of commodity

x at OP2 prices. By joining a" and b" prices we derive the demand curve for commodity x which is sloping downwards from left to right.
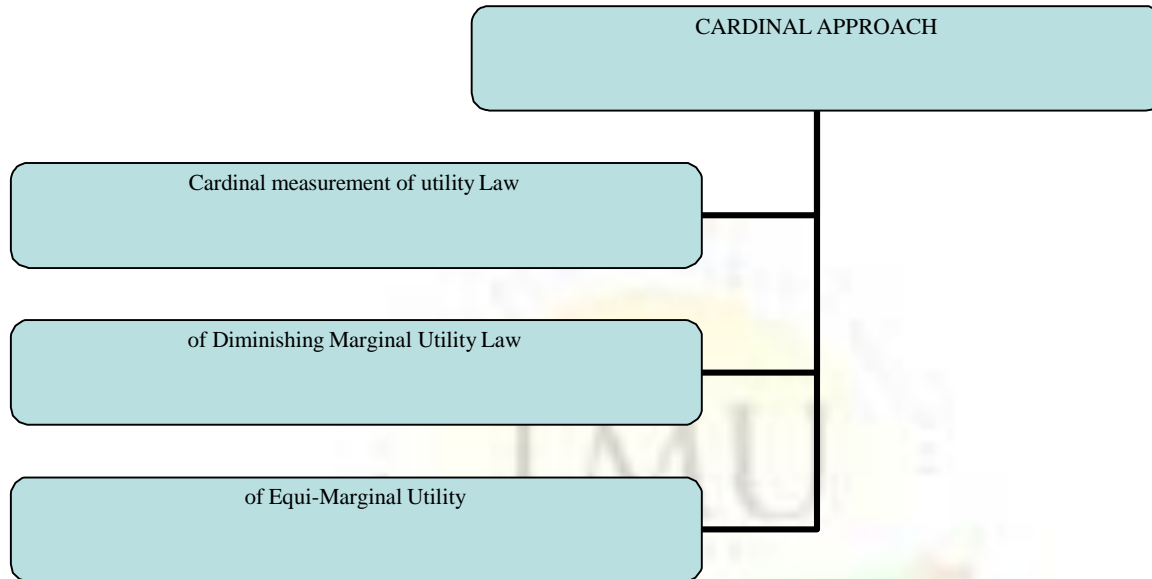
2.8 CRITICISM OF THE CARDINAL APPROACH

1) **Cardinal measurement of the utility is not possible:** Critics have pointed out that this approach has no base as the cardinal measurement of utility is not possible. The objective measurement of utility is not possible.

2) **Unrealistic assumption of the constant marginal utility of money:** The critics have pointed out that the cardinal approach is based on the unrealistic assumption of constant marginal utility of money. As the income of the consumer increases the marginal utility of money diminishes and as the income of the consumer decreases the marginal utility of money increases. Thus, money cannot be used as a measuring rod.

3) **The axiom of diminishing marginal utility is not established on facts:** The law of diminishing marginal utility is not established on facts as it is just based on the psychological law. The classical economists have taken the psychological law for granted. They have not established the reasons for the validity of the law.

4) **Average consumer is not so calculative:** In the classical analysis it is assumed that the consumer will prepare a list in his mind about the utilities derived from the different commodities and will spend his limited income as per the utilities derived. However, in reality the average consumer is not so calculative. It is difficult for any consumer to prepare such a list.

2.9 A QUICK REVISON

Figure 2.9 presents a quick revision of the whole chapter.

Figure 2.9 A Quick Revision

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                              │        CARDINAL APPROACH          │
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2.10 KEYWORDS

Cardinal numbers, total utility, marginal utility, law of diminishing marginal utility, law of equi-marginal utility.

2.11 ASSESS YOUR PERFORMANCE

Short Questions:

Q.1 What is total utility?

➢ The sum total of the utilities derived from the consumption of all the units of a given commodity.

Q.2 What is marginal utility?

➢ Marginal utility is the utility derived from the consumption of one additional unit of a commodity.

Q.3 Give two exceptions of the law of diminishing marginal utility.

➢ This law is not applicable if we take small quantities of a commodity. For example: if we take drop of milk instead of a glass of milk then the law will not work.

➢ This law is not applicable if a consumer is addicted to certain commodities like alcohol, cigarettes etc.

Q.4 State the law of equi-marginal utility.

➢ This law implies that in order to maximize his satisfaction level, a consumer should spend his given income on the purchase of commodities in such a way that the last rupee spent on each commodity yields him equal marginal utility in all.

Q.5 Give the equilibrium condition in one commodity case as per cardinal school.

➢ The equilibrium condition in one commodity case is

MUx = Px

Long Questions

Q.1 Explain the law of diminishing marginal utility. Also explain its significance.

Q.2 Discuss the law of equi-marginal utility.

Q.3 Explain how a consumer attains equilibrium in one commodity case through the cardinal approach.

Q.4 Critically explain the cardinal approach.

Q.5 Explain how a consumer attains equilibrium in more than one commodity case through the cardinal approach.

2.12 Suggested Readings

Ahuja, H.L. (1980), Modern Economics, S.Chand and Company Limited, New Delhi.

Chopra,P.N. (1992), Micro Economic Theory and Welfare Economics, Kalyani Publishers, Ludhiana.

Koutosoyiannis, A. (1979), Modern Microeconomics, Macmillan press limited, London.

Marshall, A., (1920), Principles of Economics, Macmillan and Company, London.

Indifference Curve Analysis

STRUCTURE OF THE CHAPTER

3.1 OBJECTIVES OF THE CHAPTER

The objective of this chapter is to familiarize the readers with the concept of the ordinal utility. This chapter explores the dimensions of indifference curve analysis. In this chapter the attainment of equilibrium is done through the different tools of indifference curve and price line.

3.2 INTRODUCTION

J.R.Hicks and R.G.D.Allen in 1928 jointly wrote a paper titled, "A Reconsideration of the Theory of Value". In this paper both of them criticized the cardinal measurement of utility and

the derivation of demand curve based on this measure. They said that utility cannot be measured in cardinal numbers. Utility is a subjective concept. It varies from one individual to another. They suggested that instead of asking the consumer how much utility is derived from the consumption of a commodity, we should ask the consumer to rank or order his preferences. Order of preferences or scale of preferences is defined as the ranking of the combinations of goods as per utilities derived from the various commodities. Later on, in 1939 Hicks discussed this concept of indifference curve analysis in detail in his book, "Value and Capital". The publication of this book led to the complete demolition of the cardinal measurement of utility.

Though this approach became popular with the work of Hicks but economists like Edgeworth, Fisher and Pareto did talk of deriving the demand work on the basis of the ordinal utility. A constructive effort was also made by Slutsky, who derived the demand curve in 1915 with the help of ordinal utility approach. However, his effort went unnoticed. Later on with the publication of Hicks and Allen"s work the classical works and their ideas were completely shattered. Thus, the concept of cardinal utility was replaced by ordinal utility. Hicks and Allen"s approach was regarded superior to cardinal approach as it had fewer assumptions and it was more realistic.

3.3 Preference And Indifference

Hicks and Allen believed that we should not ask the consumer as to how much of utility is derived from the different commodity bundles as it is not possible to reveal the exact utility derived from the commodities. Therefore, they said we should ask the consumer to rank his or her preferences as per the utilities derived from the commodities. So, they stressed on preparing order of preferences.

Whenever we talk of the order of preference or ranking of preferences two things come to our mind:

> Preference

> Indifference

Relationship Between Commodities

> *Preference*
> *Indifference*

Let us say that X and Y are two combinations of commodity bundles i.e. X shows different amounts of commodity a and b (say a1 and b1). Likewise Y is showing different amounts of

commodities a and b (say a2 and b2). Whenever the consumers are asked to choose between X and Y, three basic relations come to our mind:

X can be preferred to Y (XPY)

Y can be preferred to X (YPX)

X can be indifferent to Y (XIY)

Preference implies that a consumer feels that a particular combination of commodities gives him more utility than the other combination of commodities. Say when X is giving more utility to the consumer as compared to Y then X is preferred to Y i.e. XPY or when Y is giving more utility to the consumer as compared to Y then Y is preferred to X i.e. YPX. Likewise there can be some other combinations of a and b which give him different level of utilities and hence, can be ranked in term of preference. However, sometimes it may so happen that both X and Y give him same level of utility then he can either choose X or Y. This relationship is called as indifference because then he would be indifferent as to the particular combination he consumes because both give him same level of utility. Likewise there can be some other combinations of commodities a and b which give him same level of utility then the consumer can be indifferent towards them.

3.4 ASSUMPTIONS

Following are the different assumptions of the indifference curve analysis:

1. **Rational Consumer**: The indifference curve analysis studies rational consumer. A rational consumer is the one who aims at attaining the maximum level of satisfaction by spending his limited income.
2. **Axiom of Completeness**: This axiom implies that all the combinations of the commodities can be ranked in terms of either preference or indifference. There can be no other relationship between the commodities i.e. the consumer cannot be ignorant towards the relationship between the commodities.
3. **Axiom of Selection**: This axiom states the objective of the consumer. It implies that the aim of the consumer is to reach the most preferred state. Whenever we offer him different commodities he will try to reach at the maximum possible level of the utility.

4. **Axiom of transitivity**: If X, Y and Z are the different combinations of the commodities and if X is preferred to Y and Y is preferred to Z then X will also be preferred to Z. it can be written as,

X P Y, and Y P Z

then X P Z.

Likewise, if X is indifferent to Y, Y is indifferent to Z then X will also be indifferent to Z. i.e.

If X I Y, and Y I Z

then,

X I Z.

5. **Utility is ordinal in numbers**: It implies that utility cannot be measured in terms of cardinal numbers like 1, 2, 3, etc. It is a subjective concept. Commodities can only be ranked as per utilities derived from them for example first, second, third etc.

6. Utility of the consumer is dependent on the various amounts of the different commodities.

7. **Axiom of consistency**: It implies that if A is greater than B then in the same price and income situation B cannot be greater than A.

8. **Convexity of preferences**: Hicks and Allen assumed convexity of preferences. Therefore, indifference curves are convex to the origin.

9. **Non-satiety**: The consumer is assumed to not to reach satiety. He will always prefer more than less.

Now, for deriving the equilibrium of the consumer we need to study the meaning of indifference curves and price line.

3.5 INDIFFERENCE CURVES

In indifference curve analysis indifference schedule, indifference curve and indifference map are discussed. These are discussed in detail below:

3.5.1 Indifference Schedule

Indifference schedule implies the tabular representation of the different combinations of two commodities that give same level of satisfaction to the consumer so that the consumer is indifferent as to the particular combination he consumes. This is explained in table 3. 5. 1.

Table 3.5.1.Indifference Schedule

Combinations of x and y	Commodity x	Commodity y
A	1	100
B	2	88
C	3	78

The table shows that combination A has 1 unit of x and 100 units of y, combination B has 2 unis of x and 88 units of y, combination C has 3 units of x and 78 units of y. It is assumed that these combinations of A, B and C give equal utility to the consumer, therefore, he would be indifferent whether he gets A, B or C.
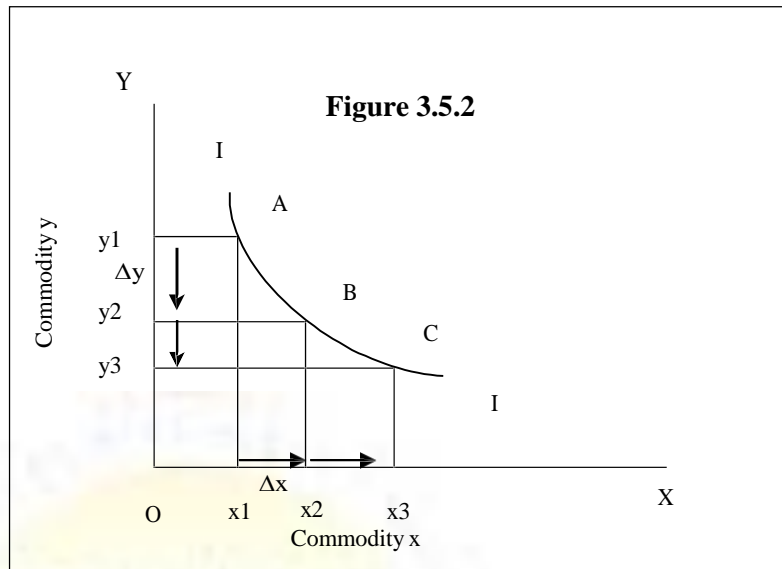
3.5.2 Indifference Curve

Indifference curve is an important tool of this approach. It has been defined differently by different economists.

According to Koutsoyiannis[1],

"An indifference curve is the locus of points or a locus of particular combinations of bundles of goods which gives the same level of utility to the consumer, so that he is indifferent as to the particular combinations he consumes".

---

[1] Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

Figure 3.5.2

Indifference curve implies a line which shows the different combinations of the commodities that give equal or same level of utility to the consumer. Since these combinations give the consumer same level of utility, therefore, the consumer would be indifferent as to the particular combination he consumes. Say if combination A shows ox1 amount of x and oy1 amount of y, combination B shows ox2 amount of x and oy2 amount of y, combination C shows ox3 amount of x and oy3 amount of y and combination D shows ox4 amount of x and oy4 amount of y. Out of all these combinations, A, B, and C gives the consumer same level of utility then he would be indifferent between these. Then whether he consumes A or B or C will not affect his rankings or his utility. Figure 3.5.2 shows the indifference curve II. On the horizontal axis we have commodity x and on the vertical axis we have commodity y. A, B and C show the different combinations of x and y commodities. Since these give same utility, therefore, the line joining these combinations is called as indifference curve.

Since, combination A and combination B in figure 3.5.2 lie on the same indifference curve II, therefore, utiltiy derived from A is equal to utility derived from B. In moving from A to B, the consumer is having more of x and less of y. If utilities are equal then the loss in utility should be equal to gain in utility.

Therefore, on the same indifference curve,

$$\text{loss in utility} = \text{gain in utlity}$$

50

$$\text{or, } (-)\Delta y. \ MU_y = \Delta x. \ MU_x,$$

$$\text{or, } (-)\Delta y \ / \ \Delta x = MU_x \ / \ MU_y,$$

for a small change in y and x

$$- \ dy/dx \ = \ MU_x \ / \ MU_y,$$

$$MRS_{xy} = - \ dy/dx = MU_x \ / \ MU_y$$

Where,　　　　　　　　　　$\Delta y =$ change in the utility of y,

$\Delta x =$ change in the utility of x,

$MU_x =$ Marginal utility of x,

$MU_y =$ Marginal utility of y,

$MRS_{xy} =$ Marginal rate of substitution of x for y.

Marginal rate of susbstitution of x for y is called as the slope of the indifference curve. It is defined as the number of units of commodity y to be given up for an extra unit of commodity x so that the consumer stays on the same indifference curve or so that the consumer maintains the same level of satisfaction.

Prof. Bilas said,

"The marginal rate of substitution of x for y is defined as the amount of y the consumer is just willing to give up to get one more unit of x and maintain the same level of satisfaction."[2]

Since the indifference curve is assumed to be convex to the origin, therefore, the marginal rate of substitution is negatively signed. Therefore, in convex indifference curve marginal rate of substitution is diminishing. Diminishing margainal rate of substitution of x for y implies thaat as we move from A to B to C, we go on substituting x for y but the amount of x required to be substituted for y goes on increasing.

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[2] Chopra, P.N. (1992), Micro Economic Theory and Welfare Economics, Kalyani Publishers, Ludhiana.

According to Koutsoyiannis,

" Marginal rate of substitution of x for y is defined as the number of units of commodity y that must be given up in exchange for an extra unit of commodity x so that the consumer maintains the same level of satisfaction"[3].

From the derivation given above, we can make out that although the indifference curve approach criticised the cardinal approach to the measurement of utility, yet deep down the concepts of indifference curves were also based on the concepts of cardinal utility anlaysis.
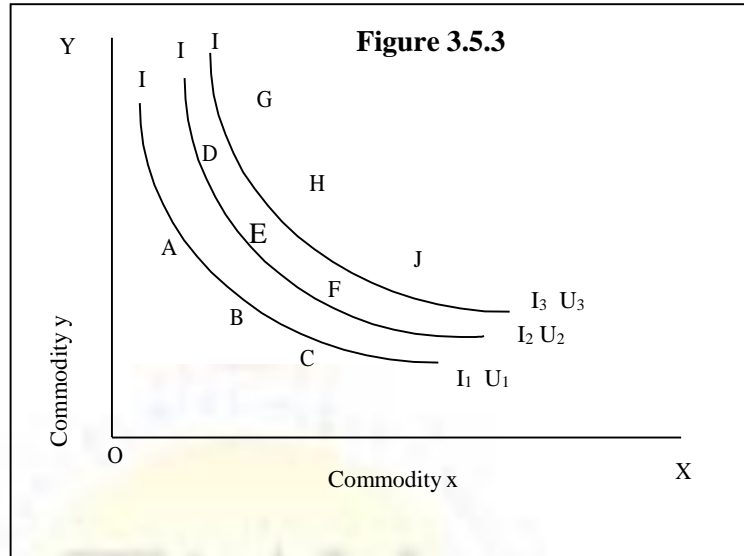
3.5.3 Indifference Map

When the consumer ranks his preferences graphically, it is called as indifference map. When the consumer is indifferent between the different combinations then he stays on the same indifference curve. But when he is prefering a particular combination over the other then he is moving to the higher indifference curve. This implies that when he is on the higher indiffference curve then he is getting higher utility as compared to the lower indifference curve. This can be explained with the help of figure 3.5.3. The figure shows three different indifference curves I I_1, I I_2 and I I_3. All these indifference curves show different levels of utiltiy. I I_1 shows the U_1 level of utility and I I_2 indifference curve shows U_2 level of utility. Likewise, I I_3 shows the U_3 level of utility. U_1 is less than U_2 and U_2 is less than U_3 level of utility, i.e.

$U_1 < U_2 < U_3$

Therefore, since combinations A, B and C gives him same utility level (U_1), the consumer is indifferent between them. Likewise combinations D, E and F gives him same level of utility (U_2) and so he is indifferent between them. Similarly, combinations G, H and J give him same level of utility so he would be indifferent between them. But between (A, B, C), (D,E,F) and (G, H, J) he is preferring first (G, H, J) then (D,E,F) and lastly (A, B,C). Thus, his rankings can be written as:

[3] Koutsoyiannis, A. (1979), op.cit.

Figure 3.5.3

1. G or H or J

2. D or E or F

3. A or B or C

This implies that as per his ranking he first wants to have any combination on I I_3 then any combination on I I_2 and then any combination on I I_1. This way he has ranked his preferences through indifference map. Hence, indifference map may be defined as the graphic representation of the preferences of the consumer through the indifference curves.

3.6 PROPERTIES OF INDIFFERENCE CURVES

Now, we shall discuss the properties of the indifference curves. These are given below:

1. **Indifference curve has negative slope:** Negative slope implies that if the quantities of one commodity decreases, then the quantity of the other commodity must increase, if the consumer is to stay on the same indifference curve. In figure

Figure 3.6.1
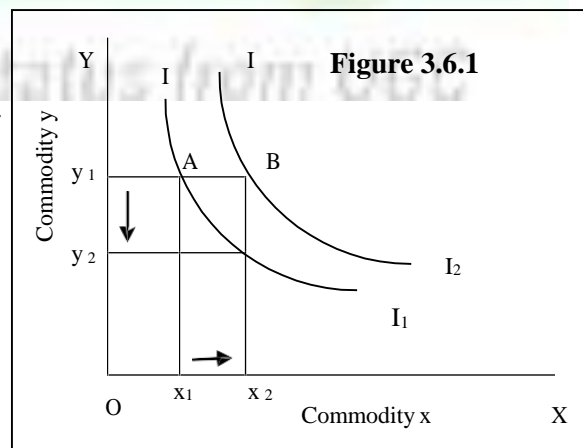
3.6.1, the consumer is originally on the indifference curve II_1 and he is consuming combination A which includes ox_1 amount of commodity x and oy_1 amount of commodity y. If now the consumer wants to have more of commodity x say ox_2 then he must reduce his consumption of y from oy_1 to oy_2 in order to remain on the same indifference curve otherwise he will move to a higher indifference curve II_2. Even when he keeps his consumption of y same and still increases the consumption of x to ox_2 then he will move to a higher utility level and on a higher indifference curve.

2. **Higher Indifference curve represents higher level of satisfaction:** The farther away from the origin an indifference curve lays, the higher the level of utility it denotes. This is because the consumer always wants to have maximum level of utility and thus, he always prefers to be on a higher indifference curve. In figure 3.5.3, consumer will always prefer to be at II_3 indifference curve and not II_2 and II_1 as it is giving maximum level of utility.

3. **Indifference curves do not intersect:** Indifference curves do not intersect with eachother. If they did, the point of their intersection would imply that one combination of commodities is giving two different levels of utilities. In figure 3.6.2 combination A lies on two different indifference curves which imply that it is denoting U1 level of utility as well as U2 level of utility, which is not possible.


Figure 3.6.2

54
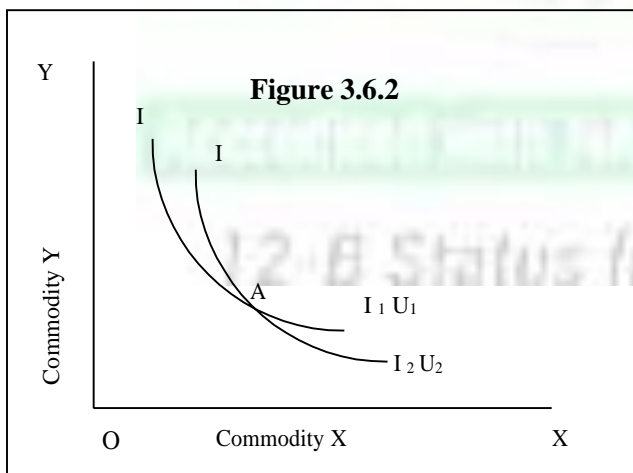
4. Indifference curves are convex to the origin:

Convexity implies that the marginal rate of substitution declines which is assumed to be so in the model. It also implies that the commodities are substitutes only up to some extent called as „somewhat substitutes". These goods can be substitutes but not perfectly. Figure 3.6.3 shows that x and y can be substituted between A and B but if we want to increase the consumption of one commodity beyond A and B then the consumption of the other increases. This indicates that the consumer has reached a point of satiety at A and B that is why beyond these points he needs more of Y in order to tolerate more of X.

5. Indifference curves may or may not be parallel:

Indifference curves need not to be parallel to one another. They may be parallel, they may not be parallel. They might come closer to one another but will never intersect because two different indifference curves should indicate two different levels of utilities. This is explained in figure 3.6.4.

Figure 3.6.3

Figure 3.6.4
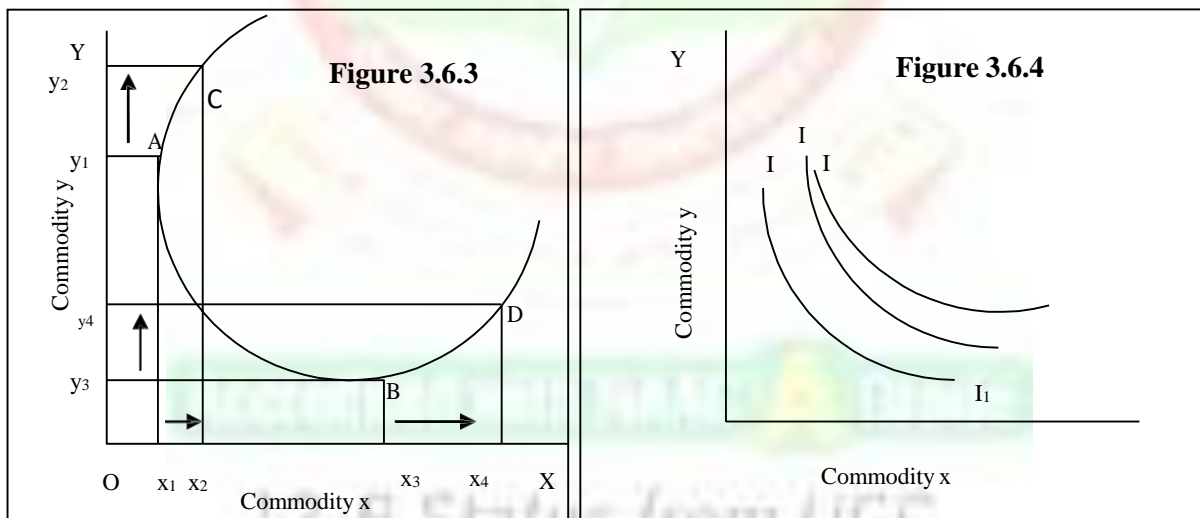
6.   Indifference curves do not touch the horizontal or vertical axis:

If the indifference curve touches either the horizontal or vertical axis then it implies that he is not consuming one commodity but this goes against the assumption. Also the analysis assumes somewhat substitutes and this kind of relationship can happen only in case of perfect substitutes.

Figure 3.6.7 quickly recalls the properties of indifference curves. In the next section we shall discuss the shapes of indifference curves.

Figure 3.6.7

3.7 SHAPES OF INDIFFERENCE CURVES

The indifference curves can be of the following types:

1. **Indifference curve in case of somewhat substitutes:**

   In case of somewhat substitutes, indifference curves are convex to the origin. In this case the marginal rate of substitution goes on diminishing. In this case as the consumption of

one commodity is increased the consumption of the other commodity must decrease in order to remain on the same indifference curve. This is explained in figure 3.6.1.

2. **Indifference curves in case of perfect substitutes:**

Perfect substitutes are those commodities which can be substituted for one another perfectly. These commodities are so perfect that there is no way by which we can distinguish between those commodities. In such commodities the marginal rate of substitution remains constant. The indifference curve will be a downward sloping straight line. As we move from A to B to C the substitution of x for y is taking place at the same rate (figure 3.7.1). In such cases one can spend the whole of his income on one commodity i.e. the indifference curves touches OX and OY axis.

3. **Indifference curves in case of complementary commodities:**

Complementary commodities are those which are consumed together as these goods complement each other. For example: car and petrol, pen and ink. Perfect complementary commodities are those which are required in a fixed amount with the other good. For example: pair of socks. In the case of complementary commodities, the marginal rate of substitution becomes zero as there is no substitution possible between the goods. Thus, indifference curve analysis breaks down. This is explained in figure 3.7.2.

Figure 3.7.1   Figure 3.7.2   Figure 3.7.3
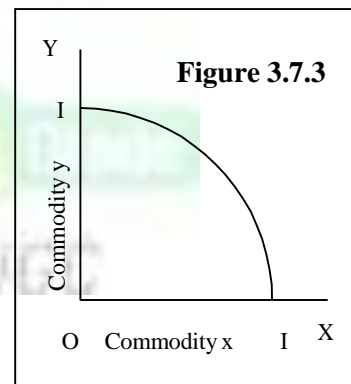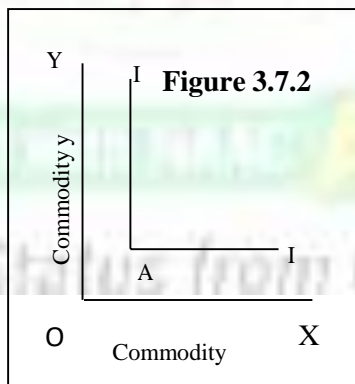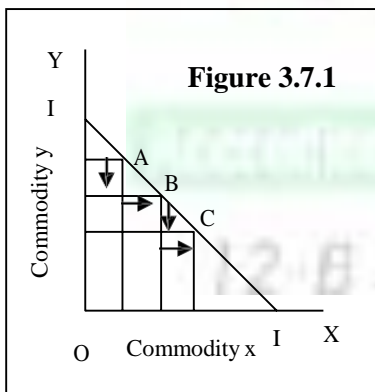
The figure shows that there is only one possible combination of x and y i.e. A.

4. Concave indifference curve:

Sometimes indifference curve can be concave to the origin. In this case marginal rate of substitution is decreasing. As we are moving on the indifference curve II we are substituting less and less of x for more and more of y.

3.8 PRICE LINE

The indifference curves show the preferences of the consumer and the objective of the consumer is to be on the highest possible indifference curve as it gives maximum utility. However, for attaining the equilibrium of the consumer we need to know the restrictions on the consumer in the form of his income and prices of the commodities which will then decide the choice of the combinations of the commodities and the respective utility derived from it. So we introduce the concept of price line. Price line is also called as the budget line or income line. Price line or the budget line shows the different combinations of two goods which a consumer can buy at the prevailing prices with his given income. If the total income is represented by Y, Px, P_y represents the prices of commodity x and commodity y and Q_x and Q_y represents quantities of commodity x and y bought. Then $P_x Q_x$ and $P_y Q_y$ shows the total expenditure incurred on the purchase of commodity x and y. Then a consumer has to equate his total income to this total expenditure. This can be written as,

$$Y = P_x Q_x + P_y Q_y$$

This is called as the price line or income constraint. AB is the price line in the figure 3.8.1. It divides the commodity space into attainable and unattainable combinations. Any combination beyond AB line is not attainable. Any point on the line or under the line is attainable. However, the inherent assumption in consumption theory is that the consumer is spending whole of his income. If the consumer


Figure 3.8.1

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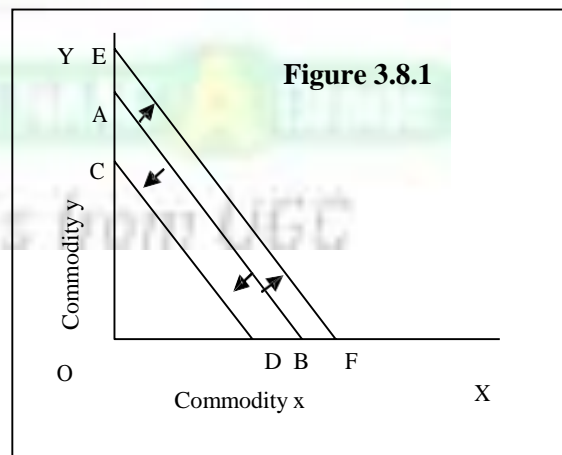
spends whole of his income on the purchase of commodity Y then with his income and the prices of the commodities he can have OA amount of y and if he spends whole of his income on commodity x then he can have OB amount of x. The slope of the price line is:

Slope of price line AB $= P_x / P_y$

3.9 CHANGES IN PRICE LINE

The price line or the budget line shifts with the changes in the income of the consumer and the prices of the commodities. These are discussed in detail below:

1. **Shifts in price line when income of the consumer changes:** If the prices of the commodities remain constant but the income of the consumer increases then it will cause a shift in the price line. The price line will shift in a parallel way because with the increase in his income he can buy more of both of his commodities. If the income increases then the price line will shift outwards to EF in figure 3.9.1. If the income of the consumer decreases then the price line shifts downward to CD in figure 3.9.1.

2. **Shifts in price line when prices of the commodities change:**

    a) **If the price of commodity x changes:** When the price of commodity x changes, price of commodity y and the income of the consumer remaining constant then the price line may shifts outwards and inwards (figure 3.9.1). If there is a fall in the price of x then the consumer can have more of commodity x. Therefore, the price line will shift outwards to AC from AB. When the price of commodity x rises then he will be forced to buy less of commodity x. Then the price line will shift inwards to AD from AB.

    b) **If the price of commodity y changes:** When the price of commodity y changes, price of commodity x and the income of the consumer remaining constant then the price line may shifts outwards and inwards. If there is a fall in the price of y then the price line will shift outwards to PR from PQ (figure 3.9.2). When the price of commodity y rises then the price line will shift inwards to PS from PQ.

Figure 3.9.1

Figure 3.9.2
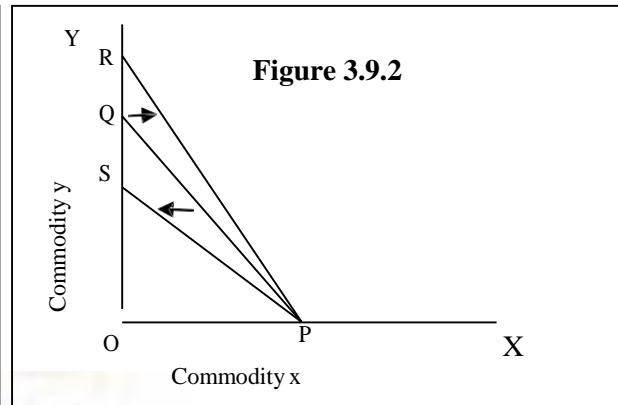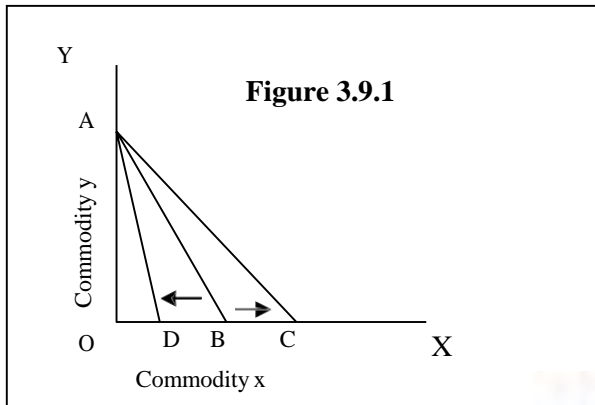
3.10 DERIVATION OF CONSUMER'S EQUILIBRIUM

Through the indifference map consumer has ranked his preferences. The objective of the consumer would be to be at the highest possible indifference curve. However, the attainment of this objective depends on the price line. Therefore, in order to know the consumer's equilibrium we superimpose the indifference map over the price line. Figure 3.10.1 shows the consumer's equilibrium. Given his price line he will try to be at the maximum possible indifference curve II_3. However, given his price constraint AB, II_3 is falling under the unattainable zone. II_2 is tangent to AB implying that he can have any combination on AB price line given his price line. The exact combination of goods is revealed by the point of tangency of indifference curve and price line i.e. e. Thus, the consumer would buy ox1 amount of commodity x and oy1 amount of commodity y. This also implies that equilibrium can be at any part of indifference curve. Thus, the following two conditions of equilibrium should be met:

1. Indifference curve must be tangent to the price line.

2. Indifference curve must be convex to the origin.

Mathematically, at the point of tangency the slope of indifference curve is equal to the slope of price line. This can be written as:

$$\textbf{Equilibrium} = MRS_{xy} = - dy / dx = Mu_x / MU_y = P_x / P_y$$

Figure 3.10.1
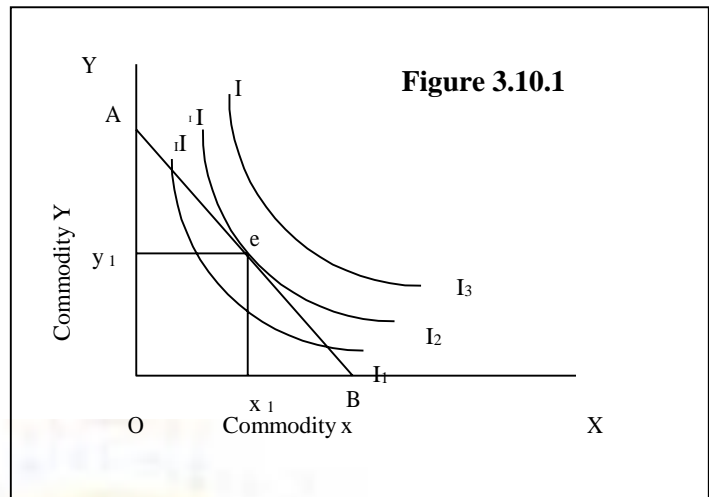
3.11 CHANGES IN THE CONSUMER'S EQUILIBRIUM

The equilibrium of the consumer changes with a change in the income or the prices of the commodities. These are discussed below:

1. **Changes in equilibrium due to the changes in income:**

   When the income of the consumer changes the price line shifts outwards or inwards as is explained in figure 3.8.1. This also affects the consumer's equilibrium. This is explained in figure 3.11.1. The consumer is originally on EF price line. When the income of the consumer increases the price line shifts outside to CD and then to AB. Consequently, the consumer's equilibrium point also changes from e to e_1 and then to e_2. The line which joins the different equilibrium points due to the shift in the price line due to changes in income is called as income consumption curve (YCC).

Figure 3.11.1
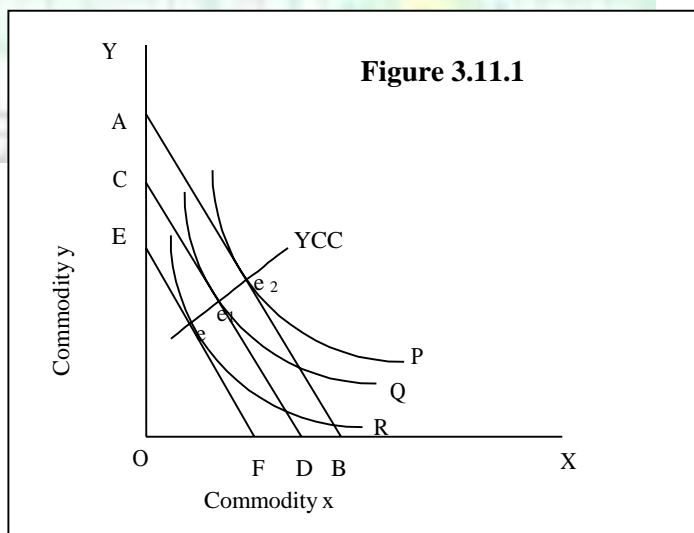
2. Changes in equilibrium due to changes in prices of the commodities:

When the prices of the commodities change the price line shifts outwards as is explained in figures 3.9.1 and 3.9.2. Consequently, the equilibrium also changes as is shown in figure 3.11.2a (e, e_1 and e_2). The curve which joins the different points of equilibrium of the consumer due to a change in the price of one commodity is called as price consumption curve (PCC).

Figure 3.11.2a

Figure 3.11.2b
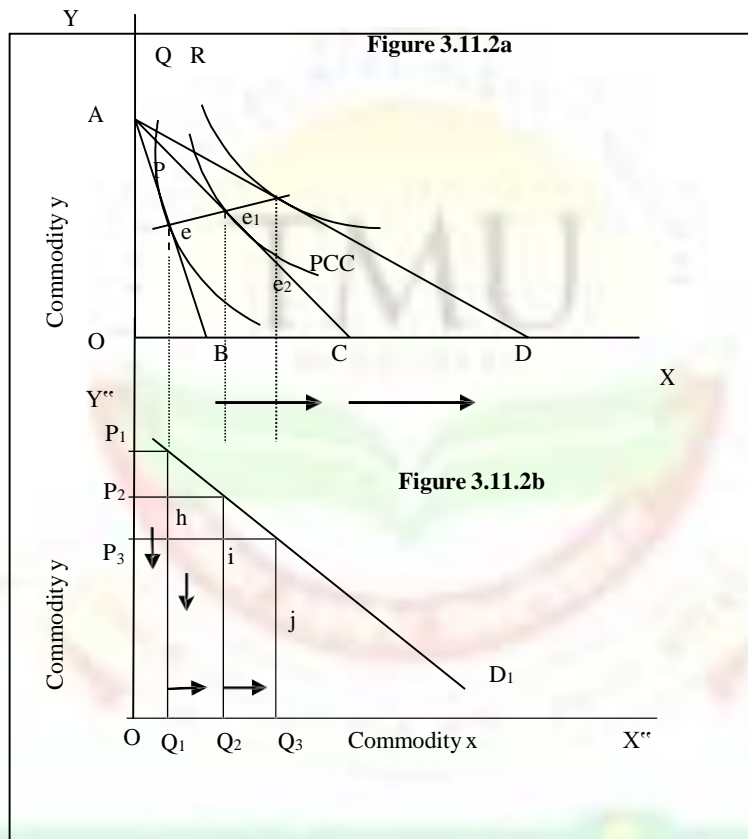
3.12 DERIVATION OF THE DEMAND CURVE

The superiority of the indifference curve over the cardinal utility approach can be proved completely with the derivation of the demand curve of the consumer for a particular commodity based on the ranking of the preferences. This is explained in the figure 3.11.2a and 3.11.2b. When the consumer is at equilibrium point e then he is consuming some amount of x and some amount of y at their respective prices. Let us derive the consumer"s demand curve for commodity x. It can be drawn by stretching the quantities of commodity x demanded by the consumer in the

lower part of the diagram. The consumer is buying OQ_1 amount of commodity x at a relatively higher price say OP_1. This can be drawn in the lower part of the diagram by assuming some price which is relatively higher than others. Then with the fall in the prices of x to say OP_2, the quantity demanded of x increases to OQ_2. When the prices fall further to say OP_3 then the quantity demanded of x increases further to OQ_3. Thus, the demand curve D_1 can be drawn by joining points h, i and j. Thus, the indifference curve approach shows the derivation of the demand curve of the consumer with the help of ranking of his preferences.

3.13 COMPARISON OF CARDINAL UTILITY APPROACH AND INDIFFERENCE CURVE APPROACH

Similarities

1. The cardinal utility approach is criticized by Hicks on grounds of cardinal measure of utility which asked the consumer how much utility the consumer derived from the consumption of a commodity. However, Hicks indifference curve approach itself is based on the concepts of cardinal utility as marginal rate of substitution is dependent on marginal utility i.e.

$$MRS_{xy} = - \, dy \, / \, dx = Mu_x \, / \, MU_y$$

2. Secondly both the approaches are based on the assumption of rationality.

Differences

1. Indifference curve approach is better as it is based on the ordinal measurement of utility. However, cardinal utility approach is based on the cardinal measurement of utility.

2. Indifference curve approach seems more realistic as it asks the consumer to rank his preferences as per the utilities derived from the commodities. It does not ask the consumer how much utility is derived from the consumption of a commodity. It just asks for his order of preferences. However, cardinal utility approach is not realistic as it asks the consumer how much utility is derived from a particular commodity.

3. Indifference curve approach establishes the existence of law of demand through the indifference curves. However, in the cardinal utility approach, the law of demand is based on the diminishing marginal utility which was just based on the psychological law.

4. The indifference curve approach explains the case for inferior and giffen commodities through the indifference curves. However, cardinal approach does not explain it in a proper way.

3.14 CRITICISM

1. **Old wine in a new bottle:**

   Critics call indifference curve approach as just an old wine in a new bottle. This criticism is based on the hidden dependence of the indifference curve approach on the concept of marginal utility. It just represents the same concept in just a new and different way.

2. **Effects of advertising, tastes, habits are not covered:**

   The indifference curve approach does not study the impact of advertising on the ranking of the preferences of the consumer. It also does not explore the impact of changes in the order of preferences due to changes in tastes and habits of the consumer.

3. **Diminishing marginal rate of substitution:**

   Hicks and Allen have explained the convexity of indifference curve on the basis of diminishing marginal rate of substitution. However, it does not establish the reasons for the convexity of the indifference curve. It is just assumed to be so. This has become a major attack against the approach.

4. **Complete knowledge of preferences:**

   This approach assumes that the consumer has complete knowledge about his ranking of preferences. However, many a times the consumer is not able to rank the commodities as per the utilities derived from it.

5. **The indifference curve analysis becomes highly technical in more than three commodities:**

The indifference curve analysis is easier to handle when we are considering just two commodities. However, if we consider more than two commodities then the analysis becomes more technical and highly complicated.
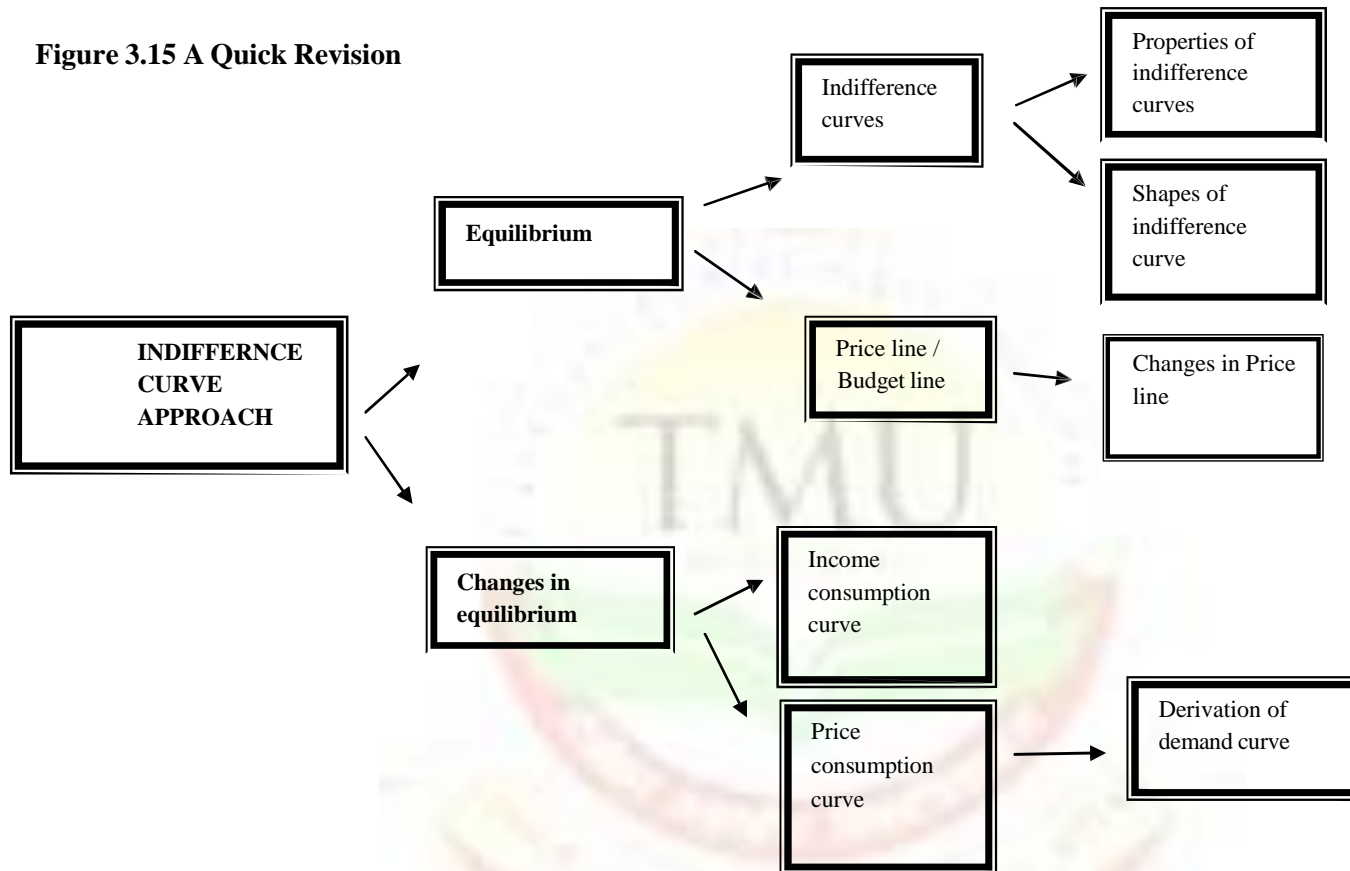
Thus, though indifference curve approach has its weaknesses but it is credited for establishing the ordinal utility approach.

3.15 A QUICK REVISION

Figure 3.15 quickly sums up the chapter.

Figure 3.15 A Quick Revision

3.16 KEYWORDS:

Cardinal measurement of utility, ordinal approach, indifference, preference, two commodities, indifference curve, marginal rate of substitution, properties, shapes, price line, slope, equilibrium, income consumption curve, price consumption curve, derivation of demand curve.

3.17 ASSESS YOUR PERFORMANCE

Short questions

Q.1 Who popularized the indifference curve approach?

➢ R.G.D.Allen and J.R.Hicks.

Q.2 What is the meaning of indifference in indifference curve approach?

➢ Indifference implies that the consumer is getting same level of utility from two combinations of commodities. So he is indifferent between the two.

Q.3 What are indifference curves?

➢ Indifference curves are the locus of points of combinations of commodities that give the same level of utility to the consumer so that he is indifferent as to the particular combinations he chooses.

Q.4 What is price line?

➢ Price line or the budget line shows the different combinations of two goods which a consumer can buy at the prevailing prices with his given income.

Q.5 What is marginal rate of substitution of x for y?

➢ Marginal rate of substitution of x for y is defined as the number of units of commodity y to be given up for an extra unit of commodity x so that the consumer stays on the same indifference curve.

Long Questions

Q.1 What are indifference curves? Discuss their properties.

Q.2 Discuss the indifference curve approach. Explain how this approach is better than the cardinal approach.

Q.3 Indifference curve is an old wine in a new bottle. Discuss.

Q.4 Critically explain how a consumer attains equilibrium through indifference curve approach.

Q.5. Discuss the different shapes of indifference curves and price line.

3.18 Suggested Readings

Ahuja, H.L. (1980), Modern Economics, S.Chand and Company Limited, New Delhi.

Koutosoyiannis, A. (1979), Modern Microeconomics, Macmillan press limited, London.

Dwivedi, D.N. (2003), Microeconomics Theory and Applications, Pearson education Limited, Delhi.

Ryan, W.J.L. (1958), Price Theory, Macmillan Press Limited, London.

Law of Demand

4.1 OBJECTIVES OF THE CHAPTER

This chapter sets to apprise the readers with the basic and fundamental law of economics i.e. the law of demand. The chapter firstly explains all the basic concepts needed to be understood before studying the law. Then the readers shall be briefed about the law. In the end the readers are also introduced to the concepts of elasticity of demand.

4.2 BASIC CONCEPTS USED IN THE DEMAND ANALYSIS

Given below are the different concepts that should be understood well before reading the law of demand:

1) **Desire:**

   Desire implies that a person intends to buy a particular commodity but he does not have the enough money to buy it. For example: when you wish to have a house of 1 crore though your income is just Rs. 10,000.

2) **Want:**

   Want refers to a situation when you desire to buy a commodity and you have enough money to buy it but you do not have the willingness to part with your money i.e. the person has the capacity to buy the commodity but is not willing to spend his money on the purchase of that commodity. For example: a person whose salary is more than Rs. 3 lakhs per month has the desire and the capacity (other things remaining constant) to buy a house in a normal locality but he does not want to do so as may be, he wants to meet some other more pressing demand like the education of his children in some foreign university.

   So the difference between desire and want is that in the case of the former the person does not have the capacity to buy a commodity but in latter the person has the capacity to buy a commodity but does not have the willingness to buy that commodity.

3) **Demand:**

   Demand is the quantity of good and service which an individual or a group desires and is willing to have at the current prices. This implies that in the case of demand two elements must be present:

   Firstly, the capacity to buy a commodity i.e. one should have the money to buy a commodity.

   Secondly, the willingness to part with the money i.e. one should be ready to spend money on the purchase of that commodity.

   In the definition of demand the term „current price" is very important. Demand is always at a particular price as if there is any change in the prices of the commodities the demand may or not may not be there. For example: when the price of the commodity x was Rs. 20 the consumer A demanded 2 units of that commodity but when the price of that commodity x increased to say Rs. 40 then the demand of the consumer fell down to zero. So, the consumer may be demanding a particular commodity only at a particular price.

Desire	**Want**	**Demand**
↓	↓	↓
No capacity to buy a commodity	Capacity to buy a commodity but no willingness to spend money	Capacity to buy a commodity and willingness to spend money
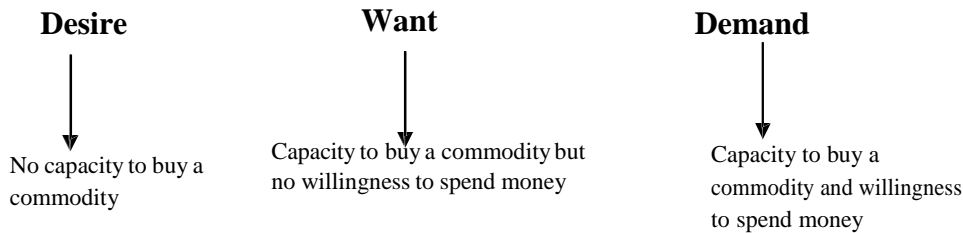
4) Aggregate Demand

Aggregate demand is the total demand of the economy for a particular commodity at current prices at a given time. This can be explained with the help of an example: the total demand of an economy for commodity x at a particular price say Rs. 20 per unit in the year 2013. Aggregate demand is also called as total demand for commodity x. it can be divided into two types of demand:

➢ Final demand: Final demand implies the total demand for final commodity x. Final goods are those which are meant for final consumption. These are not then used as intermediate goods. Final demand can be divided into:

- Demand for consumer products: Consumer products include consumer durables and consumer non-durable products. Durables are those which can be kept for longer period of time for example: refrigerators, air-conditioners, etc. Consumer non-durables are those which cannot be kept for longer period of time, for example: food.

- Demand for investment products: Investment goods are the goods that are demanded for real investment like machineries, tools equipments, etc. The demand for investment goods is also called as demand for producers goods.

➢ Intermediate demand: demand for intermediate goods is the demand for those goods which are the output of one commodity but used as inputs in other industry. For example: tyres are the product of tyre industry but these are used as inputs in car industry. So tyres are intermediate products and the demand for the same is called as demand for intermediate products.

5) **Effective Demand**

   Effective demand may be defined as the demand for goods and services of the total economy backed by actual payment at current prices at a given time i.e. aggregate demand backed by actual payment.

6) **Autonomous demand**

   Autonomous demand is also called as direct demand. Autonomous demand is that demand which has not been created by the demand for some other commodity. This implies that such demand is required directly to satisfy human wants. Thus, this is not a byproduct of some other demand. This can be explained as: demand for food, house etc.

7) **Derived demand**

   Derived demand as the name suggests, is derived from the demands for some other products. Thus, such a demand is dependent upon the demand for other products. Derived demand is required to fulfill the attainment of some other demand. Derived demand does not directly satisfy the human wants. For example: though demand for a house is a direct demand but in order to fulfill that demand, demand for bricks, cement, iron, wood etc also props up. This type of demand for bricks, cement, iron, wood etc is called as derived demand. In fact, the demand for producer"s goods or investment goods is derived demand.

8) **Concept of market**

   Market can be classified on the basis of total consumers or total firms. From the side of the consumers, it can be defined as, the sum total of the demand of all the consumers for a particular product say x. Thus, market for product y would imply the demand for y from all the consumers of the same commodity.

9) **Essential goods**

   Essential goods or commodities are those goods that are required for the sustenance of every man. This includes commodities like food, vegetables, oil, minimum clothing, footwear etc. These are also called as necessities as these are a must for the survival of humans.

10) **Normal goods**

   Normal goods or commodities are those goods whose demand increases with the increase in income of the consumer.

11) Luxuries

Luxuries are those commodities whose demand increases with the increase in the prices of the commodities. These includes: cars, house in a posh area, diamond watches etc.

12) Substitutes

These are those commodities that can be used in place of one another. Like tea and coffee, coke and pepsi etc.

13) Complementary goods

These are those goods that are to be used together always or are used in a fixed proportion. For example: car and petrol, pen and ink, etc.

4.3 INTRODUCTION

Demand and supply are the two central pillars of the equilibrium in markets. Demand is the amounts of a commodity that a consumer will prefer to buy at different prices at a particular period of time.

According to Prof. Benham,

"The demand for a particular good is the amount of it which will be bought per unit of time at that price"[1].

In this definition Professor Benham has clearly stressed that demand for a commodity is always in relation to its price and a particular time. The purpose of the theory of demand is to determine the various factors that affect demand. Such a relationship is also called as the law of demand. It is the fundamental law of economics. It is central to the determination of equilibrium in markets. It explains the behavior of the consumers or to be more precise, the law of demand explains the preferences of the consumer for a particular commodity at different prices of that vary commodity keeping other things constant.

4.4 DEMAND FUNCTION

The traditional theory of demand assumes that the demand of a commodity is determined by its own price, prices of the other commodities, consumer‟s income, consumer‟s tastes and

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[1] Satija, Kalpana, (2009), Textbook on Economics for Law Students, Universal Law Publishing Company.

preferences. Under this the only the final consumer's demand for durables and non-durables are covered.

According to Koutsoyiannis,

"Demand is a multivariate relationship, that is, it is determined by many factors simultaneously"[2].

Thus, the demand function can be written as,

$$D_x = f (P_x, P_r, Y, T)$$

Where, D_x = demand for commodity x,

P_x = price of commodity x,

P_r = prices of the related commodities,

Y = income of the consumer,

T = tastes and preferences of the consumer.

Demand function implies a technical relationship between the quantity demanded of a commodity and the factors affecting the same. Demand function implies that the demand for a particular commodity x is dependent on its own price, prices of other commodities, consumer's income and the tastes and preferences of the consumer.

4.5 LAW OF DEMAND

If the prices of other commodities, consumer's income and tastes and preferences do not change then the demand function can be rewritten as,

$$D_x = f (P_x), \quad \text{ceteris paribus}$$

This implies that the demand for a commodity is dependent on its own price, other factors affecting demand remaining constant (ceteris paribus). Law of demand explains the relationship between the demand for a commodity and its own price other things remaining constant. Thus, the law of demand states that the quantity desired to be purchased per unit of time will be

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[2] Koutsoyiannis,A.(1979), Modern Microeconomics, Macmillan Press Limited.

greater, the lower the price ceteris paribus. This implies that with a fall in the price of a commodity the quantity demanded of that commodity increases and with a rise in the price of a commodity the quantity demanded of that commodity decreases other things remaining constant. Thus, the law of demand shows the inverse relationship between quantity demanded of a commodity and its price.

According to Professor Samuelson,

"Law of demand states that people will buy more at lower price and buy less at higher prices, other things remaining the same."[3]

According to Ferguson,

"According to the law of demand, the quantity demanded varies inversely with price".[4]

4.6 ASSUMPTIONS

Given below are some of the assumptions that must be fulfilled:

1) There should be perfect competition in the market.
2) There should be no change in the income of the consumers.
3) There should be no change in the tastes and preferences of the consumer.
4) Prices of the related commodities should remain constant.
5) The size of the population should be held constant.
6) The expectations of the consumers should remain constant.
7) All the units of the commodity under consideration should be of the same size and quality.

4.7 EXPLANANTION OF THE LAW

Law of demand says that there is inverse relationship between quantity demanded of a commodity and its price. When the price of commodity, say x, increases, quantity demanded for

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[3] Satija, Kalpana, (2009), op.cit.
[4] Ibid.

x decreases. When the price of x decreases the quantity demanded for x increases. However, this does not imply that the relationship is not proportional. This means that it will not happen that if price of x has fallen by 5 per cent then the quantity demanded for that commodity will also increase by 5 per cent. The rise or fall in the quantity demanded of x can be greater or less than or equal to 5 per cent. Thus, the law of demand simply states the changes in the quantity demanded of x as a result of a change in its price but how much change will occur will depend upon the nature of the commodities. The law can be explained in detail with the help of the demand schedule and demand curve.

4.7.1 Demand Schedule

4.7.1.1 Individual Demand Schedule

The tabular representation of the law of demand is called as demand schedule. Table 4.7.1.1 shows the law of demand in the form of a table. In this table the quantities demanded of x by consumer A at the different levels of prices is given. It is revealed in the table that as the price of x increases from 1 to 4, the quantity demanded of x decreases from 15 to 7 units of x, other things being held constant.

Table 4.7.1.1 Individual Demand Schedule

Price per Unit of x(Rs)	Quantity Demanded of x
1	15
2	10
3	8
4	7

4.7.1.2 Market Demand Schedule

The market demand is the summation of the demands of the different consumers for a particular product at the different levels of prices of that product. The market demand schedule is the tabular representation of the demands of all the consumers in market for a commodity say x at the varying prices of x. Table 4.7.1.2 shows the market demand schedule for commodity x. There

are two consumers in the market for buying x. The schedule shows that both the consumers reduce their demand for commodity x at the different levels of prices of x.

**Table 4.7.1.2 Market Demand Schedule**

Price per Unit of x(Rs)	Quantity Demanded of x by A	Quantity Demanded of x by B	Market Demand of x (A+B)
1	10	15	25
2	6	10	16
3	4	8	12
4	1	7	8

4.7.2 Demand Curve

4.7.2.1 Individual Demand Curve

Demand curve shows the different quantities of x that will be bought by a consumer at different prices graphically. Individual demand curve shows the demand curve of individual consumer. It shows the inverse relationship between quantity demanded of x by consumer say A at the different prices of x graphically. Figure 4.7.2.1a shows the individual demand curve of consumer A. The figure shows the D1 as the demand curve of consumer A. The curve shows that as the price of x falls from Op1 to Op2 the quantity demanded of x increases from Oq1 to Oq2. Likewise figure 4.7.2.1b shows the demand curve of consumer B.

Figure 4.7 .2.1a Consumer A

Figure 4.7.2.1b Consumer B

Figure 4.7.2.2 Market Demand Curve
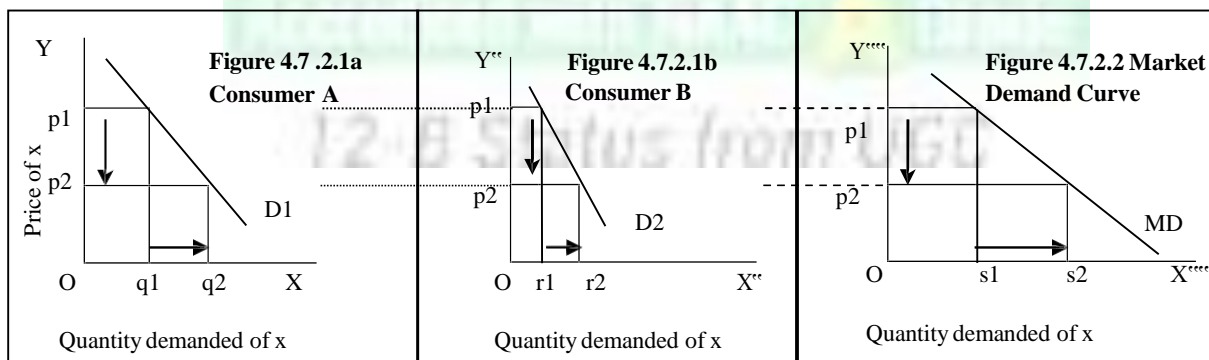
According to R.Bilas,

"The demand curve is a locus of points each representing the maximum rate of purchase at an associated price ceteris paribus i.e. the demand curve is simply a border line. Everything beneath the curve is possible and anything above the line is not possible, given the conditions of demand. At given prices one will always be willing to take smaller amounts if smaller amounts are all that one can get, but one cannot be induced to take more than those quantities shown by the demand curve. The demand curve also shows maximum prices which will be paid for different quantities per unit of time."[5]

The shape of the demand curve is downward sloping from left to right. It has a negative slope. Negative slope implies that the price of that commodity must be reduced if the consumer is to be induced to buy or demand more. The rise in the quantity demanded due to a fall in price is called as extension in demand and the fall in the quantity demanded due to a rise in prices is called as contraction in demand. In extension and contraction in demand the consumer moves along the same demand curve. Thus, these are also called as movements along the demand curve.

4.7.2.2 Market Demand Curve

Market demand curve is the graphic summation of the quantities demanded of a commodity by all the consumers in the market at the different prices of that commodity. It is drawn by graphically summing up the demand curves of all the consumers in the market. Let us say that there are two consumers say A and B in the market. The market demand curve shall be the summation of the individual demand curves of A and B. This is revealed in figure 4.7.2.2. The market demand curve (MD) is the horizontal summation of the demand curves of A and B. It shows that the total market demand for commodity x is inversely related with the price of commodity x.

4.8 REASONS FOR THE NEGATIVE SLOPE OF THE DEMAND CURVE

The demand curve slopes downward from left to right i.e. its slope is negative. The reasons for its negative slope are explained below in detail:

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[5] Bilas, R., (1971), Microeconomic Theory, Mc-Graw hill, New York.

1) **Law of diminishing marginal utility:** The law of diminishing marginal utility states that as the consumer goes on consuming more and more units of a commodity then the additional benefit that the consumer derives from it goes on decreasing. So if the consumer is to be motivated to buy more units of that commodity then its price must be reduced because the additional utility that he derives is less than the original price.

2) **Break up of price effect:** Price effect is the change in the quantity demanded of a commodity due to a change in its price. This happens because the total price effect includes income effect and substitution effect.

   Price Effect = Income effect + Substitution effect

   a)   Income effect can be explained with the help of an example. Let us say that consumer A has total income equals to Rs. 10 and the price per unit of x is also Rs. 10. Then A would be buying 1 unit of x. Now, if the price of x falls to Rs. 5. If he continues to buy 1 unit of x then he can have excess of Rs. 5. This is a sort of an increase in his real income (Rs. 10 + Rs. 5 = Rs. 15). Now, if we impose the condition of no savings then with this increased income he can now buy more of x i. e. 1 more unit of x. This additional unit of x that he consumes is due to income effect.

   b) Substitution effect implies that when two commodities that are under consideration are substitutes, for example, tea and coffee. If the price of tea remains constant and the price of coffee falls then people will switch over from tea to coffee. As a result price of tea remaining constant quantity demanded of tea decreases. Thus, in substitution effect the consumer substitutes cheaper good to the expensive good.

3) **Different uses of a commodity:** If a commodity has many uses then the quantity demanded for that commodity will automatically fall. For example, rice is used for many purposes like boiled rice, kheer, idli etc. If the price of rice increases then a rational consumer will cut down his demand for rice.

4.9 EXCEPTIONS TO THE LAW OF DEMAND

Exceptions to the law of demand mean the situations where the law of demand does not apply. Usually, whenever, the price of a commodity increases then the quantity demanded of that

commodity falls. However, sometimes, with the rise in the price of a commodity, the quantity demanded increases rather than decreasing. Thus, the law of demand fails in some situations. In such a situation the demand curve will be upward sloping. These are discussed below:

1) **Rare and expensive things:** The law of demand does not apply in case of rare and expensive commodities. Rare and expensive commodities include diamonds, gold, antique furniture, expensive paintings etc. The demand for these commodities increases with an increase in their price. People prefer to have more and more of such commodities when their prices are increasing.

2) **Giffen goods:** Robert Giffen had put forward commodity called as giffen goods. Broadly goods are classified into normal, inferior and giffen goods. Normal goods are those goods whose demand increases as the income of the consumer increases. For example: good quality shirt, ghee, wheat etc. Inferior commodities are those commodities whose demand decreases as the income of the consumer increases. For example poor quality shirt, dalda, bajra etc. However, giffen goods are inferior goods i.e. as the income of the consumer increases he will have less of this commodity but as the price of that commodity increases the consumer will be forced to have more of that commodity, given his income and other constraints. Such a commodity will then be called as giffen good.

3) **Ignorance:** The law of demand also fails in situations when the consumer is ignorant. Such a consumer will continue to buy more of a commodity even at higher prices or less of that commodity even at lower prices.

4) **Less calculative consumer:** This law fails in situations wherein though the consumer is not ignorant but is not so calculative that every time the price of a commodity decreases, he will increase the demand for that commodity. This happens because the decision to buy a particular commodity is not only dependent on its price but also on the tastes, habits and preferences of the consumers.

5) **Expectations about the future prices of a commodity:** This law is not applicable in situations where the expectations about the future prices of a commodity are very dominant. For example, if today, there is an expectation that the prices of petrol might increase tomorrow then today many consumers would rush to get petrol filled at today‟s prices. This will lead to a rise in demand of petrol at today‟s prices. Likewise, if there is a negative expectation about the market situation then the consumers would not be willing

to buy a commodity even at reduced prices today. Because in this case the consumers would be unsure about the future.

6) **Emergencies:** This law does not apply when there are emergent situations. In such cases despite the fact that the price of a commodity is very high still the consumer would buy the commodity. Thus, in case of emergencies this law does not apply.

4.10 SHIFTS IN DEMAND CURVE

Due to the changes in the other factors remaining constant the demand curve of a commodity undergoes a shift. As a result these factors are called as shift factors. This implies that whenever there is a change in the prices of the related commodities, income of the consumer, tastes, habits and preferences of the consumer (price of that commodity remaining constant) then the demand curve will shift either inwards or outwards. These factors and their impact on the demand curve are discussed in detail below:

1) **When prices of the related commodities change:**

In this case the demand function can be written as:

$D_x = f(P_r) \overline{_{Px, Y, T}}$

i.e. the consumer's demand for commodity x is dependent on the prices of the related commodities other things remaining constant. Related commodities are those commodities which are either substitutes of the original commodity (x) or are complementary to the original commodity (x). Substitute goods are those goods which can be used in place of one other like coke and pepsi. When the price of coke remains constant but the price of pepsi falls then the demand for pepsi shall increase as a result there will be a decline in the demand for coke. Thus, the demand curve will shift downwards and there will be a decrease in demand. This is explained graphically in figure 4.10.1
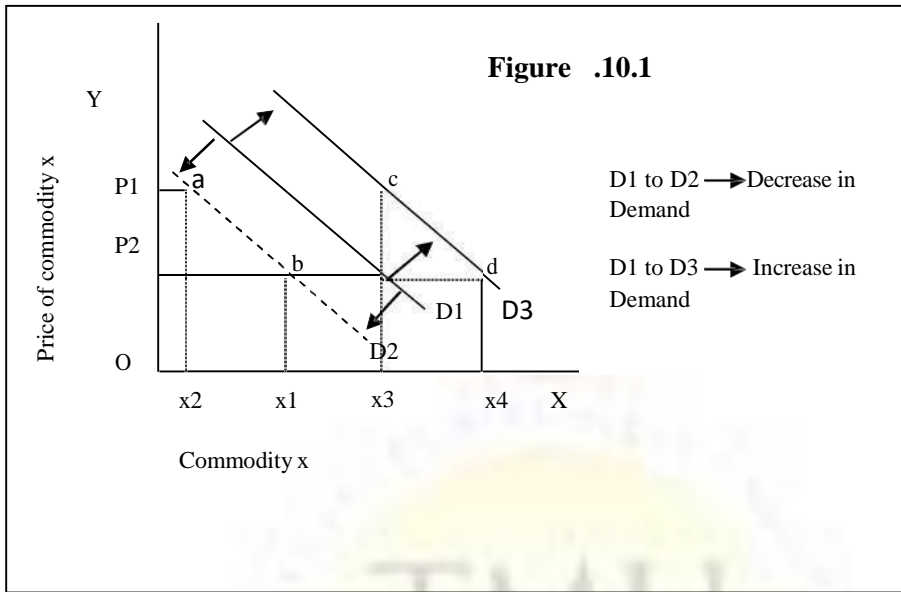
Figure .10.1

Figure 4.10.1 shows that the original demand curve is D1. When the price of x remains constant at OP1then if the price of its substitute decreases then it will become a cheaper commodity. Then people will substitute cheaper commodity to the expensive one. As a result the demand for commodity x will fall even though its own price has remained constant at OP1. Thus, the consumer would move to point a. Likewise, we can get point b. If we join a and b then we get the new demand curve D2. This is the downward shift in the demand curve. It is called as the decrease in demand.

When the price of the original commodity remains constant but the price of the substitute increases then the consumer will increase the demand for the original commodity as it will be relatively cheaper. Therefore, the consumer will move from point a to point c and likewise to point d. If we join point c and d then we will get a new demand curve D3. This shows the upward shift in the demand curve. This is also called as increase in demand.

Likewise, when we consider the case of complementary commodities, there will be a shift in the demand curve. In case of complementary commodities, both the commodities are needed together. Let us say, we consider commodities x and y and commodity x is the commodity under consideration. If the price of x remains constant but the price of y falls then the consumer will buy more of y and he will then be forced to have more of x also. So the consumer will shift to the new demand curve D3. Likewise, if the price of x

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remains constant but the price of y increases then the consumer will reduce the purchase of y which will also cut down his demand for x. This is so because both x and y are needed together. Therefore, the consumer will shift to a lower demand curve i.e. D2.

2) **Changes in the income of the consumer:**

In this case the demand function can be written as,

$$D_x = f\ (Y)\overline{Px,Pr,T}$$

This implies that demand for commodity x is a function of the income of the consumer while the price of commodity x, prices of the related commodities and tastes remain constant. When the price of x remains constant and the income of the consumer increases and if x is a normal commodity then the demand for commodity x will increase. As a result the consumer will move to a new demand curve D3 from D1 (figure 4.10.1). Likewise when the price of a commodity x remains constant but the income of the consumer decreases then the demand for commodity x will decrease. Then the consumer will shift from D1 to D2.
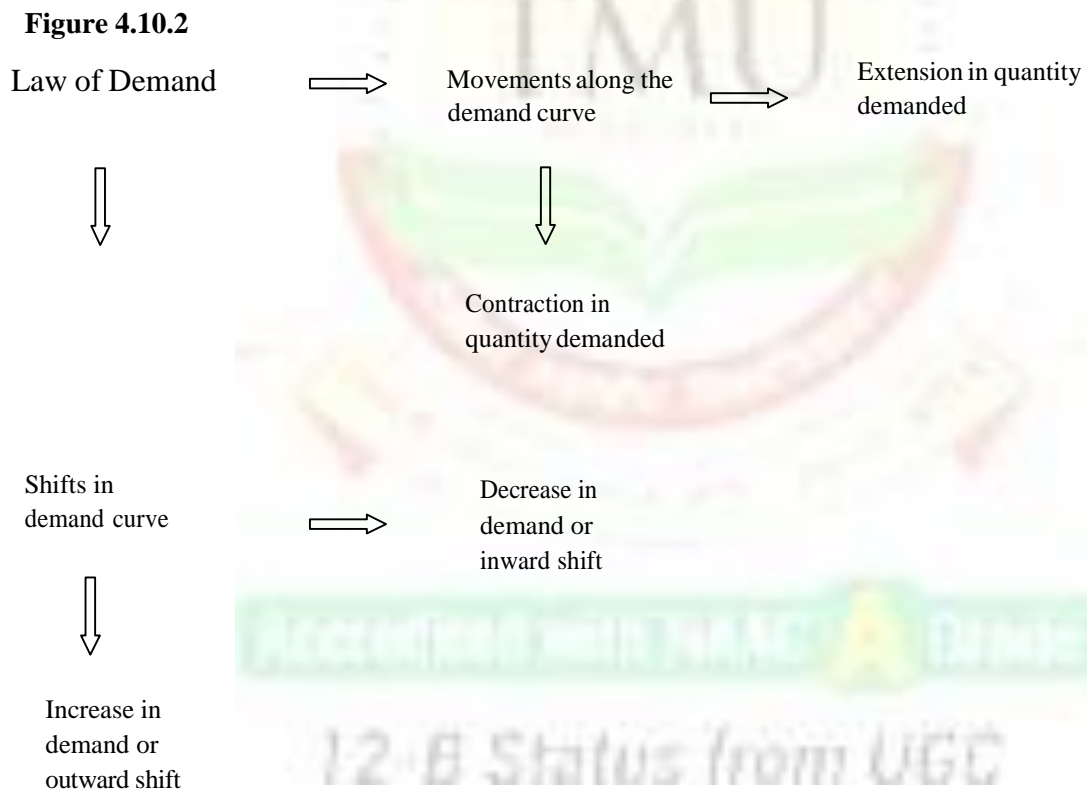
3) **Changes in tastes, habits and preferences of the consumers**

Whenever, the tastes, habits and preferences of the consumer changes the demand curve will also shift. Then the demand function can be written as,

$$D_x = f\ (T)\ \overline{Px,Pr,Y}$$

Thus, the demand for commodity x is a function of the tastes, preferences and habits of the consumer when other variables affecting the demand for x have remained constant. Graphically it is revealed in figure 4.10.1. when the price of x has remained constant but the taste of the consumer changes in favour of x then the demand for commodity x will increase and the consumer will move to a new demand curve i.e. D3. Thus, there will be an outward shift in the demand curve. Likewise, when there will be a change in the taste of the consumer against commodity x then the demand for commodity x will fall though the price of x remains constant. Thus, the demand curve will shift inwards and the consumer will move to D2 demand curve from D1.

Sometimes, shifts in demand curve are confused with the movements along the same demand curve. However, whenever the quantity demanded of commodity x changes due to a change in its own price (other factors remaining constant) then the consumer moves along the same demand curve. There is an extension or contraction in demand. But when the demand of a commodity changes due to a change in „other factors", price of x remaining constant, then the consumer shifts to a new demand curve. This shift can be inwards or outwards leading to a decrease or increase in demand respectively. This is explained in figure 4.10.2.

Figure 4.10.2

Law of Demand ⟹ Movements along the demand curve ⟹ Extension in quantity demanded

⇓ ⇓

Contraction in quantity demanded

Shifts in demand curve ⟹ Decrease in demand or inward shift

⇓

Increase in demand or outward shift

4.11 A QUICK REVISION

The figure given below summarizes the chapter.

Figure 4.11 A Quick Revision
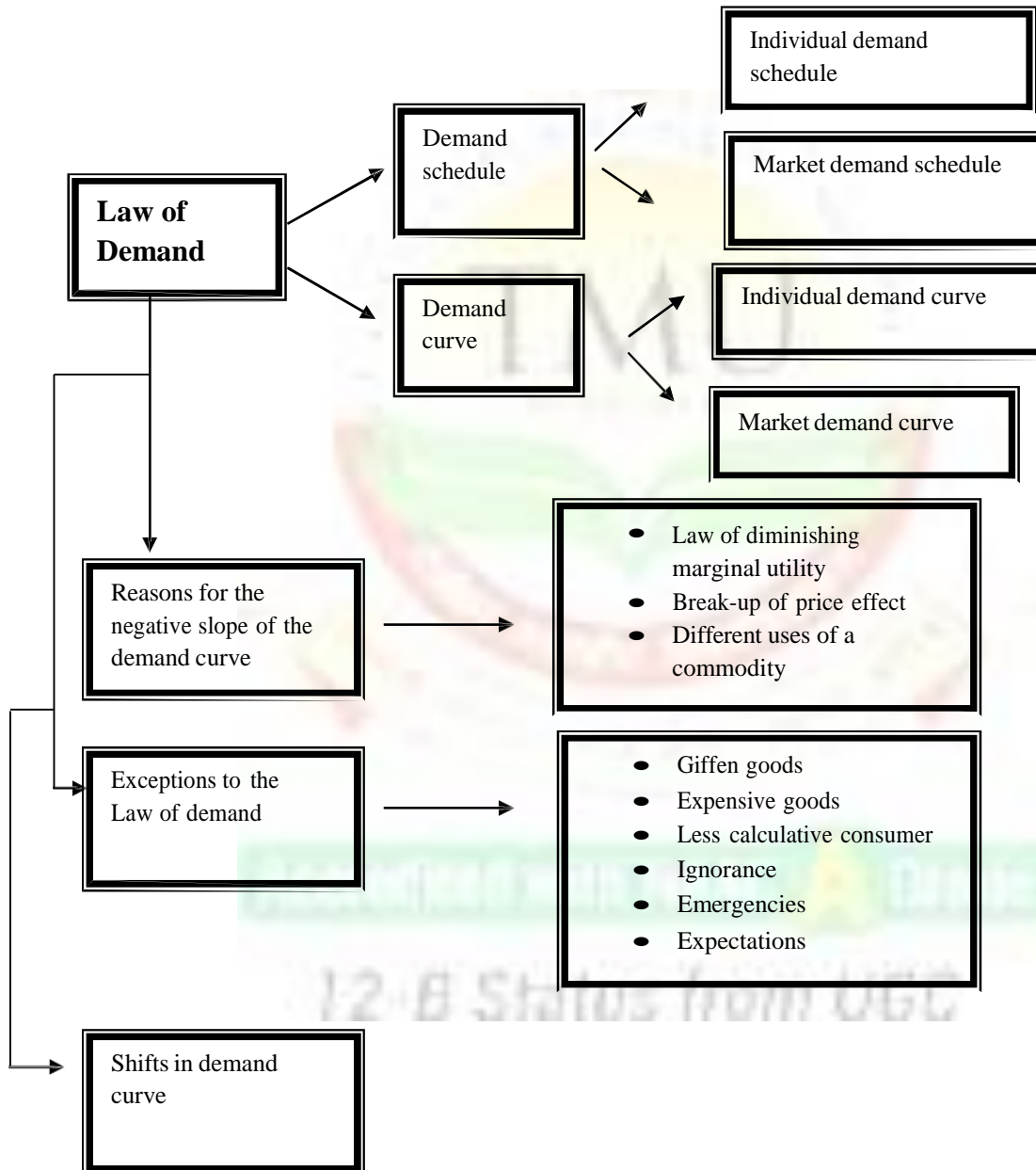
4.12 KEYWORDS

Desire, want, demand, utility, satisfaction, aggregate demand, demand function, effective demand, law of demand, individual demand schedule, individual demand curve, market demand schedule, market demand curve, negative slope, law of diminishing marginal utility, break up of price effect, exceptions, giffen goods, luxury goods, shifts in demand curve, other factors, income, substitutes, complementary goods.

4.13 ASSESS YOUR PERFORMANCE

Short Questions

Q.1 What is demand?

➤ Demand is the quantity of good and service which an individual or a group desires and is willing to have at the current prices.

Q.2 What is demand function?

➤ Demand function shows the functional relationship between demand for a commodity and the factors affecting the same. Thus, the demand function can be written as,

$D_x = f (P_x, P_r, Y, T)$.

Q.3 Give two reasons for the negative slope of the demand curve?

➤ Two reasons for the negative slope of the demand curve are:
  - Law of diminishing marginal utility
  - Break up of price effect

Q.4 State the law of demand.

➤ The law of demand says that if other factors affecting demand for a commodity remain constant then the demand for commodity x is inversely related with the price of x. i.e.
  $D_x = f (P_x)$

Q.5 Give two exceptions to the law of demand.

> Two exceptions to the law of demand are:

- Giffen goods
- Luxury goods

Long Questions

Q.1 State the law of demand. Also give its exceptions.

Q.2 Explain the reasons for the negative slope of the demand curve.

Q.3 Show how the changes in „other factors" affects the demand curve.

Q.4 "The fundamental law of economics i.e. the law of demand, fails in some situation", Comment.

Q.5 what is demand function? Explain the law of demand.

4.14 Suggested Readings

Satija, Kalpana, (2009), "Textbook on Economics for Law Students", Universal Law Publishing Company.

Koutsoyiannis, A.(1979), "Modern Microeconomics", Macmillan Press Limited.

Bilas, R., (1971), Microeconomic Theory, Mc-Graw hill, New York.

Dwivedi, D.N. (2003), Microeconomic Theory and Applications, Pearson Education, Delhi.

Activity 1

Define the Law of Demand.

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_____
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Activity 2

What are the reasons for the Negative Slope of the Demand Curve.

_____
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LESSON 5

Elasticity of Demand

Structure of the Unit

5.1 OBJECTIVES OF THE CHAPTER

This chapter explains the concept of elasticity of demand. It also explains the reasons for studying the concept of elasticity separately than the law of demand. The different types of elasticity, their measurement and the significance of this topic are also explained.

5.2 INTRODUCTION

Law of demand tells us that when the price of a commodity say x changes then the quantity demanded of that commodity also undergoes a change i.e. there is inverse relationship between the two. However, the law of demand tells us only the direction of change but it does not tell us the amount of change. The latter is explained by the concept of elasticity of demand. Elasticity of demand is a significant concept in economics. It is of help to many important economic agents as it is helps them to measure the change and thus, the concept of elasticity helps in decision making process.

5.3 CONCEPT OF ELASTICITY

Elasticity is a very broad concept. However, some perceive elasticity as only the price elasticity of demand. But actually elasticity of demand is very wide and price elasticity is just one part of it. Elasticity of demand implies proportionate change in the quantity demanded of a commodity due to proportionate change in the factors affecting demand. Thus, elasticity of demand measures the change in quantity demanded due to a change in its own price, prices of the related commodities and income of the consumer.

The formula of elasticity of demand can be written as:

Ed = Proportionate change in quantity demanded of x / proportionate change in factors affecting demand

Or,

Ed = percentage change in quantity demanded of x / percentage change in price of x or prices of the related commodities or

income.

Hence, elasticity of demand can be of three types:

> ➤ Price elasticity of demand
> ➤ Cross price elasticity of demand
> ➤ Income elasticity of demand

Elasticity of Demand

> ➤ *Price Elasticity of Demand*
> ➤ *Cross Price Elasticity of Demand*
> ➤ *Income Elasticity of Demand*

5.4 PRICE ELASTICITY OF DEMAND

Price elasticity of demand is the proportionate change in the quantity demanded of x to a proportionate change in the price of x. It is popularly called as elasticity of demand because price of x is the most variable factor that affects demand. It has been defined by various economists. Some of these definitions are given below.

According to Kenneth Boulding,

"Elasticity of demand measures the responsiveness of demand to changes in price".[1]

According to Alfred Marshall,

"The elasticity of demand in a market is great or small according as the amount demanded increases much or little for a given fall in price"[2]

The formula for elasticity of demand can be written as,

Ed = proportionate change in quantity demanded of x / proportionate change in price of x

Or, Ed = percentage change in quantity demanded of x / percentage change in price of x.

Or, it can be written as,

$Ed = (-) \Delta Q_x/Q_o \div \Delta P_x/P_o,$

or $Ed = (-) \Delta Q_x / \Delta P_x \times P_o / Q_o$

where, ΔQ_x = change in quantity demanded,

ΔP_x = change in price of x,

P_o = initial price and

Q_o = initial quantity.

This can be elaborated with the help of an example:

Let us say that the initial price of a burger is Rs.25 and its initial demand is for 25 units. When the price of burger increases to say Rs. 30 then the demand falls to 20 units. Thus, change in price is (Rs 25 – Rs 30) which is equal to (-) 5 and change in quantity demanded is (25-20) which is equal to 5. Thus, formula can be written as,

$Ed = (-) \text{-}5/5 * 25/ 25 = 1.0$

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[1] Chopra, P.N., (1996), Micro Economic Theory and Economic Welfare, Kalyani publications, Ludhiana.
[2] Ibid.

Thus, the elasticity of demand is one. This implies that if the price of burger increases by one then the quantity demanded of burgers will also change by one. Thus, the quantity demanded of burgers is elastic to a change in the prices of burgers. Note, that there is a negative sign put intentionally in the formula of price elasticity. This is done so because the relationship between price of x and quantity demanded of x is inverse. So if, negative sign is not put then the value of elasticity shall be negative which might seem awkward. Therefore, a negative sign is added to cancel the negative sign of the inverse relationship.

### 5.4.1 Degrees of Price Elasticity of Demand

Based on the intensities of the elasticity, price elasticity of demand can be classified into different degrees. Given below are the different degrees of price elasticity of demand:

1) **Perfectly inelastic Demand**

    Inelastic demand refers to a situation when even a major change in the price of x brings no change in the quantity demanded of x. Thus, the demand is inelastic to a change in the price for that commodity. In this case the degree of elasticity is zero i.e.

    Ed = 0.

    Figure 5.4.1a shows the inelastic demand.

Figure 5.4.1a   Figure 5.4.1.b   Figure 5.4.1c   Figure 5.4.1.d

Figure 5.4.1e
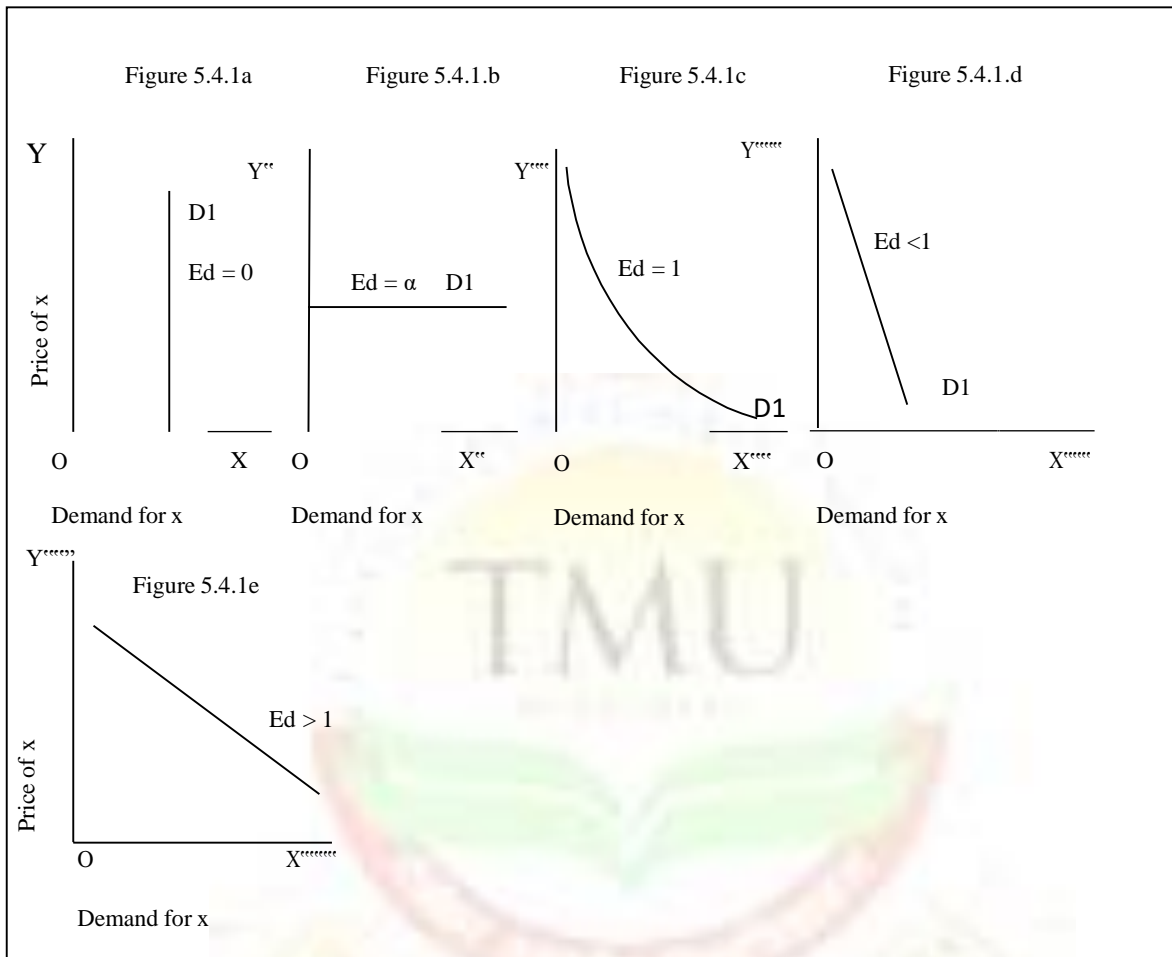
2) Perfectly elastic demand

Perfectly elastic demand refers to a situation when even a slight change in the price of a commodity causes an infinite change in the quantity demanded of that commodity. A small rise in the price of x causes the demand for that product to decline to zero. Likewise, a small reduction in the price of x causes the demand for that product to increase infinitely which no producer is able to meet. Such a demand curve is parallel to the horizontal axis. In this case the degree of elasticity is infinity. Figure 5.4.1b shows the perfectly inelastic demand.

$Ed = \alpha$

3) **Unitary elastic demand**

When a one per cent change in the price of a commodity causes a one percent change in the quantity demanded of x then the degree of elasticity is said to be unitary. If the price of commodity x increases by say five per cent then the quantity demanded of that commodity falls by five per cent. The degree of elasticity is one per cent. This is shown in figure 5.4.1c.

Ed = 1

4) **Less elastic demand**

When a one per cent change in the price of a commodity causes demand for that commodity to change by less than one percent then it is called as less elastic demand. If the price of a commodity increases by five per cent then the quantity demanded of that commodity decreases by less than five percent and vice-versa. Such a behavior of demand happens in case of necessities. The degree of elasticity is less than one. Less elastic demand curve is explained in figure 5.4.1.d. The figure shows the demand curve having a steep slope which is due to the less elastic demand.

Ed<1

5) **More elastic demand**

More elastic demand implies that a one per cent change in the price of a commodity causes demand for that commodity to change by more than one per cent. This implies that the degree of elasticity is greater than one. If the price of a commodity increases by five per cent, then the demand for that commodity falls by more than five per cent. This happens in case of luxuries. If the price of luxuries decreases by five per cent, then the quantity demanded increases by more than five per cent. Figure 5.4.1e shows the more elastic demand. In the figure, the demand curve is sloping downwards from left to right but its slope is flatter due to the more elastic demand.

Ed > 1

5.4.2 Measurement of Price Elasticity of Demand

Price Elasticity of demand can be measured by the following methods:

1) **Total expenditure or total outlay method**

Elasticity of demand can be estimated with the help of the total expenditure of the consumer on the purchase of that commodity. This is done by studying the changes in the total expenditure of the consumer with the changes in the price of that commodity. This method of measuring elasticity was propounded by Alfred Marshall. It is also called as the total revenue method. Total expenditure of the consumer can help in estimating elasticity of demand as the variations in expenditure are compared with the changes in the prices. These can be classified into:

➢ When with a small change in the price of the commodity say x the total expenditure of the consumer remains the same then it is a case of unitary elastic demand.

➢ When price and total expenditure on x moves in the same direction then the elasticity of demand is said to be less than one. This implies that with a small reduction in the price of the commodity x the total expenditure of the consumer also declines then elasticity is said to be less than one.

➢ The third case pertains to a situation when the price and total expenditure on x moves in different direction then it is the case of more elastic demand. This signifies that if the price of x falls and the total expenditure on x increases then it is called as more elastic demand.

This method can be explained with the help of figure 5.4.2.1. In the figure total expenditure is measured on OX axis and price of x is measured on OY axis. FC is the total expenditure curve.

Figure 5.4.2.1
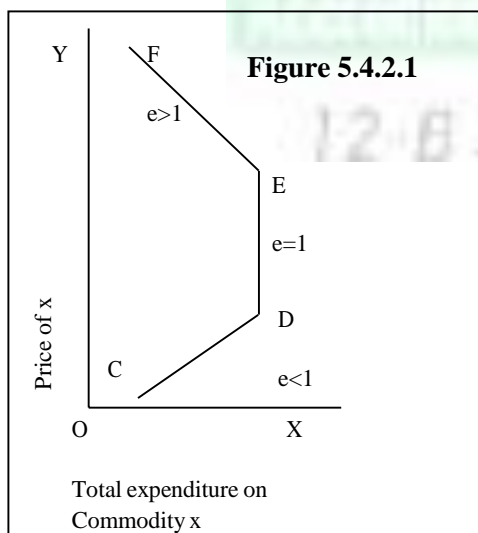
Between FE the elasticity of demand is greater than 1 and between ED the elasticity of demand is equal to 1. Between DC the elasticity of demand is less than 1.

2) Point Method

This method is used when elasticity is to be measured at a particular point on the demand curve. This can be used when the demand curve is a straight line or even if it is a curve. This is explained in figure 5.4.2.2a and 5.4.2.2b.
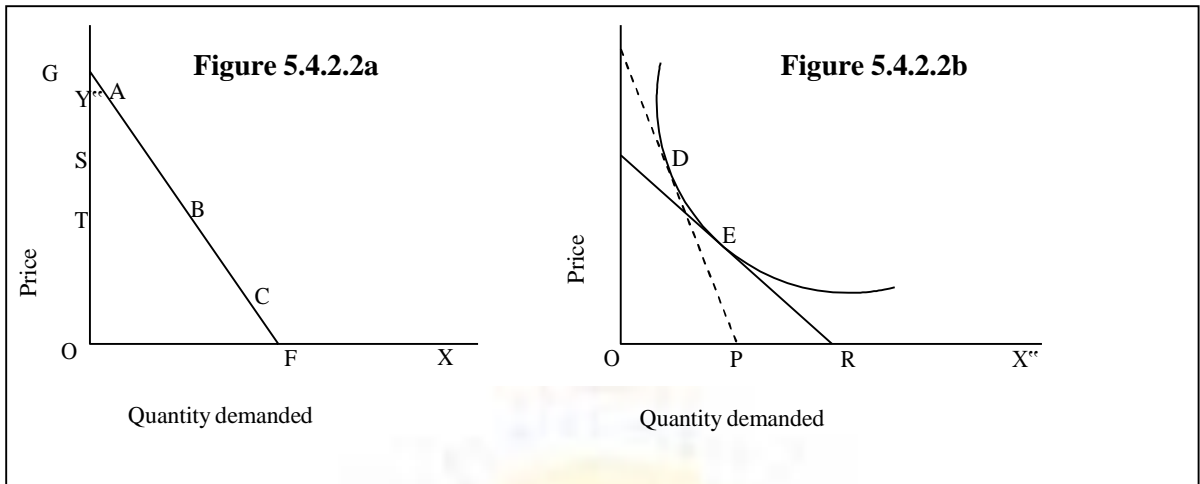
Figure 5.4.2.2a shows a straight line downward sloping demand curve. In order to measure the elasticity at a point on the straight line demand curve, the following formula is used:

Ed = lower segment of the demand curve

      Upper segment of the demand curve

Thus, in order to measure elasticity at point B on the demand curve, the demand curve is joined on both the axis. At this point the lower segment is equal to the upper segment; therefore, the elasticity at this point is equal to one. Likewise the elasticity at point C is less than one and at point A is greater than one.

Likewise, when the demand curve is not a straight line then the elasticity is measured by drawing a straight line from one axis to another and touching the curve. In order to know elasticity at point D on the demand curve, a tangent SP is drawn from OY" axis to OX" axis and it touches the demand curve at point D. Likewise, in order to know elasticity at point E tangent TR is drawn. Therefore, elasticity at point D is equal to DP divided by DS, i.e.

Ed at D = DP/DS

Similarly, elasticity at point E is equal to ER divided by ET, i.e.

Ed at E = ER / ET.

This method is useful when there is a small change in demand.

3) Arc Elasticity

The point elasticity method is useful when there is a small change in the prices of the commodities. However, it is not a very useful measure as small changes in the prices are rare. Hence, we need a measure in order to find out the elasticity when there are large changes in the prices of the commodities.

$Ed = Q1 - Q2 / Q1 + Q2 \div P1 - P2 / P1 + P2$

Or, it can be written as,

$= \Delta Q / Q1 + Q2 \div \Delta P / P1 + P2$,

Or,

$= \Delta Q / \Delta P \times P1 + P2 / Q1 + Q2.$

Where,

ΔQ = change in quantity,

ΔP = change in price,

$Q1$ = initial quantity,

$Q2$ = new quantity,

$P1$ = initial price,

$P2$ = new price.

Graphically figure 5.4.2.3, shows the demand curve D. on OY axis prices of commodity x are given and on OX axis quantity demanded of x is measured. When we have to measure elasticity on the demand curve from point A to point B then we take average of the prices of OP1 and OP2 and average of the two quantities demanded.

Figure 5.4. .3

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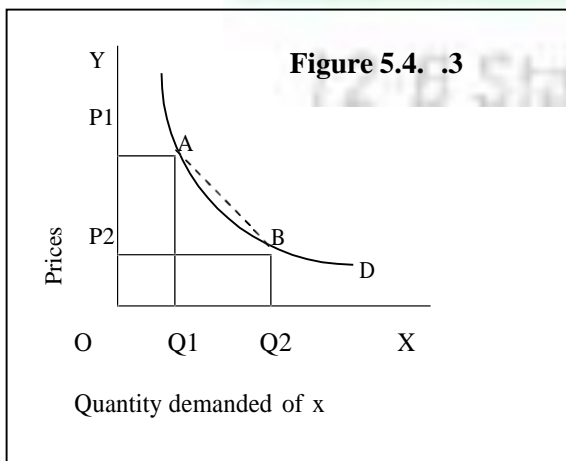
5.4.3 Comparison between the Arc and Point Elasticity of Demand

There are two points of comparison between the arc elasticity method and point elasticity method. These are discussed below:

1) Arc elasticity of demand is used when we have to find out elasticity between two different points on the demand curve. However, point elasticity method is used when we have to find out elasticity over a point on the demand curve. Thus, arc method measures elasticity over a long stretch on the demand curve and point method measures elasticity only at a point.

2) Arc method of measuring elasticity is used when we have large changes in the quantities occurring due to large changes in the prices. However, point method is used when we have smaller changes in quantities occurring due to small changes in the prices.

5.4.4 Choice of Method

The choice of method for measuring elasticity of demand depends on the objective of the measurement. If the purpose is to know the exact elasticity and we have the requisite data in hand then the arc elasticity method should be used. But if we just want to know the degree of elasticity or we have restrictions on the availability of the data then we should use the point elasticity method. Also, if we want to know the impact of large changes in prices then again arc method should be used whereas if the objective is to know the small changes then point elasticity method should be used.

5.4.5 FACTORS AFFECTING PRICE ELASTICITY OF DEMAND

The main factors affecting the price elasticity of demand are discussed below:

1) **Availability of substitutes**

   If a product has more substitutes then the demand for that product will be highly elastic and if a product has fewer substitutes then the demand for that product will be less elastic. This is so because if the price of x increases and in the market y, z, d and b are the substitutes and their prices have remained constant then the consumer can very easily shift to its substitutes and hence the demand for x becomes highly elastic.

2) **Nature of a commodity**

The elasticity of a commodity depends on the nature of the commodity also. If a commodity is necessity then any change in its price will bring only a minor change in the quantity demanded of that commodity. Thus, the demand for necessities is generally less elastic. For example: the demand for salt does not change much with the change in its price because it is a necessity. However, in case of comforts and luxuries the demand is relatively more elastic as a small change in their prices brings a great change in their demand. Further commodities can also be classified into producer"s goods and consumer"s goods. The demand for producers" goods is generally more elastic as compared to the demand for consumer"s goods. The consumer goods can also be classified into consumer durables and consumer non- durables. The demand for consumer durables is more elastic as compared to the demand for consumer non-durables.

3) **Different uses of a commodity**

The elasticity of a commodity also depends on the different purposes it can be used for. If a commodity has more uses then the demand will be more elastic. If a commodity has fewer uses then its demand will be less elastic. For example: computer mouse has limited use in a household. Therefore, its demand is less elastic. However, electricity can be used for various purposes in a household. So if the price of mouse increases then in a household the demand for mouse will not be affected to a large extent. However, if the price of electricity increases then the household may cut down its use for say, ironing, washing etc. Hence, the demand for electricity will fall drastically. Thus, its demand is highly elastic because electricity can be used for many purposes.

4) **Delay in the purchase of a commodity**

The elasticity of a product also depends on the possibility of delaying the purchase of a commodity. If the purchase of a commodity can be delayed then its demand will be more elastic and if the purchase of a commodity cannot be delayed then its demand will be less elastic. For example: the purchase of A.Cs, refrigerators can be delayed and hence their demand is more elastic.

5) **Share of the commodity in the consumer's budget**

The elasticity of a product is also dependent on the share of that commodity in the budget of the consumer. If a commodity has a major share in the budget of a household then a slight increase in its demand is going to affect its demand. Thus, elasticity will be more.

However, if a commodity has a very small share in the budget of a consumer then even 100 per cent increase in its price brings no change or very less change in its product. Thus, its demand will be less elastic. For example: in a middle class household the share of matchbox in the total budget is very less but the share of say cold drinks is more. Then the rise in the price of matchbox may not bring much change in its demand. However, a rise in the price of the cold drinks brings change in its demand. Therefore, the demand for cold drinks will be more elastic and demand for matchbox will be less elastic for this household.

6) **Income of the household**

The elasticity of demand is also dependent on the income of the household. If the household falls in the lower middle class category then their demand will be more elastic as compared to the upper middle class or high income group. The demand of the upper class household is not affected much with the change in the prices of the commodities but the demand of the lower middles class household is affected a lot with the change in the prices of the commodities. For example: if the price of electricity increases then the lower middle class will immediately cut down its consumption and hence, its demand will be more elastic. But the upper middle class may not be affected at all by the change in the prices of electricity. Thus, the demand of the lower income household will be more elastic and the demand of the upper class household will be more elastic.

7) **Habits**

If the consumer is habitual to certain commodities then any rise in their prices may not affect their demand. For example: if the consumer is addicted to cigarettes then any rise in the price of cigarettes will not bring any change in the demand for the same commodity or will bring only a minor change in the demand for that commodity. Thus, in case of habits or addictions the elasticity of demand is very less.

8) **Existing prices in the economy**

The demand for a particular commodity is also dependent on whether the existing prices are high or low. If the existing prices of middle range commodities are high then their demand will be more elastic. However, if the existing prices of high priced commodities like diamonds are high then their demand will not be affected.

9) **Time of change**

Elasticity of demand is also sensitive to changes in the time period. If the time period of the changes in prices is short then the elasticity of demand will be low. However, if the changes in prices of commodities persist for a long period of time then the elasticity of demand will be high.

10) **Complementary commodities**

Elasticity of demand is also dependent on the nature of the commodities. If two commodities are jointly demanded then their elasticity"s are also affected. For example, if the demand for cars is relatively less elastic then any change in the prices of the petrol will bring no change or very less change in its demand. This is because petrol is needed to run the car and if the demand for car is less elastic then the demand for petrol automatically becomes less elastic.

5.4.6 Significance of Price Elasticity of Demand

The price elasticity of demand is of special significance to the different economic agents and sectors. The following points shall explain the significance of studying price elasticity of demand:

1) **Significance for the producers**

Elasticity of demand helps the producers in fixing the prices of the commodities. If the demand for the commodity is less elastic then the producers can fix high prices and if the demand is more elastic then the producer should not fix high prices because then he may lose his consumers. Elasticity helps the producers not only in fixing of prices but also in altering prices. If the demand for a product is less elastic then the producer can change the price easily as he may lose only small consumers but when the demand for a product is more elastic then he cannot alter the prices so easily as he may lose majority of his customers.

2) **Significant for Taxation Policy**

This concept is also useful in framing taxation policy. The taxes are imposed more on those products whose demand is relatively less elastic. For example, more taxes are imposed on cars. This helps the government in two ways. Firstly, the government can generate more revenue through this way as the demand will not fall so much with the

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levying of the taxes and secondly, the rich people would be taxed more as compared to the poor people. This helps the government in attaining the objective of equitable distribution of income.

3) **Significance for a Monopolist**

Price elasticity of demand helps the producers in price discrimination. He can indulge in price discrimination only when the price elasticity of demand is different in different markets. Let us say that a monopolist has two markets (A and B) and in both the markets he is selling similar product. It is also assumed that there is no exchange of information or products possible between the two markets. In market A demand for his product is less elastic and in market B, the demand for his product is more elastic. So he will fix a higher price for market A and lower price for market B.

4) **Significant in factor pricing**

The concept of elasticity of demand is of special significance in the theory of factor pricing. This concept helps the different factors of production in fixing and increasing their shares. If workers know that the product that they are manufacturing has less elastic demand then they can get their wages increased easily as compared to those workers who are manufacturing a product whose demand is more elastic.

5) **Determination of the prices of the products which are jointly produced**

The elasticity of demand helps in estimating the prices of the products that are produced jointly. For example oil and oil cakes are two jointly produced goods[3]. If the demand for oil is relatively inelastic then the producer shall a higher price for oil and relatively lower price for oil-cakes.

6) **Explains the Paradox of Poverty**

The elasticity of demand helps us in explaining the paradox of poverty of the farmers. The paradox is that when farm products are produced in surplus then the farmers get reduced incomes. The paradox is explained with the help of elasticity of demand. The demand for the agricultural produce is largely inelastic. When the supply of agricultural products increases, demand remaining relatively inelastic, the prices of the goods decline. This then reduces the incomes of the farmers and hence, it explains the paradox of poverty.

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[3] Satija, Kalpana, (2009), Textbook on Economics for Law Students, Universal Law Publishing Company, Delhi.

7) **Significance in international trade**

Elasticity of demand is a significant concept even in international trade. This concept helps us in determining the terms of trade and the prices of the commodities. For example if country A is exporting commodity x to country B and the demand for country A"s exports is relatively inelastic then A would fix the price of x at a higher side.

5.5 CROSS PRICE ELASTICITY OF DEMAND

Cross price elasticity of demand measures the responsiveness of the quantity demanded of a commodity to a change in the price of the related commodities other factors remaining constant. For example, when the quantity demanded of a commodity say x changes not due to a change in the price of x but due to a change in the price of y then this measure is called as cross price elasticity of demand. It can be measured by dividing proportionate change in the quantity demanded of x by the proportionate change in the price of y. It can be written as,

Ced = proportionate change in the quantity demanded of x

proportionate change in the price of y

$= \Delta Q_x/Q_{xo} \div \Delta P_y/P_{yo}$

Where, ΔP_y = change in the price of y

P_y = initial price of y.

Cross price elasticity of demand is helpful in measuring the elasticity of a commodity due to a change in the prices of its substitutes and complementary commodities.

5.5.1 Cross price elasticity of demand in case of substitutes

Two commodities are related to one another in three different ways. They can either be substitutes or complementary or independent of each other. Substitutes are those commodities that can be used in place of the other commodity. For example: tea and coffee, coke and pepsi etc. The cross price elasticity of demand for substitutes is positive. This can be illustrated with the help of an example. Let us say that the commodity under consideration is tea. Coffee is its substitute. The price of tea remaining constant, if the price of coffee falls then coffee will

become relatively cheaper. As a result people will cut down the consumption of tea and increase the consumption of coffee. Thus, the quantity demanded of tea will go down due to a reduction in the price of coffee. It can be concluded that the signs of both will move in the same direction. So the cross price elasticity of demand of substitutes is positive.

Ced = Positive for substitutes.

5.5.2 Cross price elasticity of demand in case of complementary commodities

Two commodities can be complementary to each other. Complementary commodities are those commodities which are to be used together or are to be used in a fixed proportion. The example can be: pen and ink, car and petrol, gas stove and gas cylinder etc. The cross price elasticity of demand between complementary commodities can be explained with the help of an example. Let us say that we have pen and ink. If the price of pen remains constant and the price of ink rises then as per the law of demand the quantity demanded of ink will fall. If the quantity demanded of ink will fall then as a result the quantity demanded of pen will also go down. Thus, there is inverse relationship between the price of ink and quantity demanded of pen. Hence, the cross price elasticity of demand is negative for complementary commodities.

Ced = Negative for complementary commodities.

5.6 INCOME ELASTICITY OF DEMAND

Income elasticity of demand studies the relationship between the income of the consumer and the quantity demanded of a commodity when other factors affecting the demand remain constant. It measures the change in the quantity demanded of a commodity due to a change in the income of the consumer. The formula for income elasticity of demand can be written as,

Yed = proportionate change in the quantity demanded of x
$$\overline{\text{proportionate change in the income of the consumer}}$$

$$= \Delta Q_x/Q_{xo} \div \Delta Y/Y_o$$

Where, ΔY = change in the income of the consumer

Y_O = initial income of the consumer.

5.6.1 Income elasticity of demand in case of inferior commodities

On the basis of the income of the consumer, commodities can be classified into normal, inferior and luxury commodities. In this section we shall explain the income elasticity of demand for inferior commodities. Inferior commodities are those commodities whose demand decreases with the increase in the income of the consumer. For example: the demand for a poor quality shirt decreases as the income of the consumer decreases. Likewise the demand for dalda, a poor quality product, decreases as the income of the consumer increases. In such cases, the income elasticity of demand is negative.

Yed = Negative for inferior goods.

5.6.2 Income elasticity of demand in case of normal commodities

Second type of classification of commodities on the basis of income of the consumer is normal commodities. Normal commodities are those commodities whose demand increases as the income of the consumer increases. For example, good quality shirt, ghee etc. As the income of the consumer increases he will buy more of these products. Thus, income elasticity of demand for normal goods is positive.
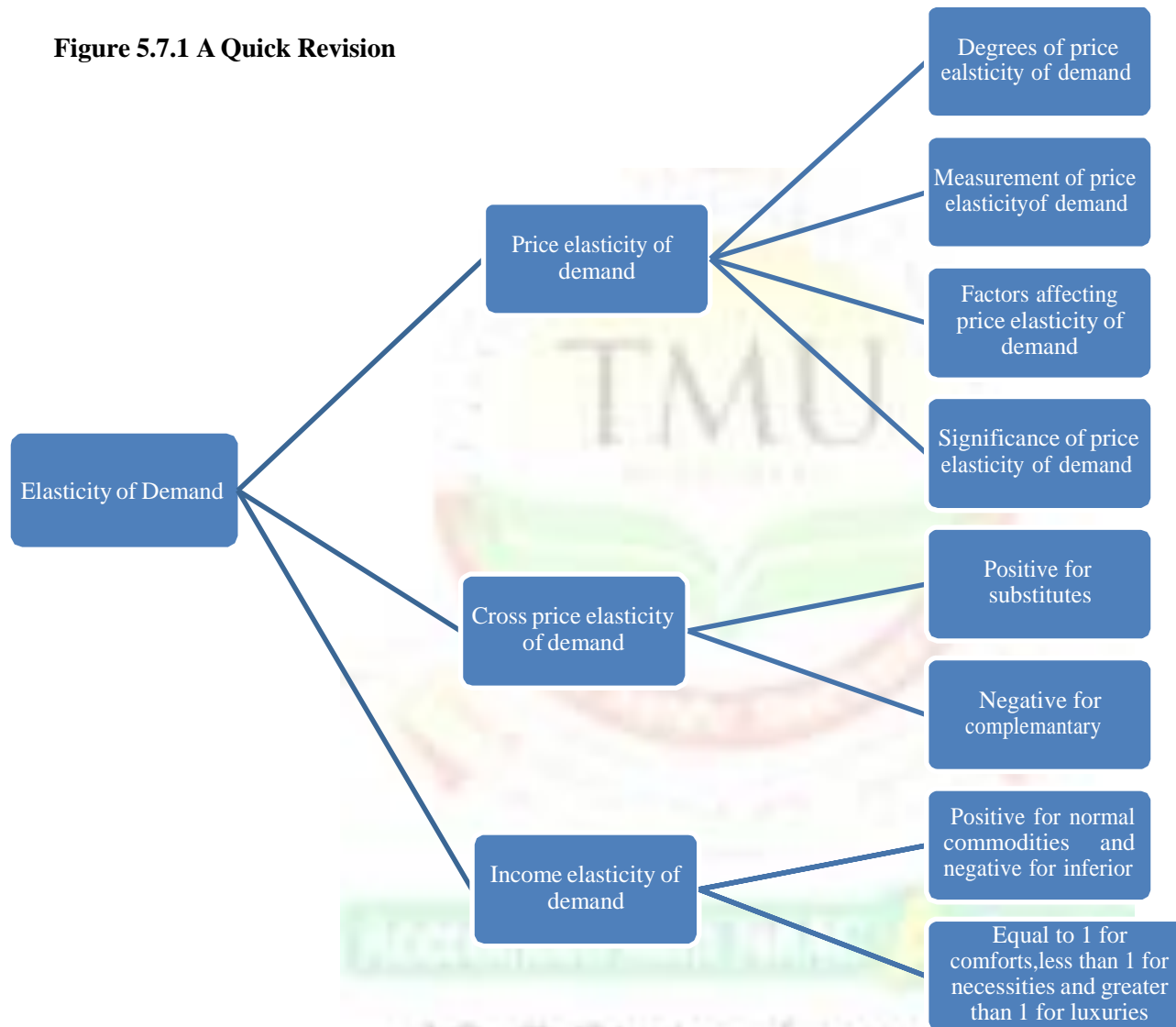
Yed = Positive for normal goods.

5.6.3 Income elasticity of demand in case of necessities, comforts and luxuries

Commodities can also be classified on the basis of necessities, comforts and luxuries. Necessities are those commodities that are required for the survival. It includes commodities like salt, water etc. In such cases the income elasticity of demand is less than 1. Comforts are those commodities that are required for a comfortable lifestyle. It includes commodities like: television, bed etc. The income elasticity of demand for comforts is equal to 1. Luxuries include those commodities that are required for a luxurious lifestyle. It includes commodities like: cars, house in a posh area etc. In this case the income elasticity of demand is greater than 1.

5.7 A QUICK REVISION

Figure 5.7.1 quickly sums up the whole chapter.

Figure 5.7.1 A Quick Revision

Elasticity of Demand

- Price elasticity of demand
  - Degrees of price ealsticity of demand
  - Measurement of price elasticityof demand
  - Factors affecting price elasticity of demand
  - Significance of price elasticity of demand
- Cross price elasticity of demand
  - Positive for substitutes
  - Negative for complemantary
- Income elasticity of demand
  - Positive for normal commodities and negative for inferior
  - Equal to 1 for comforts,less than 1 for necessities and greater than 1 for luxuries

5.8 KEYWORDS

Elasticity of demand, price elasticity of demand, degrees of price elasticity, outlay method, point method, arc method, income elasticity of demand, inferior goods, normal goods, comforts, luxuries, necessities, cross price elasticity of demand, substitutes, complementary.

5.9 ASSESS YOUR PERFORMANCE

Short Questions

Q.1 What is elasticity of demand?

> Elasticity of demand measure the change in quantity demanded due to a change in its own price, prices of the related commodities and income of the consumer.

Q.2 Give the types of elasticity.

> Elasticity is of three types; price elasticity, cross price elasticity, income elasticity of demand.

Q.3 What is price elasticity of demand?

> Price elasticity of demand is the proportionate change in the quantity demanded of x to a proportionate change in the price of x.

Q.4 What is Income elasticity of demand?

> It measures the change in the quantity demanded of a commodity due to a change in the income of the consumer.

Q.5 What is cross price elasticity of demand?

> It measures the change in the quantity demanded of a commodity due to a change in the prices of the related commodities like substitutes or complementary commodities.

Long Questions

Q. 1 Discuss in detail the concept of elasticity of demand?

Q. 2 Explain the degrees of price elasticity of demand and also explain the different ways to measure the same.

Q.3 Discuss the different factors affecting the price elasticity of demand

Q.4 Explain the concept of elasticity of demand and also discuss its significance.

Q.5 Explain price, cross and income elasticity of demand.

5.10 Suggested Readings

Chopra,P.N. (1996), Micro Economic Theory and Economic Welfare, Kalyani publications, Ludhiana.

Dwivedi, D.N. (2003), Microeconomics, Theory and Applications, Pearson Education, Delhi.

Satija, Kalpana, (2009), Textbook on Economics for Law Students, Universal Law Publishing Company, Delhi.

Theory of Production

Structure of the Unit

6.1 OBJECTIVES OF THE CHAPTER

The objective of this chapter is to apprise the readers about how the decisions regarding the choice of inputs are taken by the producer. This is done through the explanation of the different laws of production and through the determination of the equilibrium.

6.2 INTRODUCTION

The first five chapters explained how the consumers decide the amount of a commodity to be bought at different prices. While studying the behavior of the consumers it was assumed that the decisions of the producers were constant. Now, in the theory of the production, the readers are apprised about how the producers combine

Production function

Production function shows the functional relationship between factor inputs and outputs.

the different factors of production to produce a particular level of output. While studying this we assume that the decisions of the consumers are held constant.

Production is the act of transforming inputs into outputs. Production is carried out by transforming different inputs into outputs or the relationship between the factors of production and output can be stated in a technical manner which is called as production function. The production function can be classified into different types. These are discussed below:

1) **Long run production function:** Long run implies that during this time period output can be increased by increasing both labour and capital i.e. the scale of the plant or its capacity can be increased. Production is done by combining various factors of production. These are: land, labour, capital and raw material, etc. The long run production function can be written as,

> **Types of Production function**
>
> ➢ *Long run production function*
> ➢ *Short run production function*
> ➢ *Homogeneous production function*
> ➢ *Non- homogeneous production function*
> ➢ *Cobb – Douglas production function*

X = f (La, L, K, R)

Where, X stands for output,

La stands for land,

L stands for labour,

K stands for capital,

R stands for raw material.

Since land remains constant for any given economy, therefore, it is kept out of the production function. Value of the raw materials is deducted from the total value of the output; therefore, it is also kept out of the production function. Thus, the production function can be rewritten as,

X = f (L, K)

This is the long run production where both labour and capital are variable.

2) **Short run production function:** In the short run, capital cannot be increased immediately as a result it remains fixed. Then output can be increased by increasing only labour. Then, production function can be written as,

$$\bar{X} = f(L)_K$$

i.e. output is a function of labour when capital is constant. Diagrammatically production function can be explained in figure 6.2.1

Figure 6.2.1
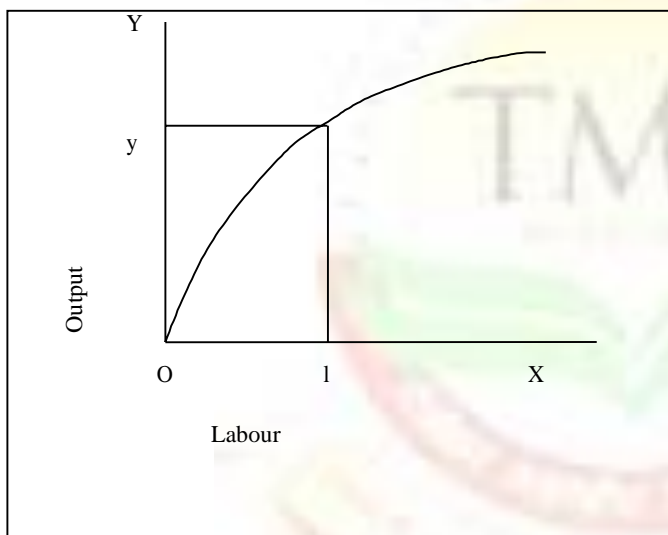
Thus, in the short run factors of production can be classified into two categories:

➤ **Fixed factors of production:** Fixed factors of production are those factors of production which come into the production till the factory is ready for trial production. Such as land, building, machinery etc. These are grouped under capital. These factors cannot be increased or decreased in the short run. Thus, these are called as fixed factors of production.

➤ **Variable factors of production**: Variable factors of production are those factors of production which come into the

Factors of production in short run	Factors of production in long run
Fixed factors *Variable factors*	*All factors are variable*

production after the trial production. Usually labour, raw materials, running expenses of the machinery falls in this category. These factors can be increased or decreased in the short run. They do not remain fixed. Thus, these are called as variable factors of production.

However, in long run all the factors of production can be increased or decreased. Thus, all the factors of production are variable.

3) **Homogeneous production function:** Suppose, we have the following production function, where output (X) is a function of labour (L) and capital (K),

$X = f(L, K)$

If now, we increase both labour and capital with the same proportion say „m" then the new level of output (X*) can be written as,

$X^* = f(m L, m K)$

If it is possible to take out m as a common factor then the new level of output (X*) can be expressed as a function of m raised to the power „n" and the initial level of output, then it is called as homogeneous production function. This can be explained as,

$X^* = m^n f(L,K)$

$X^* = m^n X$

So, a homogeneous production function is a function in which if each of the inputs are multiplied by m, and it is possible to take m out of the production function as a common factor. The power n of m is called as the degree of homogeneity and is a measure of returns to scale.

If n = 1 then we have constant returns to scale,

If n > 1 then we have increasing returns to scale,

If n < 1 then we have decreasing returns to scale.

Homogeneous production function is divided into two categories:

➢ **Linear homogeneous production function**: Linear homogeneous production function is that production function in which the degree of homogeneity is equal to 1. This implies that n = 1.

- ➢ **Non-linear homogeneous production function**: Non homogeneous production function is that production function in which the degree of homogeneity is not equal to 1.

4) **Non Homogeneous production function:** Suppose, we have the following production function, where output (X) is a function of labour (L) and capital (K),

X = f (L, K)

If, now, we increase both labour and capital with the same proportion say „m" then the new level of output (X*) can be written as,

X* = f (m L, m K)

If it is not possible to take m out as a common factor then the production function is called as non – homogeneous production function.

5) **Cobb- Douglas production function:** Various economists and mathematicians have given empirical production functions based on actual data. Cobb and Douglas gave their own production function based on empirical findings. The mathematical form of the Cobb and Douglas production function is given below:

$Q = A L^{\alpha} K^{\beta}$

Where, Q stands for the level of output,

L stands for labour,

α and β are the constants,

K stands for capital,

A stands for technology and is a constant.

This production function shows that any change in labour will increase the level of output by the exponent α and any change in capital will increase the level of output by the exponent β. Cobb and Douglas gave this production function not for a firm but for the whole of the manufacturing industry. So, the level of output Q represents the manufacturing output or output of manufacturing industry. If we apply log on both sides then the production function can be written as,

$\text{Log } Q = \text{Log } A + \alpha \text{ Log } L + \beta \text{ Log } K$

Cobb – Douglas production function is used to estimate returns to scale.

If $\alpha + \beta = 1$ then we have constant returns to scale.

If $\alpha + \beta < 1$ then we have decreasing returns to scale.

If $\alpha + \beta > 1$ then we have increasing returns to scale.

6.3 LAWS OF PRODUCTION

Since, there is difference in the long run and short run factors of production, therefore, the decisions of the producers on how much of the factor inputs are to be combined in the short run and in the long run are also different. Thus, the laws of production can be studied under two heads:
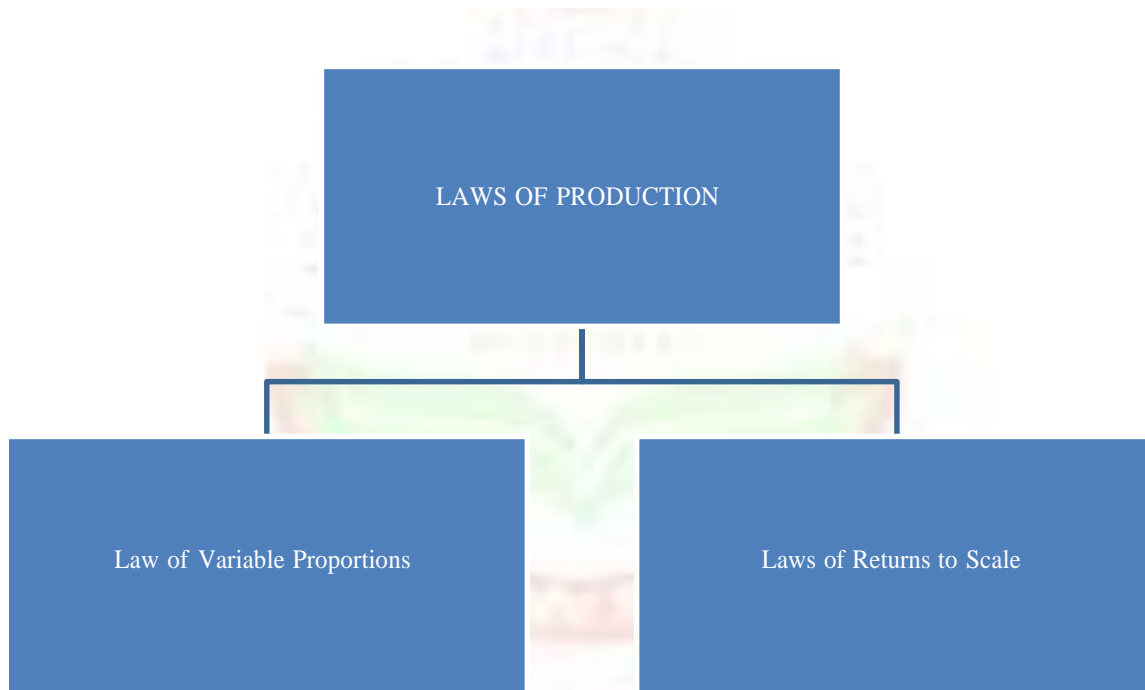
6.3.1 Law of variable proportions

Since, in the short run one factor of production is fixed (capital) and the other factor of production (labour) is variable, then any change in output will occur due to a change in the variable factor of production. If we want to study that if we increase labour and capital then whether the total output or product increases or decreases or remain constant then this is explained by the law of variable proportions.

The law of variable proportions says that in the short run labour is variable and capital is fixed then total output will increase initially but beyond a certain point it will decrease. This is called as the law of variable proportions because the proportions of the variable factor (labour) are increased to the fixed proportion of capital.

6.3.1.1 Statement of the law

According to Koutsoyiannis,

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Law of Variable Proportions

Applicable in the Short run

</div>

"In general if one of the factors of production (usually capital K) is fixed, the marginal product of the variable factor (labour), will diminish after a certain range of production"[1].

According to G.Stigler,

"As equal increments of one input are added; the inputs of other productive services being held constant, beyond a certain point the resulting increments of product will decrease, i.e. the marginal products will diminish"[2].

According to Benham,

"As the proportion of one factor in a combination of factors is increased, after a point, first the marginal and then the average product of that factor will diminish"[3].

6.3.1.2 Assumptions

Following are the assumptions of the law:

1) State of technology is given
2) One factor capital is fixed.

6.3.1.3 Explanation of the law

For the explanation of the law of variable proportions some of the basic concepts used are explained below:

1) **Total Product:**

Total product is the total amount of output produced.

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[1] Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

[2] Ahuja, H.L. (1980), Modern Economics, S.Chand and Company Limited, New Delhi.

[3] Ibid

2) **Average Product:**

Average product is the total amount of output produced by total labour.

AP = x/l

Where, x = total output,

l = total labour,

AP = average product.

3) **Marginal Product:**

Marginal product of a factor is the addition made in total product due to a change in the variable factor.

MP = Δx / Δl.

Where, Δx = change in total output,

Δl = change in total labour,

MP = marginal product.

The law of variable proportions can be explained with the help of table 6.3.1.3[4] and figure 6.3.1.3. The table and the graph show that:

➢ As more and more of labour is employed, its marginal product increases up to the third unit.

➢ The marginal product of labour becomes maximum at 3 unit and after that there is a reduction in the same. This point is called as the point of inflexion after which the marginal product curve starts to decrease.

➢ Since, marginal product is the slope of the total product curve, so till the 3 unit total product is increasing at an increasing rate but after the 3 unit of labour the total product curve is increasing at a decreasing rate.

➢ At the 9 unit, the marginal product of labour becomes zero.

➢ At the ninth unit of labour the total product curve becomes constant i.e. the total product is maximum.

➢ At the employment of the 10 unit of labour the marginal product is negative and total product is declining.
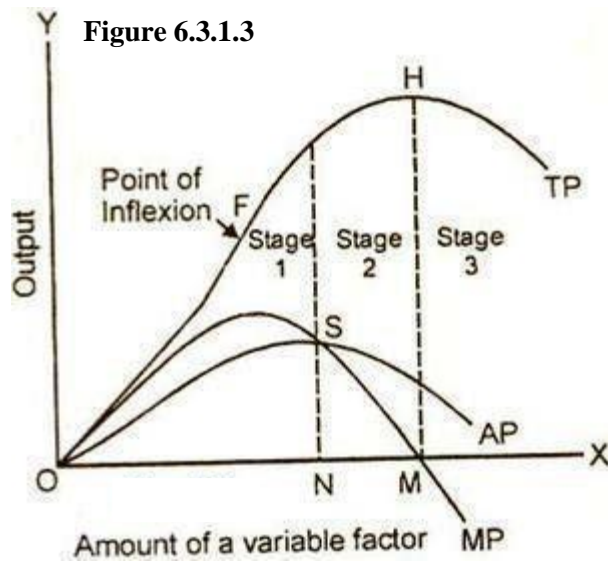
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[4] The table and the graph are from Satija, Kalpana (2009), Textbook on Economics for Law Students, Universal Law Publishing Company, Delhi.

- The average product is positive throughout. It is initially increasing reaching a maximum at the 4 unit. After that it is declining.
- When the average and marginal products are increasing the marginal product is lying above the average product curve. When the average product curve is at a maximum then marginal product is equal to average product. When the average product is declining then it is lying above the marginal product. When marginal product becomes zero average product is still positive.

Table 6.3.1.3

Combination	Fixed Factor	Units of Variable Factors	Total Product	Marginal Product	Average Product
1	K	1	20	20	20
2	K	2	50	30	25
3	K	3	90	40	30
4	K	4	120	30	30
5	K	5	135	15	27
6	K	6	144	9	24
7	K	7	147	3	21
8	K	8	148	1	18.5
9	K	9	148	00	16.4
10	K	10	145	(-) 3	14.5

Figure 6.3.1.3

The law of variable proportions explains the different stages of production. As is explained in the figure 6.3.1.3 there are three stages of production. These are discussed below:

Stage 1: In the first stage (from O to N) total product is first increasing at an increasing rate then at a decreasing rate. Marginal product is increasing, reaches its maximum and cuts average product from below at its maximum point. Average product is increasing in the first stage. Point F is the point of inflexion where marginal product is maximum and beyond it the marginal product of labour starts decreasing and average product of labour is increasing. In this stage though marginal product starts to decline yet the total product curve is increasing. This is because the efficiency of variable factor initially increases (i.e. marginal product of labour increases) which pulls up the total product curve. However, when the marginal product starts to decline then the efficiency of the fixed factor (i.e. average product is still increasing) pulls up the total product curve.

Stage 2: In the second stage (from N to M) total product is increasing and it reaches a maximum at point H. The marginal product cuts average product curve at its maximum at point N. Then it reaches zero at the maximum point of total product curve. Though the average and marginal products are falling yet these are positive. Thus, the efficiency of both the factors is falling yet positive.

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Stage 3: In the third stage (M onwards) the marginal product curve is negative and total product and average product curves are declining. Thus, the efficiency of the variable factor is negative and the efficiency of the fixed factor is falling and it is not enough to pull up the total product curve. Thus, the total product curve is declining.

6.3.1.4 The Economically Relevant Stage: Stage 2

Stage 2 is the most relevant stage of production. Producers will operate in stage 2. In stage 1 the efficiency of variable factor is maximum and the efficiency of fixed factors has not reached its maximum. The producers would like to maximize the use of both the factors as they are paying for both the factors. Thus, they would not stop in stage 1. Rather they would move to stage 2. In stage 2 both the factors attain their maximum efficiencies and the total product curve is also maximum. However he will not operate in stage 3 as here marginal product of labour is negative and average product is also decreasing. Thus, production will take place in stage 2.

6.3.1.5 Causes of increasing returns to variable factor

In stage 1 there are increasing returns to factor. This is because initially when labour is increasing it is working with more of capital i.e. say 2 workers are working on 6 machineries. So, the efficiency of both fixed and variable factors is increasing. Then as the labour is increased a situation comes when 6 workers are working on 6 machineries.

6.3.1.6 Causes of decreasing returns to variable factor

As more and more of variable factor is hired then labour gets less and less of fixed factor to work with. This implies a situation when 8 workers are working on 6 machineries or 9 workers are working on 6 machineries. This leads to chaos and reduced efficiency.

6.3.2 Laws of returns to scale

For understanding the laws of returns to scale we need to know some basic concepts that are used in the same. These are discussed below:

6.3.2.1 Basic concepts

1. **Isoquants:**

Since in the long run both labour and capital are variable; therefore, a particular level of output can be produced with the help of some labour and capital. The line which joins all the technically efficient combinations of labour and capital for producing a given level of output is called as isoquant. Isoquants can be of different shapes. These are discussed below:

➢ **Linear Isoquant:** Figure 6.3.2.1a shows the linear isoquant (ab). It is downward sloping from left to right. With labour and capital this isoquant produces x level of output. This type of isoquant exists in case of perfect substitutabilitybetween factors of production.
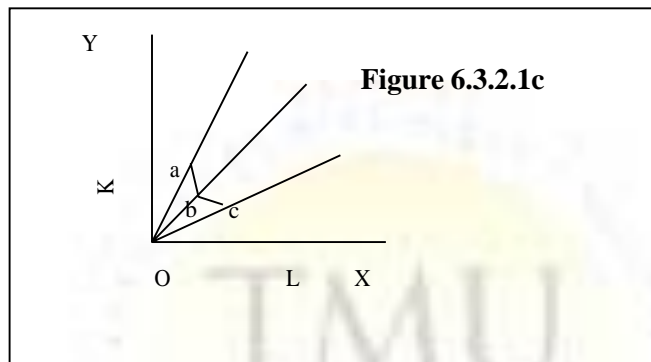

Figure 6.3.2.1a
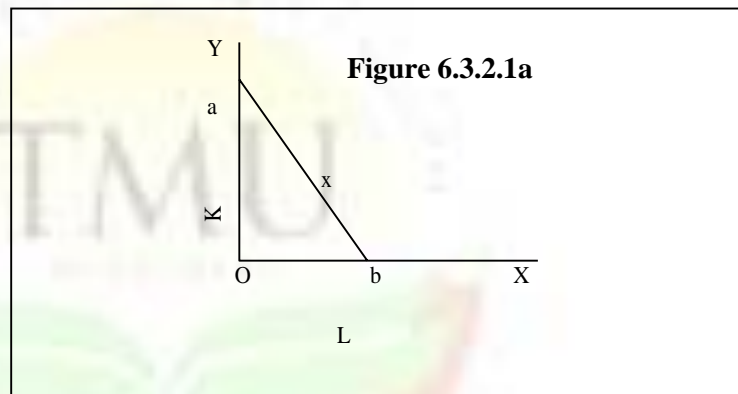
➢ **Input-output isoquant:** This type of isoquant assumes strict complementarity between the different factors of production. This indicates zero substitution. There is only one method of production of a commodity. This is called as „Leontif‟s isoquant".

Figre 6.3.2.1b
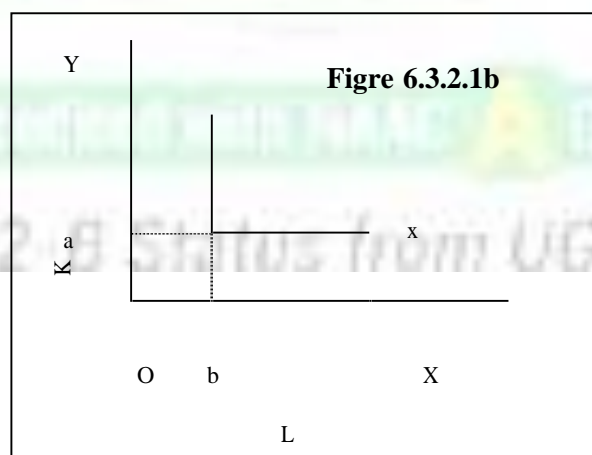
In figure 6.3.2.1b, x is the Leontif‟s isoquant. There is only one method of producing x i.e. oa amount of capital and ob amount of labour.

➤ **Kinked isoquant**

Such an isoquant assumes limited substitution between labour and capital i.e. there are only a few processes of producing a given commodity. Isoquant ac is shown in figure 6.3.2.1c. Substitution is only possible at the kinks (a, b, c). This is also called as activity analysis or linear programming isoquant.

Figure 6.3.2.1c

➤ **Convex isoquant**

Convex isoquant assumes continuous substitutability of capital and labour over a certain range, beyond which factors cannot be substituted. In this chapter we shall cover convex isoquant. Figure 6.3.2.1d shows the convex isoquant (x). For producing x there are several combinations of labour and capital like oa of capital and ob of labour and oc of capital and od of labour. The curve which joins such combinations and is convex to the origin is called as convex isoquant.

The slope of the isoquant is called as marginal rate of technical substitution of labour for capital. It is the rate at which labour can be substituted for capital so that the output remains constant. It is diminishing in case of convex isoquant because the reduction in one factor is required to increase the other factor so that the level of output remains the same.

$MRTS_{LK} = MP_L / MP_K$

Where,

$MRTS_{LK}$ stands for marginal rate of technical substitution of labour for capital.

MP_L stands for marginal

Figure 6.3.2.1d

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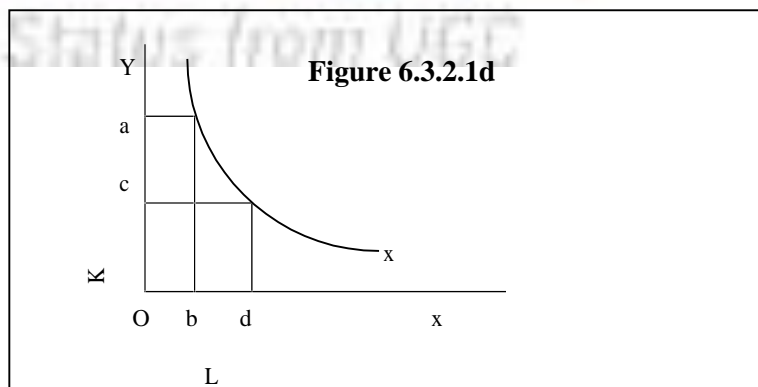
productivity of labour.

MP_K stands for marginal productivity of capital.

2 Properties of isoquants

In this chapter we are concerned with the convex isoquant. Therefore, given below are the properties of the convex isoquants:

➤ **Negatively sloping:** The isoquants are negatively sloping because if the additional labour is to be hired then capital must decrease so that the level of output remains the same.

➤ **Two isoquants do not intersect each other:**
Two isoquants do not intersect as one point cannot represent two different levels of outputs.

➤ **Convex to the origin:** The isoquants are convex to the origin. It implies as we move down from the isoquant, the amount of capital the producer is willing to give up for additional labour goes on decreasing. This means that the he is willing to give up less and less of capital for more of labour.
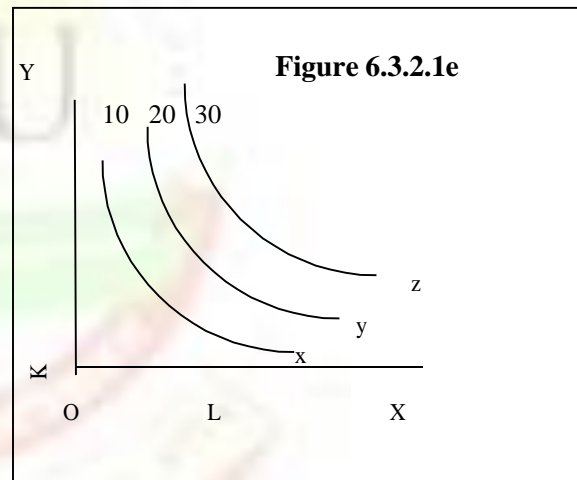
Figure 6.3.2.1e

➤ **Higher isoquant represents higher level of output:** As we move from one isoquant to another isoquant the level of output that is represented by each isoquant goes on increasing. Figure 6.3.2.1e shows the isoquant map. As we are moving from isoquant x to isoquant y to isoquant z, the level of output

Properties of Isoquants

Negatively sloping

Do not intersect

Convex to the origin

Higher isoquant represents higher level of satisfaction

represented by each isoquant goes on decreasing. Isoquant x represents 10 units of output, isoquant y represent 20 units of y and isoquant z represents 30 units of output.

6.3.2.2 Explanation of the Law

Laws of returns to scale tells us about the long run analysis of production. It tells us how the contribution of labour and capital would change or how the level of output will change when we increase both labour and capital in the long run. In the long run, output may be increased by changing all the factors of production by the same proportion or by different proportions. Traditional theory of production concentrates on the first case i.e. in law of returns to scale we change both labour and capital in the same proportion.

Returns to scale refers to the changes in output as all factors of production change by the same proportion in the long run.

Suppose we have,

$X_0 = f(L_0, K_0)$ i.e. initial output is a function of initial labour and initial capital.

Now, if we increase labour and capital by the same proportion say m then the new production function will become,

$X^* = f(mL, mK)$,

Or, if it is possible to take out the common factor then,

$X^* = m^n X_0$ i.e. new level of output will be a certain multiple of the original output.

If X* increases by the same proportion m as the inputs then it is called as constant returns to scale. It can be written as,

Constant returns to scale - n = 1.

For explaining the constant returns to scale we draw straight lines from the origin which passes through the various isoquants. These lines are called as product lines. The distance between these lines (OA and OB in figure 6.3.2.2a) tells us about the returns to scale. Constant returns to scale implies that if we double the inputs then the output would also be doubled. So if we are on isoquant x1 then
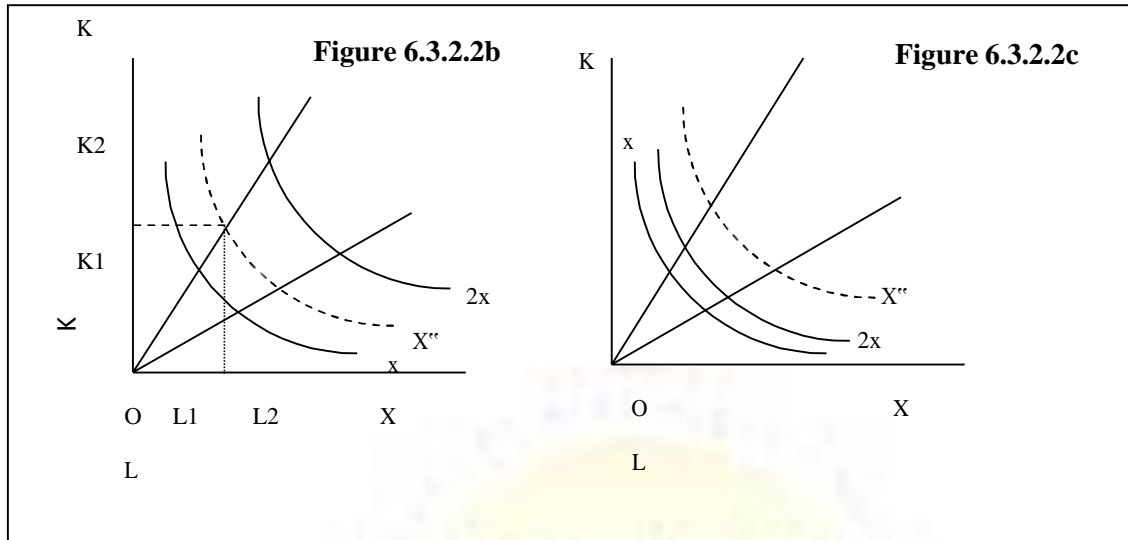

Figure 6.3.2.2a
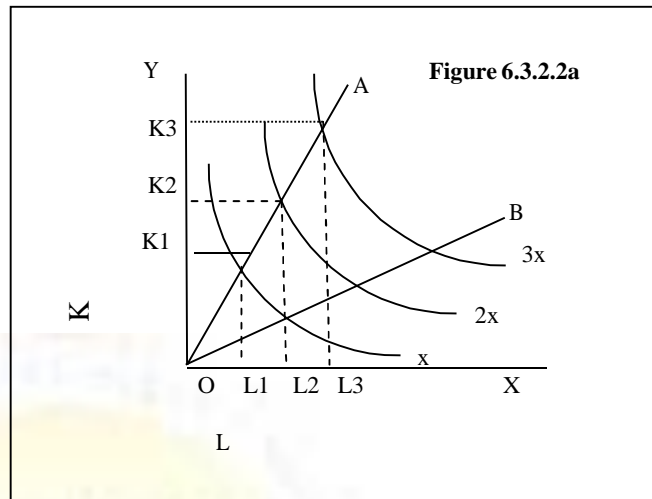
we are using OL1 of labour and OK1 of capital. If we double the labour and capital i.e. OL2 of labour and OK2 of capital then we move to a higher isoquant i.e. from x to 2x which is producing double the level of output. Constant returns to scale implies constant costs as factors of production have same efficiency.

If X* increases by less than proportionately with the increase in factors then we have decreasing returns to scale.

Decreasing returns to scale – n < 1.

Decreasing returns to scale are explained in figure 6.3.2.2b. Decreasing returns to scale implies that if we want to double the level of output (2x) then we will need not to double the labour and capital but we will have to increase labour and capital more than the double. This is because there are decreasing returns to a factor. This can be shown in the figure. If we double the labour and capital then we should have been at X" but since we are experiencing decreasing returns so we need to employ more than double the level of original labour and capital. Thus, in order to attain 2x we will need more than the double of original labour and capital. Decreasing returns to a scale implies increasing costs as the factors of production are not efficient.

Figure 6.3.2.2b   **Figure 6.3.2.2c**

If X* increases by more than proportionately with the increase in factors then we have increasing returns to scale.

Increasing returns to scale – n > 1.

Figure 6.3.2.2c shows the increasing returns to a factor. In increasing returns to a scale the factors of production are very efficient. For producing 2x we will just need less than double the level of labour and capital. Thus, if we double the factors then we would reach X" but since it is increasing returns to a scale, therefore, 2x would be attained much earlier with less of labour and capital. Increasing returns to scale implies decreasing costs as the factors of production are very efficient.

6.4 EQUILIBRIUM OF THE FIRM: OPTIMAL COMBINATION OF INPUTS

By now, we have studied that in the long run the firm wants to be at the highest possible isoquant. However, whether the firm can produce the output level assoiciated with the highest possible isoquant or not will depend on certain factors. Therefore, in this section we will study that how firm will take a decision to produce the level of output from all the available outputs represented by the different isoquants. We will also study that how the firm will decide that how much of labour and capital will go into the production of that commodity.

6.4.1 Assumptions

The following assumptions are made:

1) The goal of the firm is profit maximization. This implies that the goal of the firm is to maximize the difference between revenue and costs.
2) The price of the output is given and constant.
3) The prices of the factors of production i.e. labour and capital are given and constant.
4) The firm is producing one product.

6.4.2 Equilibrium

Since, the objective of the firm is profit maximization; therefore, profits can be maximized when the difference between revenue and costs is maximized. Revenue can be maximized by producing more output. Therefore, profits can be maximized in two ways:

➢ Maximizing output when cost is given / constant
➢ Minimizing costs when output is given

6.4.2.1 Maximizing output when cost is given / constant

In this case the firm has decided how much of costs are to be incurred and now, it has to decide which level of output can be produced with this costs. For this purpose, we need a concept of isocost line. Isocost line implies a line which shows same costs of capital and labour throughout. Figure 6.4.2.1a shows the isocost line AB.

Koutsoyiannis, has defined isocost line as,

"The locus of all combinations of factors the firm can purchase with a given monetary outlay"[5]

The slope of the isocost line is the ratio of the price of labour (w) over the price of capital (r).

Slope of isocost line = w /r.

3x

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[5] Koutsoyiannis, A. (1979), op.cit.
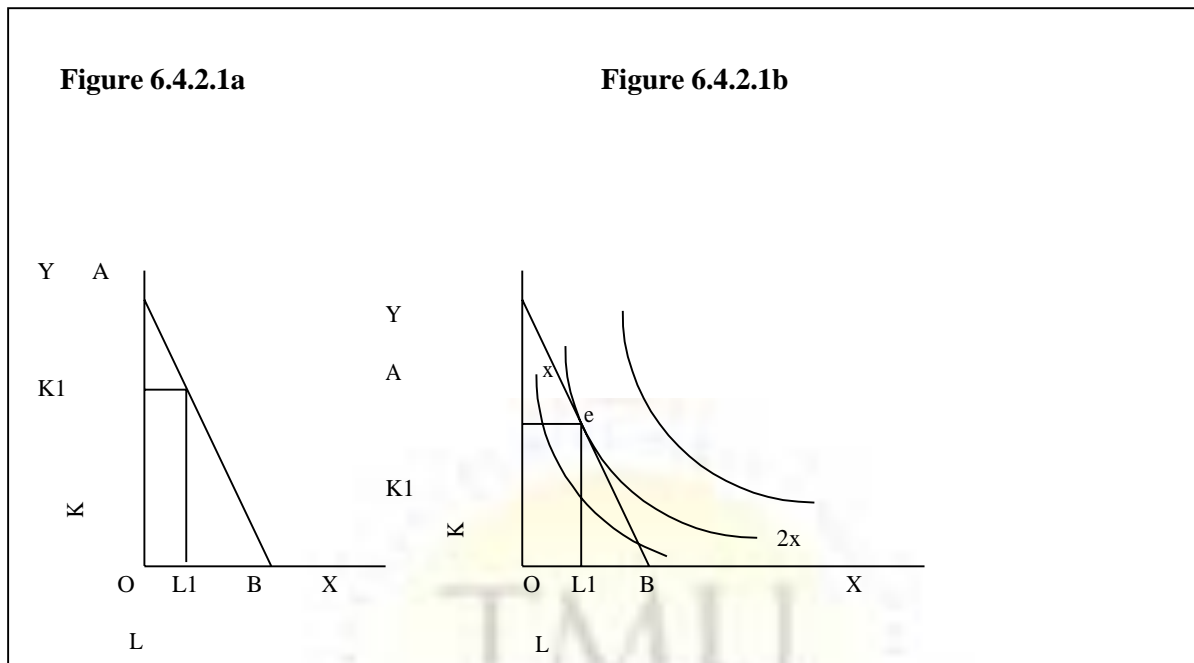
Figure 6.4.2.1a **Figure 6.4.2.1b**

Figure 6.4.2.1a shows the isocost line. AB shows the different combinations of labour and capital which can be purchased with the given budget of the producer. The figure 6.4.2.1b shows the equilibrium of the firm. For this purpose the isoquant map has been superimposed over the isocost line AB. The firm has the choice of three isoquants i.e. x, 2x and 3x. However, the isoquant 3x is not within the reach of the producer. The producer given his cost constraint AB can produce 2x level of output. However, the decision pertaining to the exact combination of labour and capital depends on the tangency of the isoquant 2x on the isocost line. In figure 6.4.2.1b the isoquant is tangent to the isocost line AB at point e. Thus, the producer will produce 2x with OL1 of labour and OK1 of capital.

6.4.2.2 Minimizing costs when output is given

In this situation the firm has decided to produce a given level of output and now it has to find the minimum cost of production required to produce such output. This is explained with the help of figure 6.4.2.2a, 6.4.2.2b and 6.4.2.2c. In the first part of the figure i.e. in 6.4.2.2a the isoquant x has been chosen by the firm and now the firm has to find the optimal combination of labour and capital i.e. the minimum costs of production. Figure 6.4.2.2b shows the different isocost lines which show the different costs of production. Now we superimpose the isoquant over the isocosts lines. The point where the one of the isocost line is tangent to the isoquant is called as

the equilibrium point. The equilibrium point e shows that the firm will produce x level of output with OL1units of labour and OK1 units of capital with CD isocost line.
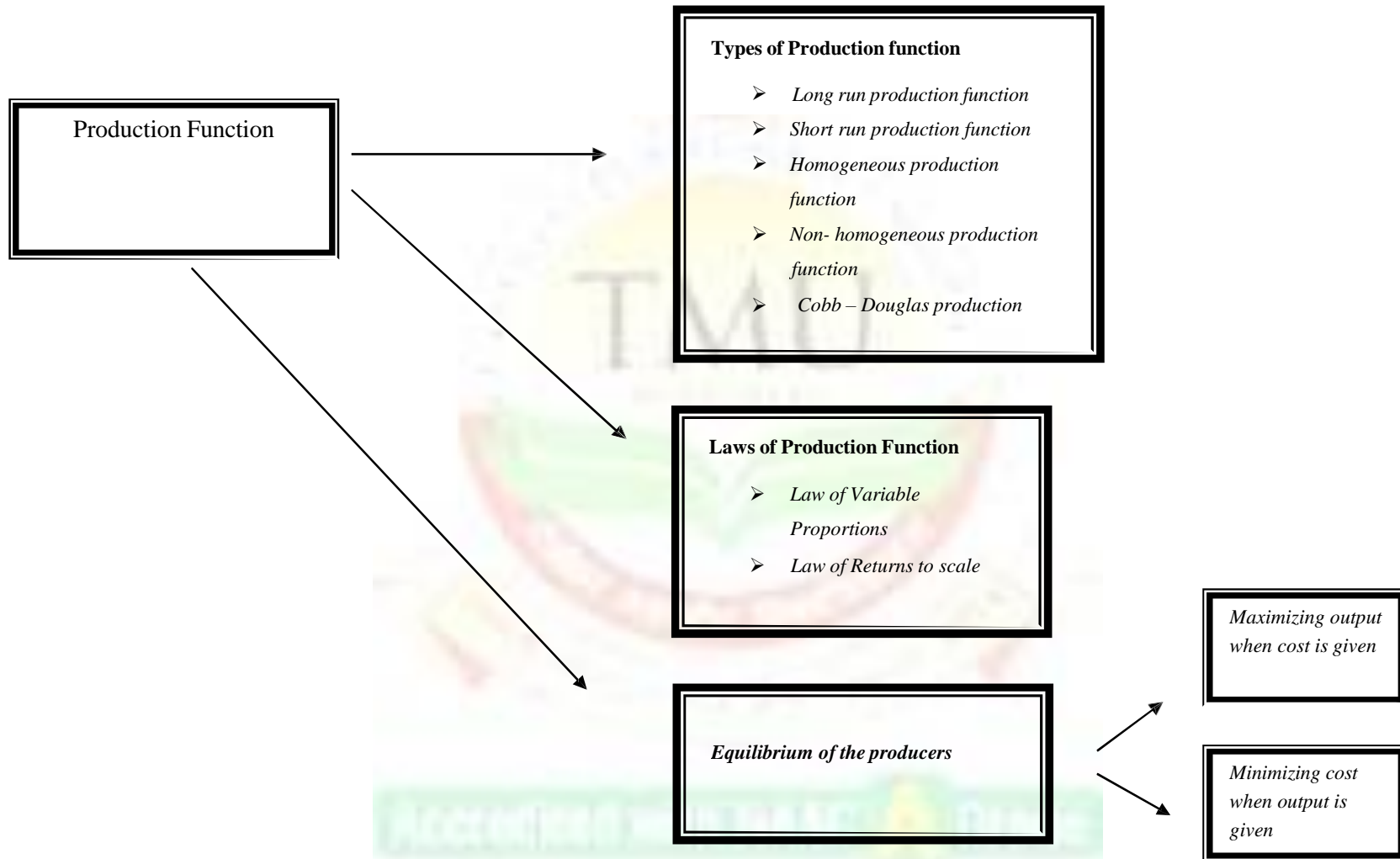

Figure 6.4.2.2a   Figure 6.4.2.2b   Figure 6.4.2.2c
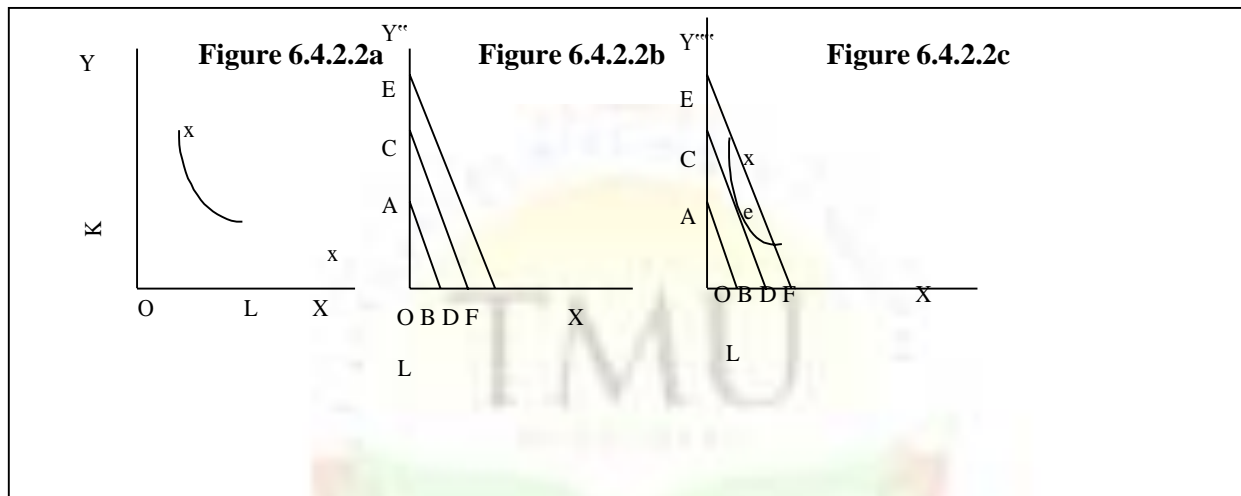
6.5 A QUICK REVISION

Figure 6.5.1 quickly summarizes the whole chapter

Figure 6.5.1 A QUICK REVISION

Production Function

Types of Production function

➢ Long run production function
➢ Short run production function
➢ Homogeneous production function
➢ Non- homogeneous production function
➢ Cobb – Douglas production

Laws of Production Function

➢ Law of Variable Proportions
➢ Law of Returns to scale

Equilibrium of the producers

Maximizing output when cost is given

Minimizing cost when output is given

6.6 KEYWORDS

Production, production function, fixed factors, variable factors, total product, average product, marginal product, variable proportions, returns to scale, isocost line, isoquants, isocline, marginal rate of technical substitution.

6.7 ASSESS YOUR PERFORMANCE

Short Questions

1) What is production function?

   ➤ Production function shows the technical relationship between factor inputs and factor outputs. It can be written as,

   X = f (La, L, K, R)

   Where, X stands for output,

   La stands for land,

   L stands for labour,

   K stands for capital,

   R stands for raw material.

2) What are fixed factors of production?

   ➤ Fixed factors of production are those factors of production which come into the production till the factory is ready for trial production. Such as land, building, machinery etc. These are grouped under capital. These factors cannot be increased or decreased in the short run.

3) Explain the law of variable proportions.

   ➤ The law of variable proportions says that in the short run labour is variable and capital is fixed then total output will increase initially but beyond a certain point it will decrease. This is called as the law of variable proportions because the proportions of the variable factor (labour) are increased to the fixed proportion of capital.

4) What are isoquants?

➢ In the long run as both labour and capital are variable; therefore, a particular level of output can be produced with the help of some labour and capital. The line which joins all the technically efficient combinations of labour and capital for producing a given level of output is called as isoquant.

5) What is average product?

➢ Average product is the total amount of output produced by total labour.

It can be written as,

AP = X/L, where AP is the average product, X stands for total output and L stands for total labour employed.

Long Questions

Q.1 Explain the law of variable proportions.

Q.2 Discuss the laws of returns to scale.

Q.3 What is production function? Explain how equilibrium is determined when the producer is producing one commodity.

Q.4 Explain the laws of production.

Q. 5 Explain the long run behavior of labour and capital in the theory of production. Also explain the attainment of equilibrium when the producer aims at maximizing output given a cost constraint.

6.8 Suggested Readings

Ahuja, H.L. (1980), Modern Economics, S.Chand and Company Limited, New Delhi.

Satija, Kalpana (2009), Textbook on Economics for Law Students, Universal Law Publishing Company, Delhi.

Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

LESSON 7

Theory of Costs

7.1 OBJECTIVES OF THE CHAPTER

The objective of this chapter is to apprise the readers about how the decisions regarding the costs of production are taken by the producer. This is done through the explanation of the short run costs of production and long run costs of production as given in the traditional theory of costs of production.

7.2 INTRODUCTION

Economic theory has given various concepts of costs. These are discussed below:

1) **Long run costs:** Cost of production is dependent on many factors. It is dependent on the level of output, technology and prices of inputs. The long run cost function can be written as,

$C = f (X, P_f, T)$

Where, c stands for costs, X stands for the level of output, P_f stands for prices of the inputs and T stands for technology.

Long run costs are also called as planning costs or ex-ante costs. These are called so because they present the optimal opportunities for the expansion of the output and thus, help the entrepreneur plan his level of investment.

2) **Short run costs:** Short run costs of production are those costs which are incurred in the short run. Since, in the short run factors of production are divided into fixed and variable factors of production, therefore; the costs incurred on fixed factors are called as fixed costs and the costs incurred on variable factors are called as variable costs. The cost function can be written as,

$C = f(X, P_f, \overline{K})$,

Where, $\overline{K}$ is the fixed factors.

If the prices of inputs and technology also remain constant then the short run cost function can be written as,

$C = f(X)$

3) **Explicit costs:** Costs incurred on the purchase of different factors of production are called as explicit costs. These are not self owned rather these are bought from the market.

4) **Implicit costs:** Certain factors of production are self owned and thus, these are not bought from the market. For example, if the entrepreneur makes use of his personal house as office for working then an imputed value of the office would be calculated. That value would be called as implicit costs.

5) **Accounting costs:** Accounting costs includes the payments made to the different factors of production and other costs that are entered in the books of accounting.

6) **Opportunity costs:** Opportunity costs are the costs of the next best alternative foregone.

7) **Economic costs:** Economic costs are the costs which includes both opportunity costs and accounting costs.

7.3 THE TRADITIONAL THEORY OF COSTS

The behaviour of the costs of production can be studied under the traditional theory of costs. The traditional theory distinguishes between the short run and long run. Short run has been defined as that time period in which some factors are fixed and some are variable. Thus, in the short run we

have fixed costs as well as variable costs. Long run has been defined as that time period in which all the factors of production are variable. Thus, all the costs are variable in the long run.

7.3.1 Short run costs of the traditional theory

In the short run costs are divided into:

1) **Total costs:**

   Total costs are the total expenditure incurred on the different factors of production. Since, there are fixed factors and variable factors of production in the short run, therefore; the total costs can be divided into:

   TC = TFC +TVC

   Where, TC stands for total costs,

   TFC stands for total fixed costs,

   TVC stands for total variable costs.

   ➢ **Total fixed costs:**

   Total fixed costs are the costs incurred on the fixed factors of production. The fixed costs includes[1]:

   a. Salaries of administrative staff
   b. Depreciation of machinery
   c. Expenses for building depreciation and repairs
   d. Expenses for land maintenance and depreciation.

   Total fixed costs curve is shown in figure 7.3.1a. In the figure on OX axis we have the level of output and on OY axis we have the level of costs. Total fixed cost curve is a straight line parallel to OX axis. This shows that as the level of output increases the fixed costs remains constant.
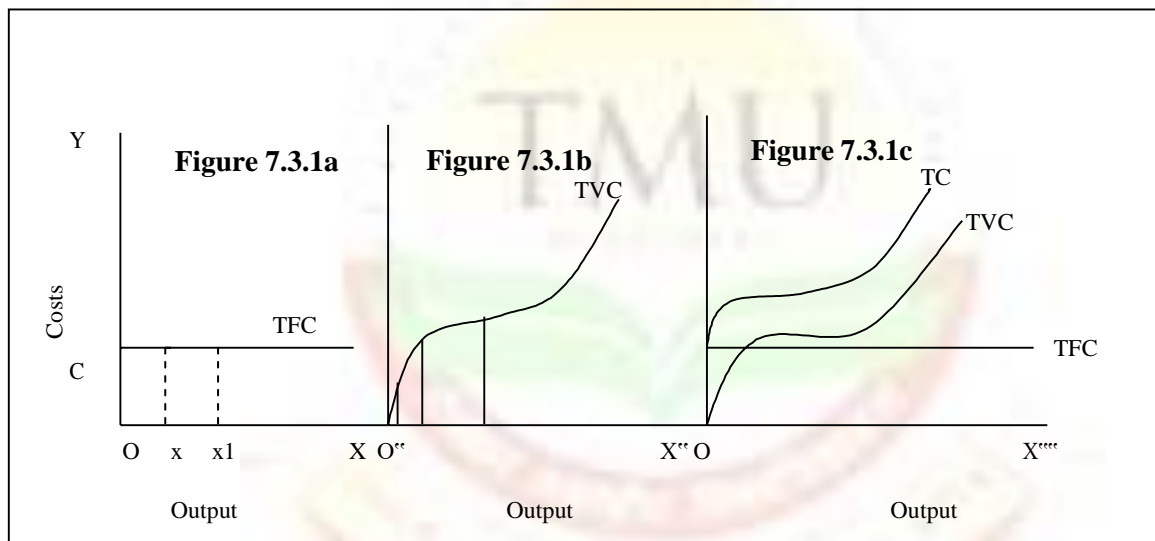
   ➢ **Total variable costs:**

   Total variable costs are the costs incurred on the variable factors of production. The variable costs includes[2]:

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[1] Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

[2] Ibid.

a. The raw materials

b. Costs of direct labour

c. Running expenses of fixed capital, such as fuel, ordinary repairs.

The total variable cost curve is shown in figure 7.3.1b. Its shape is called inverted

S- shape. This shape is due to the law of variable proportions. In initially, as the variable factor i.e. labour is employed, its productivity initially increases then reaches a maximum and then starts to decline and then it becomes negative.

Figure 7.3.1a   Figure 7.3.1b   Figure 7.3.1c

The total costs curve is obtained by joining adding both TFC and TVC. The total cost curve does not start from the origin as fixed costs do not become zero. After that total fixed costs take the shape of total variable costs.

2) **Average Costs**

Average costs are per unit costs of production. Average costs are obtained by dividing the total costs with the total output produced. It can be written as,

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

Where, AC stands for average costs,

TC stands for total costs,

And X stands for total output.

Average costs are divided into average fixed costs and average variable costs.
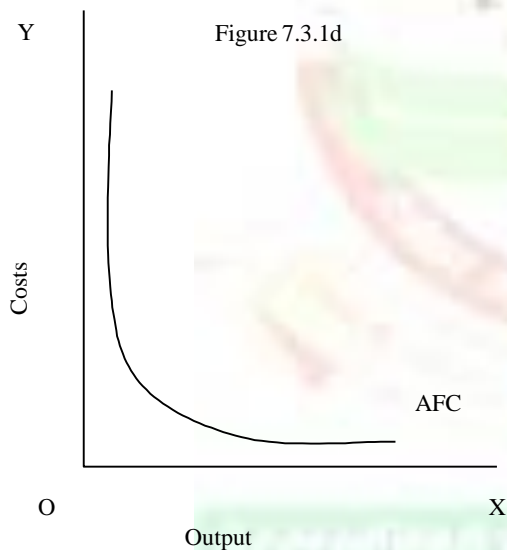
> ➤ **Average fixed costs:**
>
> Average fixed costs are the per unit fixed costs. This can be written as,

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

Or $\frac{AC}{X} = \frac{TFC + TVC}{X}$

Or, $AC = AFC + AVC$

Where, AFC stands for average fixed costs and AVC stands for average variable costs.

Figure 7.3.1d

The average fixed cost curve is shown in figure 7.3.1d. The shape of the curve is a rectangular hyperbola. Rectangular hyperbola means that at each stage same amount is added. This is true because average fixed cost curve is the slope of the total fixed cost curve. At every stage total fixed costs remain the same but the denominator keeps on increasing. This leads to a fall in the average fixed cost curve.

> ➤ **Average variable costs:**

Average variable costs are derived from slope of the total variable cost curve. Average variable costs are the variable costs per unit of output. These are obtained by dividing total variable costs by the total output. Figure 7.3.1e[3] shows the average variable cost curve. Average variable cost curve is U-shaped cost curve. The reason for the u - shape of the average cost curve is the application of the law of variable proportions. When initially the productivity of the factors is high then per unit costs are decreasing. Then the average variable cost curve reaches a minimum (point e) indicating that the productivity of the factors is maximum. After that the productivity of the factors start decreasing and as a result the per unit costs start increasing. This is why the average variable cost curve is u-shaped.

Figure 7.3.1e
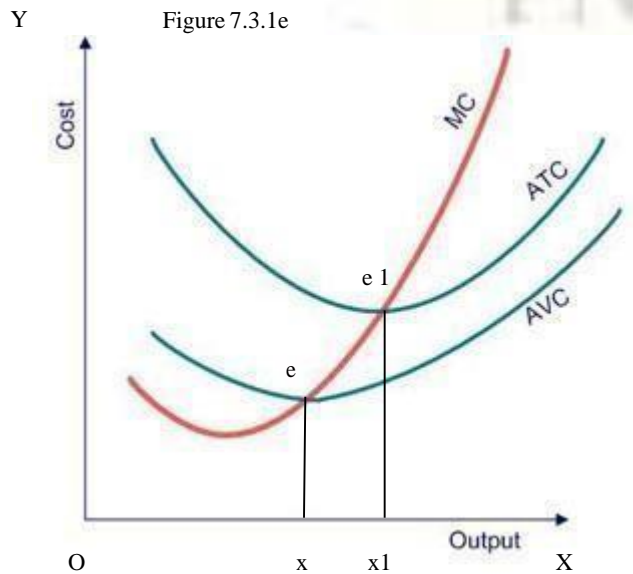
Average cost curve is derived from the summation of average fixed costs and average variable costs. As can be seen from the figure average total cost curve is also u – shaped. This is also due to the operation of the law of variable proportions. Initially average total cost curve declines, reaches a minimum at point e 1 then it starts to increase. The minimum point of average cost curve is also called as the level of optimum operation of

[3]This image has been accessed from:
https://www.google.co.in/search?q=image+of+average+variable+cost+curve&tbm=isch&imgil=u
-    aIdJadFGuwZM%253A%253Bhttps%253A%252F%252Fencrypted-tbn0.gsta

the plant (e 1). Graphically the average total cost curve is derived from the slope of the straight line drawn from the origin to the point on the total cost curve corresponding to that particular level.

3) **Marginal costs**

   Marginal cost is defined as the change in the total cost which results from a unit change in output. Mathematically, it can be written as,

   $$MC = \frac{\Delta TC}{\Delta X}$$

   Where, MC stands for marginal cost of production.

   Thus, it shows that the marginal cost of production is the change in the total cost caused by the production of an additional unit of output. Graphically, marginal cost curve is the slope of the total cost curve. The marginal cost curve is also u – shaped. This is shown in figure 7.3.1e. Initially the marginal cost curve is decreasing then it reaches a minimum point. After the minimum point it immediately starts increasing.

Thus, the traditional theory of costs divides the costs on the basis of the time period. In the short run the cost curves (AC, AVC, and MC) are assumed to be u - shaped. This u – shape of the cost curves is due to the application of the law of variable proportions. The u – shape of the costs curve implies that in the short run with a fixed plant there is phase of increasing productivity or declining costs for the firm then there is a phase of decreasing productivity or increasing costs. In between the two phases there is a single point which gives minimum costs to the firm. When the firm reaches the minimum point then the plant is utilized optimally. So, this point is also called as the optimum point of production.

7.3.2 Relationship between average total cost and average variable cost

Given below are the main points of the relationship between average total cost and average variable cost:

1) The average variable cost is a part of average total cost as,

   AC = ATC +AVC

2) Both average variable cost and average total costs curves are u – shaped.

3) The minimum point of average total cost occurs to the right of the minimum point of average variable cost. This can be seen from figure 7.3.1e. e 1 comes to the right of the minimum point of average variable cost curve i.e. e. The reason for this is that average total cost curve includes average fixed cost and average variable cost.

4) Since average cost curve includes average fixed and average variable costs, therefore, the fall in average cost curve is due to these only. Average fixed costs falls as the output is increased. So, when the AVC reaches minimum point, AC is still falling as AFC is able to counter the rise in the variable costs.

5) However, beyond point e 1 the fall in average fixed costs is not able to pull the average cost curve down as the inefficiency of the variable factor rises strongly which is revealed in the sharp rise of average variable cost curve. Thus, beyond point e1 average variable cost curve is pulling the average cost curve upwards.

7.3.3 Relationship between marginal cost and average total cost

The relationship between the marginal cost and average total cost is explained below:

1) The marginal cost curve cuts the average total cost curve and the average variable cost curve at their minimum points.

2) As long as the marginal cost lies below the average cost curve, it pulls the latter downwards. When the marginal cost curve lies above the average cost curve then it pulls the latter upward.

### 7.3.4 Long run costs of the traditional theory

In the long run all the factors of production are variable. There is no fixed factor. In the long run the scale of the plant can also be changed as more of both capital and labour can be hired. In the long run the traditional theory discusses two cost curves:

7.3.4.1 Long run average cost curve:

Long run average cost curve is also called as the planning curve as it presents before the entrepreneur the opportunities to expand the scale of the plant in the future. In the long run firm is concerned about the average costs only. The long run average cost curve is derived from the short run cost curve. This is because long run is assumed to be a summation of the short run

periods. Thus, the decisions that are taken in the short run are also relevant for the same level of output in the long run. Let us assume that the firm has the choice of the five plants with the available technology. Each plant is fit for a particular level of output. This is revealed in figure 7.3.4.1a. The firm has five plants. For producing 100 units of output the firm operates at the first plant (SAC 1). When the firm has to produce 135 units of output it can choose between the first plant and the second plant. If the firm expects that the demand for its product is likely to expand in future then the firm will shift to the next plant. However, this is for sure that for anything more than 135 units the firm will not operate on the first plant as it would be inefficient. Thus, the firm will install the next plant for anything more than 135 units. Therefore, the firm will move to the second plant (SAC 2). The firm would be at this plant only till the 240 units after which the firm will again install the next plant. This process will go on.

Now, we relax the assumption of the five plants and assume that the available technology includes many plant sizes each suitable for a certain level of output. Then the points of intersection will also become numerous. If we have a very large number of plants then we will have a curve which continuously shows the long run planning curve of the firm. It is called as the planning curve as it explains the different optimal decisions for producing the different levels of output. It also presents before the firm the opportunities available for it in the long run for expansion. This is explained in figure 7.3.4.1b.[4]

Figure 7.3.4.1a

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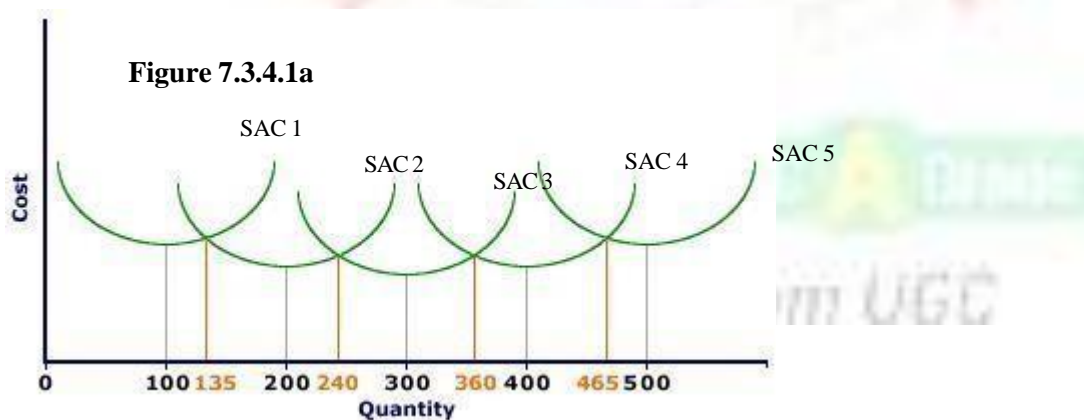
[4] This picture is accessed from:
https://www.google.co.in/search?q=images+of+long+run+average+cost+curve+of+traditional+theory&biw=1280
& bih=709&tbm=isch&imgil=ZGWV9MDWB0U3AM%253A%253Bhttps%253A%252F%252Fencrypted-
tbn1.gstatic.com%252Fima.

Figure 7.3.4.1b shows the long run average cost curve with the three different plants. For producing 2000 units of output the first short run average cost curve (SAC 1) is relevant. However, if the market demand of the firm expands to 3000 units even then the firm will operate at SAC 1 because at that level of output SAC 2 will be inefficient as it will give him more costs. However, as the firm expands and reaches 4000 units of output then it can choose between SAC 1 and SAC 2. Likewise, the firm will move from SAC 2 to SAC 3. Here the important thing to note is that when the costs are decreasing in the long run then these are also decreasing in the short run. In the figure, when LAC is declining then SAC1 is also declining. When LAC reaches a minimum point then in the short run also the firm reaches a minimum point. In the figure, LAC is minimum at point m. At this point the short run average cost curve i.e. SAC 2 is also at its minimum.

Figure 7.3.4.1b
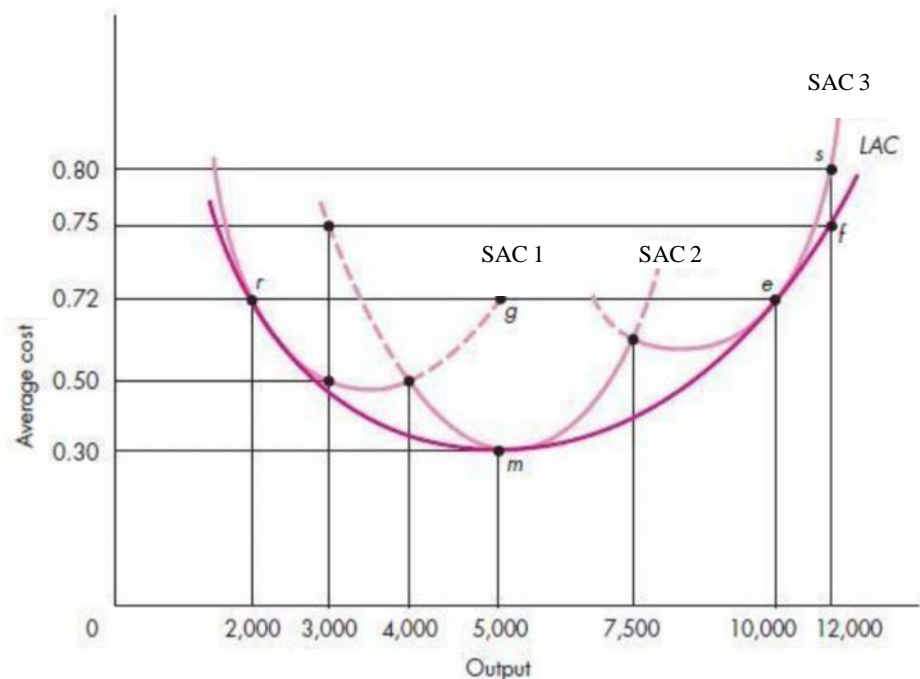
When the long run average cost curve starts to increase then in the short run also the costs are increasing. Thus, long run average cost curve is also called as the envelope curve because it envelops all the short run average cost curves. It also envelops the optimal decisions for producing the different levels of output. Optimality implies that each point on the long run average cost curve represents the minimum cost for producing that particular level of output. Thus, there is no other lower level of costs of production for producing that level of output. If the producer is on any point above the long run average cost curve then it is inefficient because it

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will show higher costs for producing output. Likewise, any point below the cost curve is desirable because it indicates lower per unit costs. However, given the current state of technology such a point is not attainable. Further, when the LAC is falling the plants are not fully utilized and when the LAC is rising the plants are over – utilized. Only at the minimum point of LAC the plant is being fully utilized.

The long run average cost curve is also U – shaped. The U- shape of the cost curve implies that the firm has only one level of output which is produced at minimum cost of production. This U – shape of the long average cost curve is due to the operation of the economies and diseconomies of scale. Economies of scale are the advantages that accrue to a firm. When initially the firm is producing 2000 units the firm is experiencing economies of scale. Because of this per unit costs start declining. Then the firm reaches a minimum cost point where these benefits are maximum but after that the firm experience diseconomies of scale. Such diseconomies of scale are largely due to the managerial diseconomies that accrue to a firm at higher levels of output. At such higher levels of output it becomes difficult for the managers to handle such operations and thus, they take wrong decisions. This leads to increase in costs and thus, the long run average cost curve starts increasing. The U – shape of the cost curves in the traditional theory has another implication. The cost curves are so shaped that the firm can optimally produce only one level of output. There is no reserve capacity with the firms because of which the firms are not supposed to have excess stock to meet even the seasonal variations. Thus, complete inflexibility is there.

7.3.4.2 Long run marginal cost curve

The long run marginal cost curve is also U – shaped. It is derived from the short run marginal cost curve. However, it is not an envelope curve. The long run marginal cost curve is obtained from the points of intersection of the short run marginal cost curves with vertical lines to the OX axis drawn from the points of tangency of the corresponding SAC curves and LAC curves. In figure 7.3.4.2a the long run and short run average cost curves are drawn. For producing OX1 level of output, aX1 is the minimum cost of production. So the point where the vertical line aX1 cuts the short run marginal cost curve, that point is the first point of long run marginal cost curve. In the figure point c is the point where the vertical line drawn from point a is cutting the short run marginal cost curve (SMC 1). Likewise, at point d the vertical line drawn from point a 1 is cutting the short run marginal cost curve (SMC 2). At point e, the vertical line eXm is cutting the

short run marginal cost curve (SMC 3). Therefore, we join points c, d and e. this curve is called as the long run marginal cost curve. The long run maginal cost curve is intitally lying below the long run average cost curve. Then it cuts the long run average cost curve from below at point e. After point e the long run marginal cost curve is lying above the long run average cost curve. As long as the long run marginal cost curve is lying below the long run average cost curve, it is pulling the latter curve downwards. When the long run marginal cost curve is lying above the long run average cost curve then it pulls the latter upwards.

At point e we have,

SAC = SMC = LAC = LMC i.e.

At point e, short run average cost curve is equal to short run marginal cost curve is equal to long run average cost curve is equal to the long run marginal cost curve.

Figure 7.3.4.2a
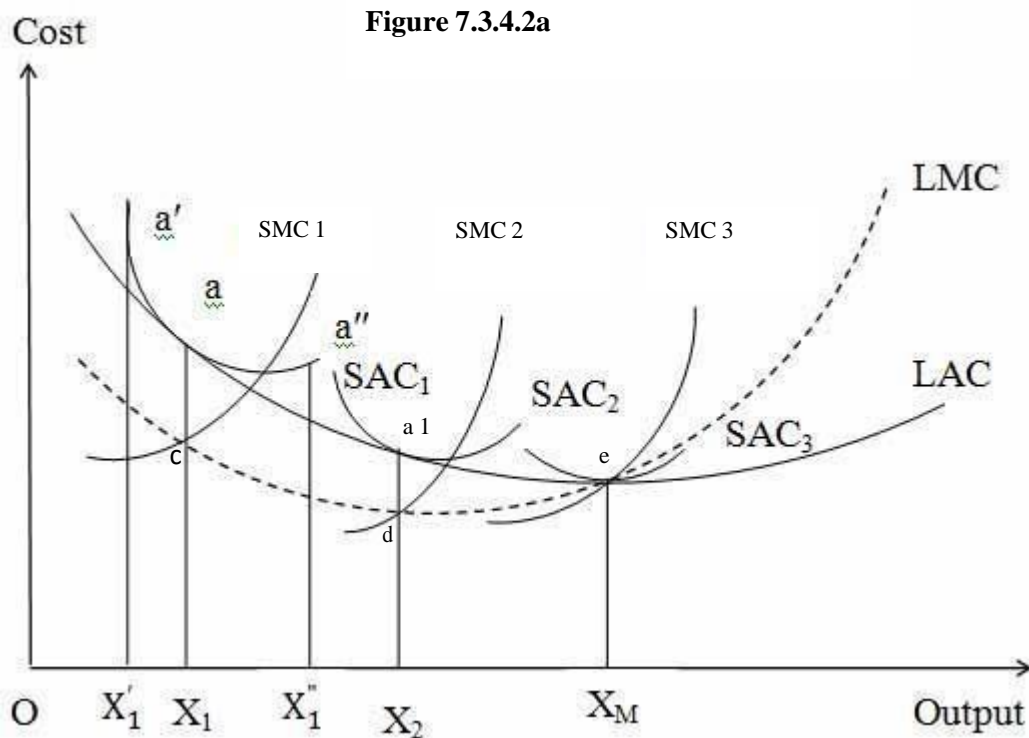
7.4 REASONS FOR THE U – SHAPE OF THE COST CURVES: ECONOMIES AND DISECONOMIES OF SCALE

The traditional theory of costs believes that the u shape of the cost curves is due to the economies and diseconomies of scale. Whenever, in the long run, a firm expands its level of output it derives various benefits. Such benefits lead to a reduction in the costs of production; these are called as economies of scale. These are defined as the reduction in the average cost of a product in the long run resulting from an expanded level of output of industry. Likewise, diseconomies of scale are the increases in the average costs of a product in the long run resulting from an expanded level of output of the industry. These can be classified into:

➢ **External economies and diseconomies of scale**: External economies arise from the expansion of the industry, i.e. reductions in the costs of all the firms in an industry due to the expansion of overall industry. External diseconomies arise from the expansion of the industry, i.e. increase in the costs of all the firms in an industry due to the expansion of overall industry. Thus, external economies and diseconomies are not dependent on the output level of the individual firm rather these are dependent on the output level of the total industry.

The external economies of scale shift the long run average cost curve downwards. In figure 7.4.1 the firm is originally at LAC1. However, due to the increased output certain benefits accrue to all the firms in the industry. As a result the long run average cost curve shifts downwards from LAC1 to LAC2.
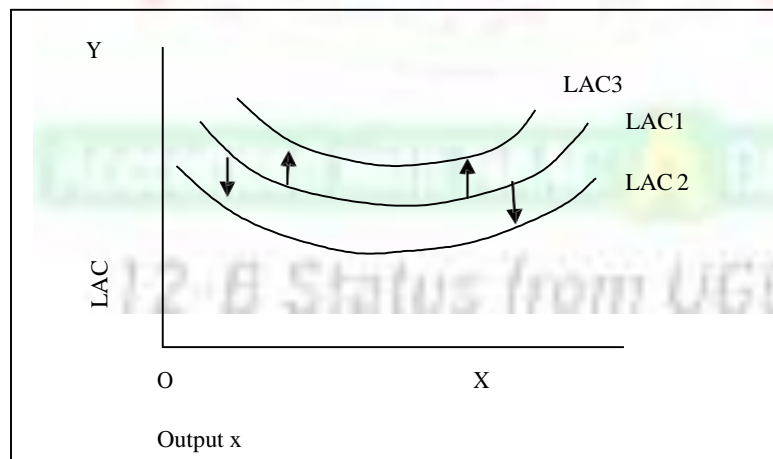
Likewise, when there are external diseconomies of scale then the long run average cost curve shifts upwards from LAC1 to LAC3.

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Marshall[5] gave the following examples of the external economies of scale:

  i. Improved methods of machinery which are accessible to the whole industry,

  ii. Economies which result from the growth of correlated branches of industry which mutually assist one another and being concentrated in the same localities encourage development of hereditary skills, the growth of subsidiary trades supplying it with implements and machinery.

  iii. Economies which are connected with the growth of knowledge and the progress of arts, especially in matters of trade knowledge: newspapers, trades, trade and technical publications.

Thus, external economies are common to all and these are basically:

  i. **Cheap raw materials and capital equipment**: Such economies are realized when if the whole industry of a product, say x, expands then the whole industry would demand more of raw materials, capital equipment. As a result the industries that are supplying raw materials and capital equipment will expand their output and this will lead to decrease in costs of these. Such benefits are passed on to the main industry producing x.

  ii. **Economies due to technological up gradation that are common to all the firms in the industry**: When the whole industry expands this may lead to the discovery of new technical knowledge, innovations and new methods of production. Due to this the productivity of the whole industry will increase and as a result the costs will come down for the whole industry.

  iii. **Improved transportation and marketing services**: The economies of scale are also realized when there is an improvement in the transportation and marketing facilities or in communication services. For example, the development of the mobile telephone services has passed on economies to all the industries. Likewise, the improvement in the transportation services leads to less breakage, and saves time and costs involved in transporting.

  ➢ **Internal economies and diseconomies of scale:**

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[5] Ahuja,H.L. (1980), Modern Economics, S.Chand and Company Limited, New Delhi.

Internal economies and diseconomies of scale are those which accrue to the firms because of its own actions and are solely confined to the firm only. Such economies may arise due to the expansion in the level of output of the individual firm. The internal economies and diseconomies are independent of the level of the output of the whole industry. Likewise, the impact of the internal economies and diseconomies is solely confined to the individual firm. The internal economies and diseconomies affect the shape of the average cost curves of the firm. Thus, the external economies of scale affect the position of the average cost curve and internal economies of scale affect the shape of the average cost curve. Internal economies are of the following types:

i. **Real economies of scale:**

    Real economies of scale are those associated with a reduction in the physical quantities of inputs, raw materials, labor, machinery, circulating capital etc. Real economies of scale include production economies. These are realized from labour, capital or inventories. Labour economies are realized as when the scale of output expands the division of labour becomes possible which leads to specialization of labour. It may also lead to time saving. The division of labour also promotes the invention of machines and methods of production that supplement the workers. As the level of output expands then the specialization of capital also takes place. Another advantage is the decline in the expenditure incurred on the set up costs and inventories. Real economies also include the selling or marketing economies. Selling economies includes the advertising economies, economies that arise from the special arrangement with the dealers. Managerial economies are also a part of the real economies. Managerial economies imply division of work to the different managers which makes the organization more flexible and more efficient. Transport and storage economies are also included in the production economies.

ii. **Pecuniary economies of scale:**

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Pecuniary economies are the economies that accrue to a firm due to discounts that a firm can obtain owing to its large scale. Following are the different discounts that a firm can obtain:

A firm can manage to get discounts in the prices of raw materials, price of the finance taken from the outside sources. Banks give loans to the large firms at reduced rates owing to their large size.

A firm can also manage to get lower prices for the advertising expenditure. This may happen as large firms spend more on advertising so this may lead to a reduction in the price of advertising. Likewise transport costs may also come down.

Firms also, sometime manage to pay lower prices to the workers. This may happen due to the brand name of the company. A worker may prefer to get job in a big firm with a huge brand name but with a lower salary rather than a job in a small firm with no brand name but with high salary.

7.5 CRITICISM OF THE TRADITIONAL THEORY OF COSTS

Critics have questioned the costs curves of the traditional theory. Following are the points of criticism leveled against this theory:

1) **The cost curves are not U – shaped:**

   The critics have pointed out that the costs curves as postulated by the traditional theory of costs are not U – shaped. This shape of the cost curves in the traditional theory is based on the belief that there is no in-built flexibility in the firms. However, in reality the firms do have flexibility as they keep excess reserves for meeting the seasonal variations.
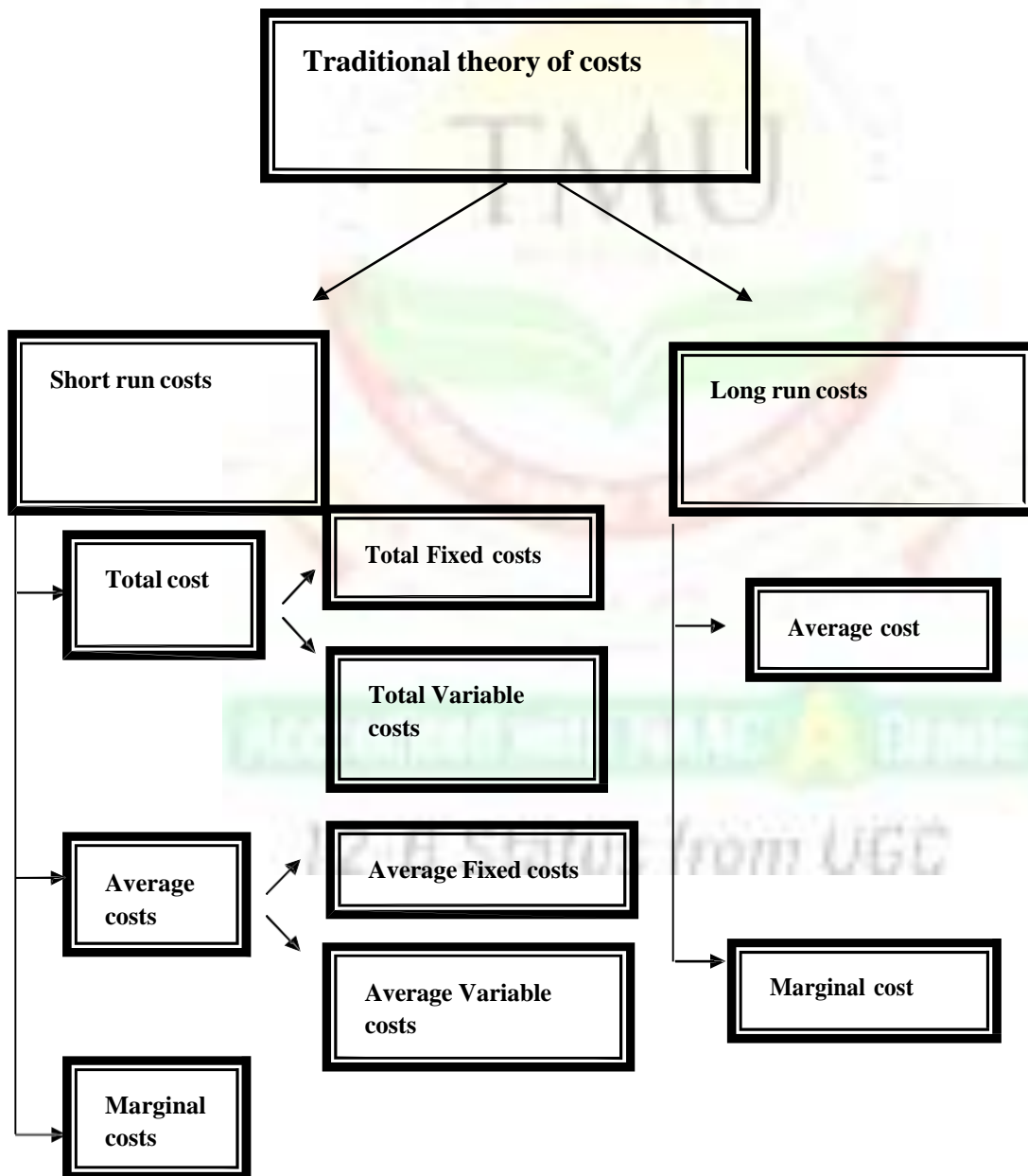
2) **Managerial diseconomies can be checked:**

   The traditional theory of costs believes that the cost start increasing after the minimum point because of the managerial diseconomies. At the higher level of output the top management becomes overburdened and thus, they take wrong decisions because of which the per unit costs start increasing. However, critics have pointed out that with time the managerial diseconomies can be checked by the improved techniques of the management science. However, even if they appear then these are overturned by the technical economies that are realized at the higher levels of output.

3) No empirical evidence in support of U – shaped cost curve:

The traditional theory of costs is also criticized on the grounds that there is no empirical evidence in support of the U – shaped cost curves. The empirical research has shown that the cost curves have long stretch of output where the costs are minimum. Such cost curves are also called as the saucer shaped cost curves. Some other empirical studies have shown the downward sloping L shaped cost curve.

7.6 A QUICK REVISION

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                     ┌──────────────────────────────┐
                     │  Traditional theory of costs  │
                     └──────────────────────────────┘
                          ↙                    ↘
        ┌──────────────────┐          ┌──────────────────┐
        │  Short run costs  │          │  Long run costs   │
        └──────────────────┘          └──────────────────┘

        ┌──────────┐    ┌────────────────┐
        │Total cost│ →  │Total Fixed costs│       ┌──────────────┐
        └──────────┘ ↘  └────────────────┘     →  │ Average cost │
                        ┌────────────────┐         └──────────────┘
                        │ Total Variable │
                        │     costs      │
                        └────────────────┘

        ┌──────────┐    ┌──────────────────┐
        │ Average  │ →  │Average Fixed costs│
        │  costs   │ ↘  └──────────────────┘     ┌──────────────┐
        └──────────┘    ┌──────────────────┐  →  │Marginal cost │
                        │ Average Variable │     └──────────────┘
                        │     costs        │
                        └──────────────────┘
        ┌──────────┐
        │ Marginal │
        │  costs   │
        └──────────┘
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7.7 KEYWORDS

Explicit cost, implicit cost, accounting cost, opportunity cost, economic cost, short run cost, long run cost, total cost, total fixed cost, total variable cost, average cost, average fixed cost, average variable cost, marginal cost, long run average cost curve, long run marginal cost curve, U – shape of the cost curve, internal economies of scale, internal diseconomies of scale, external economies of scale, external diseconomies of scale.

7.8 ASSESS YOUR PERFORMANCE

Short Questions

Q.1 What is short run total cost?

➢ Total costs are the total expenditure incurred on the different factors of production. The total costs can be divided into:

Total Cost = Total Fixed Costs +Total Variable Costs

Q.2 Explain short run average cost curve?

➢ Average costs are per unit costs of production. Average costs are obtained by dividing the total costs with the total output produced.

Q.3 Give two points of comparison of average total cost and average marginal cost?

➢ The marginal cost curve cuts the average total cost curve and the average variable cost curve at their minimum points.

➢ As long as the marginal cost lies below the average cost curve, it pulls the latter downwards. When the marginal cost curve lies above the average cost curve then it pulls the latter upward.

Q.4 What is the shape of the average cost curves in the traditional theory?

➢ U – Shape.

Q. 5 What are explicit cost?

➤ Costs incurred on the purchase of different factors of production are called as explicit costs. These are not self owned rather these are bought from the market.

Long Questions

Q.1 Explain the U –shape of the cost curves in the traditional theory of costs.

Q.2 Explain the traditional theory of costs.

Q.3 Discuss the role played by the internal and external economies of scale in the traditional theory of costs.

Q.4 Explain the different concepts of short run cost curves given by traditional theory.

Q.5 Explain the derivation of the long run average cost curve and long run marginal cost curve.

7.9 Suggested Readings

Ahuja,H.L. (1980), Modern Economics, S.Chand and Company Limited, New Delhi.

Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

Activity 1

What are the demarits of the traditional theory of costs?

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Activity 2

Define the marginal cost.

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LESSON 8

Perfect Competition

8.1 OBJECTIVES OF THE CHAPTER

From this chapter onwards we are focusing on the determination of prices and output in the different forms of market. The objective of this chapter is to unfold the determination of prices and output in perfect competition.

8.2 BASIC CONCEPTS OF REVENUE

Revenue is the total receipts of the firm that it earns by selling particular units of output in the market. There are basically three concepts of revenue:

1. **Total Revenue**

2. **Average Revenue**

3. **Marginal Revenue**

1. **Total Revenue**: Total revenue is the total amount that an individual earns by selling given units of output in the market. For example, if Mc Donald"s burger is sold at Rs. 25 and if a particular outlet of the Mc Donald"s sells, on an average, 25 pieces of burgers in a day then the total revenue of the firm is:

$TR = P \times Q$

$= 25 \times 25$

$= Rs.\ 625.$

Therefore, the total revenue of the outlet in a single day is Rs. 625.

2. **Average Revenue:**

Average revenue is the revenue per unit of output sold. It is also the demand curve of the firm. If total revenue is Rs. 1000 and the total output sold is 10 units then average revenue can be calculated by:

$AR = TR\ /\ Q$

$= 1000\ /\ 10$

$= Rs.\ 100$

3. **Marginal Revenue:**

Marginal Revenue is the addition made in the total revenue due to the sale of the additional unit of output. If the firm is originally earning Rs. 1000 by selling 10 units of a commodity but now if it sells 11 units and earns say, 1100 then the additional revenue earned by selling the additional unit is called as marginal revenue. It can be written as,

$MR = \Delta TR\ /\ \Delta X$

$= 100\ /\ 1$

$= Rs.\ 100.$

8.3 RELATIONSHIP BETWEEN TOTAL REVENUE, AVERAGE REVENUE AND MARGINAL REVENUE

The relationship between total revenue, average revenue and marginal revenue can be studied under the following heads:

1. **When AR and MR curves are constant:**

    Under perfect competition, average revenue and marginal revenue are constant and are parallel to OX axis. This is explained in figure 8.3.1a and 8.3.1b. Under perfect competition the firm has no control over prices. The firm has to sell the whole of the output at the existing prices. As is revealed in figure 8.3.1a the average and revenue curves are constant and are parallel to OX axis. The TR curve is upward sloping straight line from the origin.

Figure 8.3.1a   **Figure 8.3.1b**
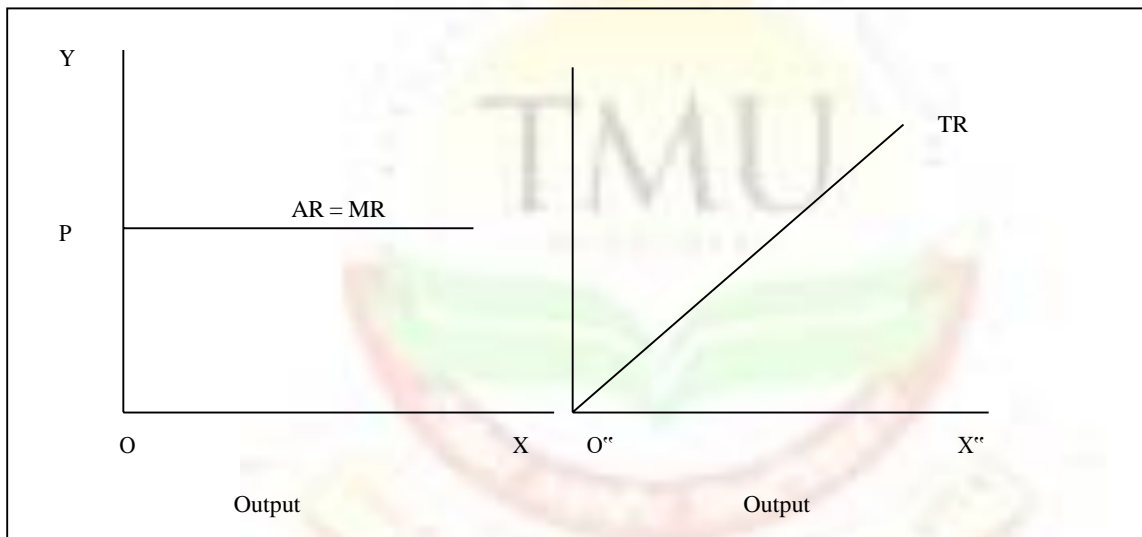
2. **When AR and MR curves are downward sloping**

    Under monopoly the AR and MR curves are downward sloping straight line. These are shown in figure 8.3.2b. The total revenue initially increases at a diminishing rate then it reaches a maximum and remains constant and then starts to decline. It is shown in figure 8.3.2a.
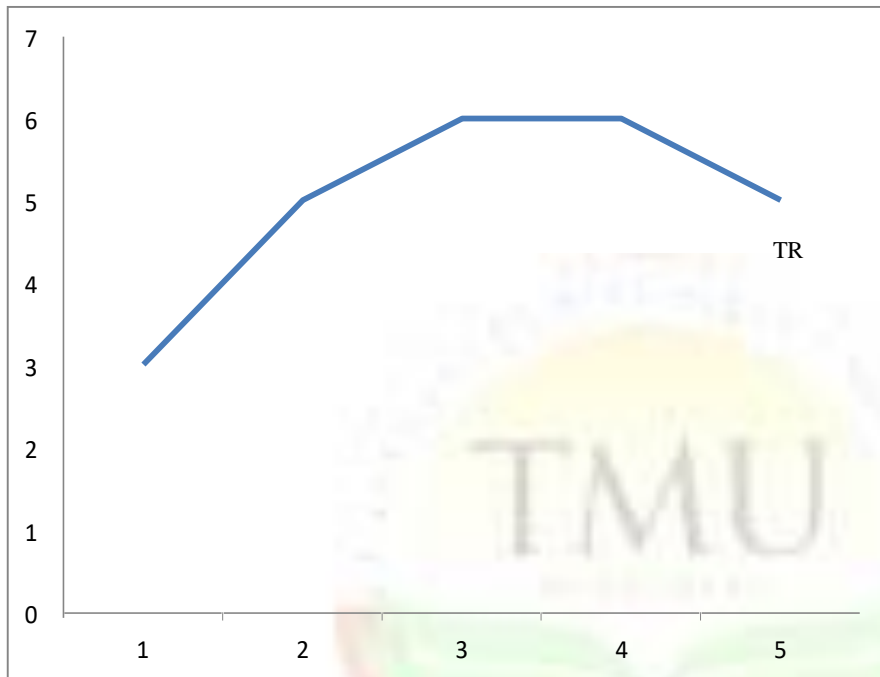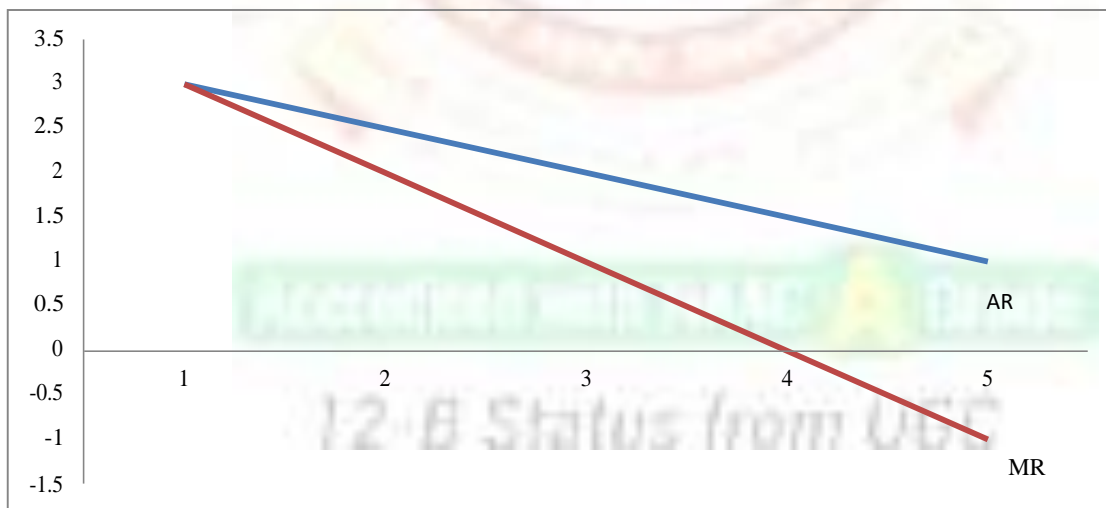
Figure 8.3.2a

Figure 8.3.2b

Marginal revenue curve lies below the average revenue curve. When TR is maximum then MR is zero but AR is still positive. When TR starts to decline then MR becomes negative but AR is still positive.

8.4 INTRODUCTION TO MARKETS

In common terminology market refers to a place where commodities are bought and sold but in economics, market does not necessarily mean a place rather it implies a system by which the buyers and sellers are able to contact each other and buy and sell commodities.

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 one another that the price of the same goods tends to equality easily and quickly."[1]

Thus, market has the following feature:

1. Market is not related to any geographical area.
2. It refers to the interaction between buyers and sellers.
3. It also refers to a commodity. Each and every commodity in economics has a market.

Markets can be classified as per various criteria. These are discussed below:

1. **Substitutability of products criterion:** As per this criterion markets are classified on the basis of existence and closeness of substitutes. That is why this criterion is called as substitutability of products criterion.
2. **Interdependence criteria:** In this criterion products are classified on the basis of the degree of interdependence between the different competitors. Thus, this criterion takes into account the extent to which the decisions of one firm is dependent on the decisions of the other firm. Hence, this criterion takes into account the total number of firms in the industry and the degree of product differentiation.
3. **Conditions of entry criterion:** This criterion was suggested by J.S. Bains. This criteria measures the ease of the entry of the firms into the industry. This implies that the markets are classified on the basis of the barriers to entry. In this criterion firms with no barriers to entry are kept in one category and firms with barriers to entry are kept in the other category.

Traditionally, markets can be classified in economics as:

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[1] Arora, Surabhi (2009), Economics for Law Students, Central Law Publications, Allahabad.

1. **Perfect Competition**: Under perfect competition there is very large number of sellers and buyers who sell homogeneous product. Competition is perfect because every firm feels that it can sell any amount of output at the prevailing market price. However, the firm in reality sells very less percentage of the total industry output. As a result the firm cannot influence the price.

2. **Monopoly**: Under monopoly there is a single seller of the product and there are no close substitutes. The firm is the industryin this market.

3. **Monopolistic Competition**: In this form of market there are large numbers of sellers in the market but they are selling differentiated products.

4. **Oligopoly**: Under oligopoly the number of sellers selling the product is very few. The firms in oligopoly are conscious of their interdependence.

In this chapter, we shall discuss the determination of output in perfect competition.

8.5 PERFECT COMPETITION

Perfect competition is that form of market in which we have large number of firms in the industry. It is pertinent to mention here that industry includes all the firms producing the product. The product that is being sold in perfect competition is homogeneous. Competition is perfect in the sense that every firm considers that it can sell any amount of output it wishes at the present market price. However, any firm cannot influence the price as the share of each producer is very small in the market. Thus, in reality under perfect competition there is no competition. It also implies that there is no rivalry in the perfect competition. The products of the firms are perfect substitutes of one another. This implies that there is no way by which the buyers can differentiate between the product of the different firms. This also implies that price elasticity of demand curve of the individual firm is infinite.

According to Koutsoyiannis,

"Perfect competition is a market structure characterized by a complete absence of rivalry among the individual firms. In practice businessmen use the word

competition as synonymous to rivalry. In theory, perfect competition implies no rivalry among firms."[2]

8.6 ASSUMPTIONS

Following are the main assumptions of the perfect competition:

1. **Large number of buyers and sellers**: Under perfect competition there are large numbers of sellers. This is assumed so that the level of the output supplied by the individual firm is very small in relation to the total quantity of output supplied. Thus, each firm alone cannot influence the prices prevailing in the market. Also, there are a large number of buyers.

2. **Homogeneous products**: All the firms in this industry produce homogeneous product. All the features of the product of all the firms are similar. There is no way by which a buyer can distinguish between the products of the different firms. This is necessary to assume otherwise if the products are differentiated then the firms would have some possibility of increasing the price of their product.

   Both these assumptions imply that the firms in the perfect competition are price takers. Price takers imply that the firms cannot influence the price of the commodity. As a result the demand curve of the firm becomes perfectly elastic.

   This is explained in figure 8.3.1a. The demand curve i.e. the average revenue curve of the firm is parallel to OX axis.

3. **Free entry and exit of the firms:** Under perfect competition there are no restrictions on the entry and exit of the firms. There might be some delays in the entry and the exit of the firms but there are no barriers on their entry.

4. **Profit maximization:** The objective or the goal of the firm is to maximize profits. There is no other goal of the firm.

5. **No government intervention:** Under perfect competition there is no interference by the government in the markets.

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[2] Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

6. **Perfect mobility of the factors of production**: Perfect mobility of the factors of production is assumed in the markets. This implies that the factors of production can very easily move from one firm to another. It is also assumed that workers also learn skills quickly which also leads to an increase in their mobility.

7. **Perfect knowledge**: Lastly, it is assumed that all the buyers and the sellers have perfect knowledge of the market. Thus, information is free and without cost. The buyers and the sellers have knowledge about the present situation and also about the future conditions.

8.7 SHORT- RUN EQUILIBRIUM OF THE FIRM AND INDUSTRY

The equilibrium of the firm and of the industry can be studied under short run as well as under long run. This section explains the short run equilibrium. However, in order to find the short run equilibrium of the industry we first need to know the short run equilibrium of the firm. This is because industry is a summation of all the firms.
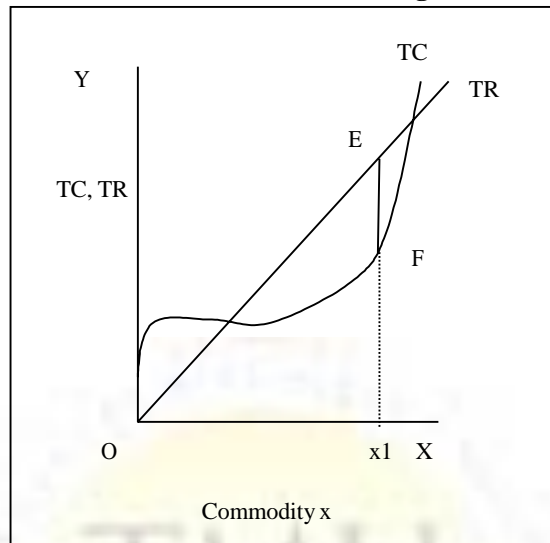
8.7.1 Short run equilibrium of the firm:

Since, the goal of the industry is to maximize profits; therefore, equilibrium of the firm is attained when profits are maximized. Profits are the difference between revenue and costs. Therefore, the maximization of the profits implies the maximization of the difference between revenue and cost. Thus, the objective of the firm is to:

Max $\prod$ = TR – TC

Since, the normal rate of the profit is included in the cost of the firm; therefore, $\prod$ is above the normal rate of profit. Graphically, $\prod$ would be maximized when the difference between the total revenue and total cost is maximized. This is revealed in figure 8.7.1a. TR is the total revenue curve and TC is the total cost curve. The OK stretch shows the losses of the firm. From K to M there are profits for the firm. However, the firm is in equilibrium when the difference between the total revenue and total cost is maximized. This happens at point E.

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Figure 8.7.1a

Commodity x

However, this approach for determining the equilibrium of the firm has been replaced by the marginal cost and marginal revenue approach. Figure 8.7.1b shows the equilibrium of the firm with the help of the marginal cost and marginal revenue of the firm. In this approach the following two conditions must be fulfilled:

1. MC = MR i.e. at the point of equilibrium marginal cost must be equal to the marginal revenue.

2. Secondly, marginal cost must cut marginal revenue curve from below. If this condition is not fulfilled then the profits will not be maximized. In figure 8.7.1b marginal cost is extended backwards then the complete shape of marginal cost is u – shaped. It is now cutting the marginal revenue curve on two points i.e. at c and at d. if the firm stops at point c where marginal cost is equal to marginal revenue then it will be a wrong decision as the firm can still maximize its profits by producing more output. So, point c cannot be the point of equilibrium.

These two conditions are fulfilled at point d where marginal cost is equal to marginal revenue and marginal cost is cutting the marginal revenue from below.

Figure 8.7.1b

Commodity x
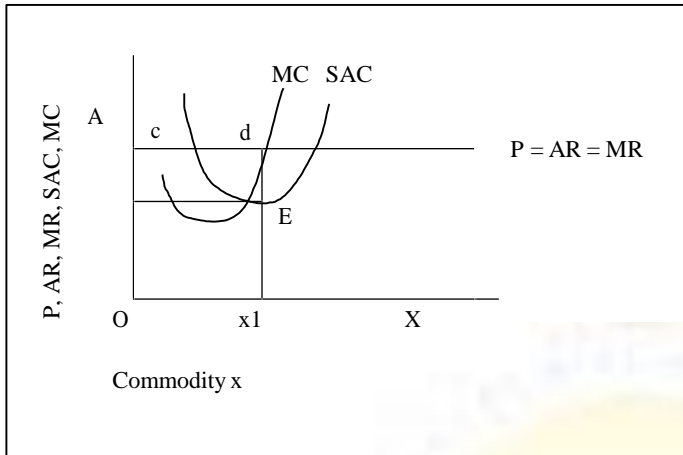
At point d the firm will sell Ox1 units of output. However, the profits of the firm will be decided by the per unit costs. At this point Ex1 is per unit cost and dx1 is the price which is given by the average revenue curve. So his profits are equal to ABEd. Thus, the firm is earning supernormal profits in the short run. However, all the firms may not necessarily earn super normal profits. The firms may earn normal profits or losses in the short run. This depends on the position of the short run average cost curve of the firm. Figures 8.7.1c and 8.7.1d show the situation when a firm is earning normal profits and losses in the short run respectively.
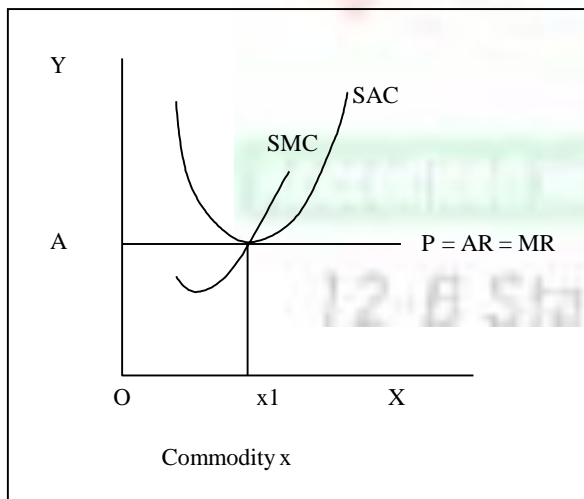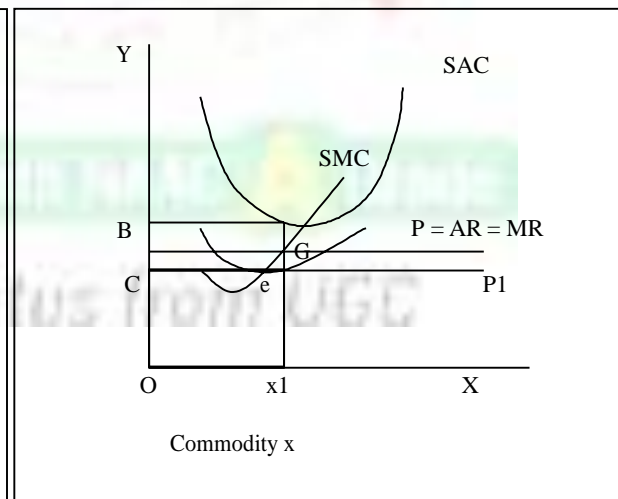
Figure 8.7.1c

Figure 8.7.1d

In figure 8.7.1c the short run average cost curve of the firm is just touching the average cost curve. This implies that the per unit cost of producing Ox1 is Ex1 and the price at which the

output is being sold is also Ex1. This implies that the firm is earning just normal profits. In figure 8.7.1d shows that the short run average cost curve of the firm is lying above the average cost curve of the firm. This shows that the per unit cost of production (Ex1) is more than the per unit price (Gx1). Therefore, the loss of the firm is BAGE. Now, the important question here is that for how long the firm will bear losses in the short run. This will depend on the average variable cost. As long as the firm is able to cover the average variable cost of production, it will continue but if the price falls below the average variable cost of production then the firm will not produce the output. Thus, the point where average variable cost is equal to the price of the output is called as the shutdown point (e) of the firm. The firm will shut down the production of the output x at this point.

8.7.2 Short run equilibrium of the industry

The industry is a summation of all the firms in the industry. The equilibrium of the industry is determined by the demand for the product and supply of the product. The demand for the product comes from the theory of consumer behavior which we have done in earlier chapters. In figure 8.7.2 the demand curve for commodity x is sloping downwards from left to right. The supply curve of the industry is added by the supply of all the firms in the industry. In the figure the supply curve of the industry is sloping upwards. The point of equilibrium of the industry is at e. At this price the buyers agree to buy Ox1 units of output and the sellers are selling Ox1 units of output at OP price. At this price the individual firms can sell their output which is revealed by their demand curve or AR curve. However, the total output of the all the firms will be equal to the output of the industry i.e. Ox1.


Figure 8.7.2
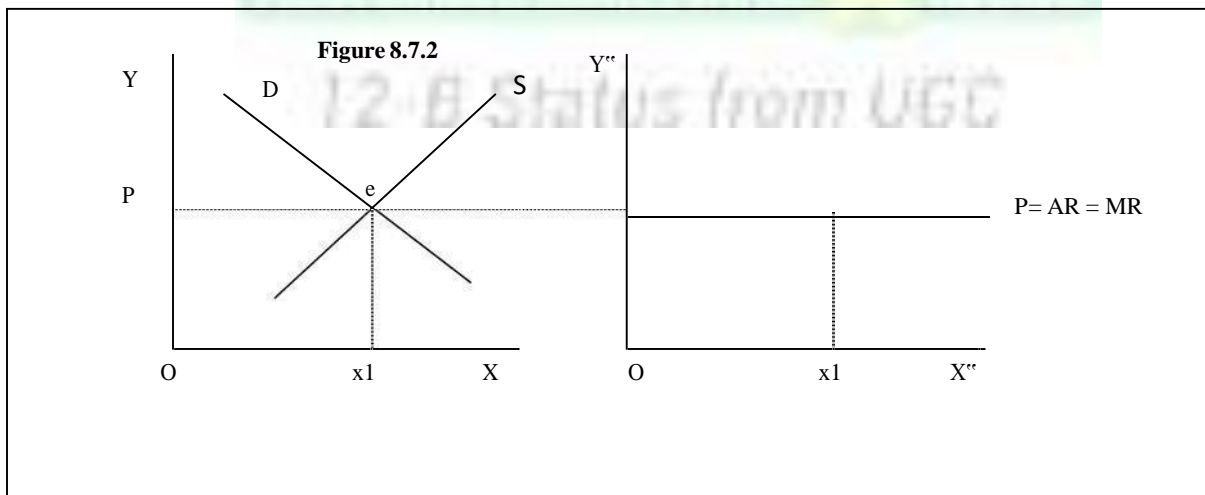
At this price OP some firms may be earning losses or super normal profits or normal profits depending upon the position of the average cost curves of the individual firms as has been shown in the earlier section.

8.8 LONG RUN EQUILIBRIUM OF THE FIRM AND INDUSTRY

8.8.1 Long run equilibrium of the firm

In the long run firms are in equilibrium when they have adjusted their plant so as to produce at the minimum point of the long run average cost curve. If the firms who were earning losses in the short run continue to do so then these would leave the market in the long run. If some firms are earning super normal profits then these would attract the new firms into the industry. Due to the entry of the new firms the industry output would expand and the prices would come down. Also, due to the entry of new firms the demand for factors of production will increase and thus, there would be an upward shift of the cost curves. These changes will continue until the long run average cost curve is tangent to the demand curve or the average curve. These changes are reflected in figure 8.8.1a and 8.8.1b.
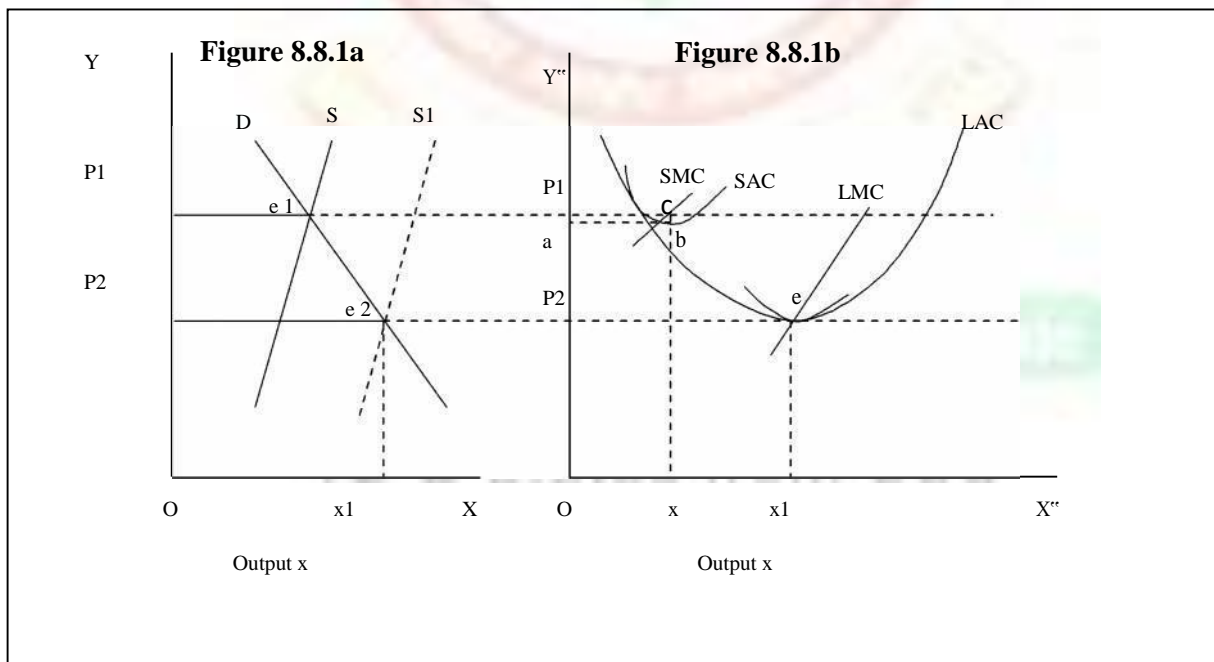
In the figure D is the demand curve for the product x. S is the initial supply curve of the industry. The industry is initially in equilibrium in the short run at point e1. In part b of the figure long run

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average cost curve (LAC) is drawn. In the short run the firm which is earning super normal profits is on short run average cost curve (SAC). P1 is the price at which the firms are selling their output. It is also the average revenue curve of the firm. The short run marginal cost curve of the firm is equal to the average revenue curve (P1) at point c. The per unit cost of producing Ox amount of output is bx. Therefore, the firm is earning P1abc as super normal profits in the short run. These super normal profits will attract new firms into the industry. Also, the firms that are earning losses in the short run they will leave the industry. However, the number of firms entering into the industry will be greater than the number of firms exiting the industry. As a result the total output of the industry will increase. Because of this the industry supply curve will shift from S to S1. When the industry supply curve shifts from S to S1, the demand curve of the firm remains constant. As a result the price of output x falls. The price will continue to fall till the firm settles at the minimum point of long run average cost curve. Thus, in the long run the firm is in equilibrium when short run average cost curve is equal to short run marginal cost curve is equal to long run marginal cost curve is equal to long run average cost curve is equal to average revenue is equal to marginal revenue is equal to price. This can be explained as:

$$SAC = SMC = LAC = LMC = P = AR = MR$$

This implies that the super normal profits of the firm would be wiped out from the market in the long run.

8.8.2 Long run equilibrium of the industry

In the long run the industry will attain equilibrium when a price is reached at which all firms are in equilibrium at the minimum point of the long run average cost curve. Under this situation all the super normal profits of the firms are wiped out and the price of the output continues to fall till the firms settle at the minimum point of the long run average cost curve of the firm. Thus, in the long run the firms earn just normal profits. Under such conditions once the long run equilibrium is attained there is no further entry or exit of the firms in the industry (state of the technology remains the same). The long run equilibrium is shown in figure 8.8.2a and 8.8.2b. The long run equilibrium is at point e and at point e1 in both the figures respectively.

Thus, in the long run the equilibrium of the industry would be attained at a point where long run marginal cost is equal to short run marginal cost curve is equal to price is equal to marginal revenue. This can be written as,

$$LMC = SMC = P = MR$$

The firms are just earning normal profits in the long run. This is ensured when long run average cost curve is equal to short run average cost curve is equal to the price.

$$LAC = SAC = P$$

This equality is ensured at the minimum point of the long run average cost curve. Now, since all the firms in the industry are in equilibrium and are earning just normal profits which implies that there is no further entry and exit of the firms. Thus, the industry supply curve will remain stable and it will remain at S in the figure. And the equilibrium price will remain at OP.

Since the price of the output x is common to all the firms this implies that all the firms will have the same minimum long run average cost curve. However, it does not mean that all the firms have same efficiency. The more efficient firms will employ more productive factors of production.

Figure 8.8.2a   **Figure 8.8.2b**
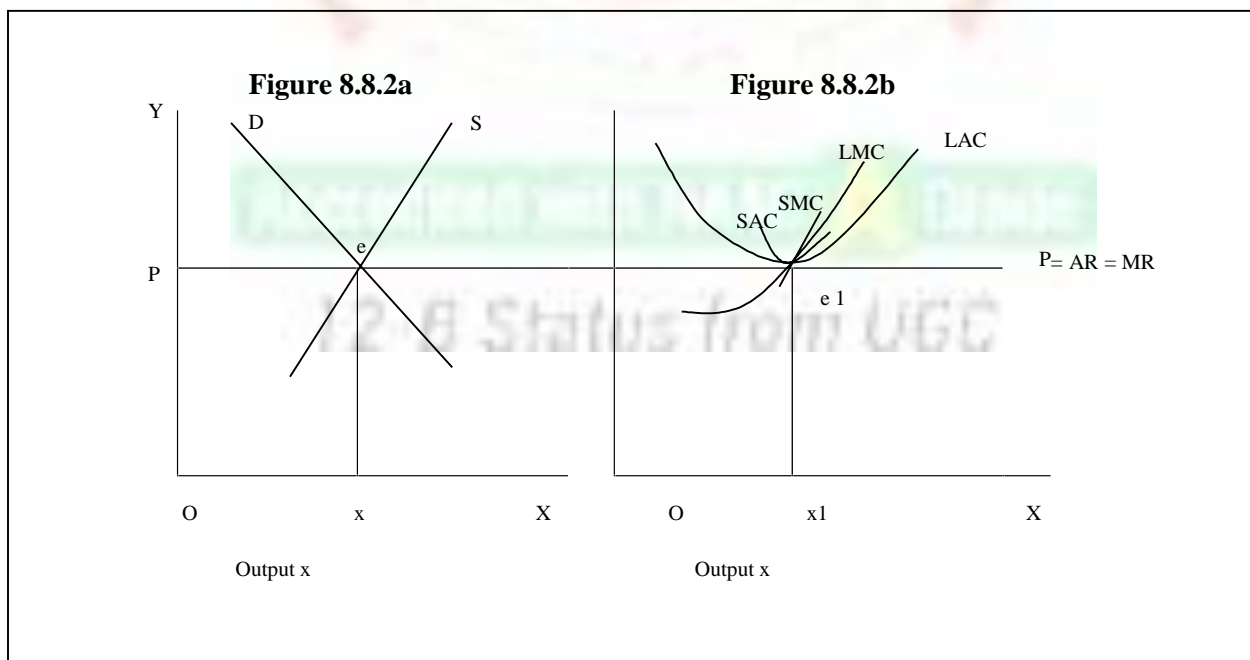
8.9 OPTIMUM RESOURCE ALLCOATION

In perfect competition optimum resource allocation takes place. This is because under perfect competition certain conditions are fulfilled that leads to the attainment of the optimality. The conditions of optimal resource allocation are discussed below:

1. In perfect competition the output is produced at a minimum cost of production. This is because in the long run all the firms in the industry operate at the minimum point of long run average cost curve. Thus, all the firms operate at the minimum point of long run average cost curve. In the short run it may happen that the firms are not operating on the minimum point of long run average cost curve. But in the long run all the firms produce commodities with minimum cost of production.

2. Under perfect competition even consumers are benefitted as they pay the minimum possible price. In perfect competition the price that prevails covers just the marginal cost of the product. This is because the conditions of the equilibrium require that the price or the average revenue curve is equal to the marginal cost. So, at the point of equilibrium, price is just covering the cost of producing an additional unit of output. Thus, consumers also avail the benefit of paying the minimum possible price under perfect competition. Due to this reason the consumer surplus is also maximized under perfect competition.

3. Under perfect competition all the plants are utilized at the full capacity. There is neither any underutilization nor any over utilization. Underutilization happens when the firm operates at the declining segment of the average cost curve. Over utilization happens when the firm operates at the rising segment of the average cost curve. However, we have seen that in the long run firms operate at the minimum point of long run average cost curve. At the minimum point of long run average cost curve the firms utilize the plant to its full capacity. This is common to all the firms in the long run.

4. In perfect competition the firms are just earning normal profits. Normal profits are the reward for the entrepreneur for combining the different factors of production and for undertaking risk and responsibility. In perfect competition in the short run some firms may earn super normal profits. However, these super normal profits are wiped out as these attract new firms in to the industry. Because of this the total supply curve of the industry expands. Since the total supply increases in the industry, therefore, when the

demand is constant then the price of the output falls. This process goes on till the price becomes equal to the average cost of production at its minimum point in the long run. The normal profits are included in the cost of production. Thus, at the minimum point of long run average cost curve the firms are just earning normal profits. Hence, under perfect competition no exploitation of the consumers takes place in the long run as the firms are not making excess profits.

8.10 A QUICK REVISION

Figure 8.10 present a quick summary of the whole chapter.

Figure 8. 10 A Quick Revision
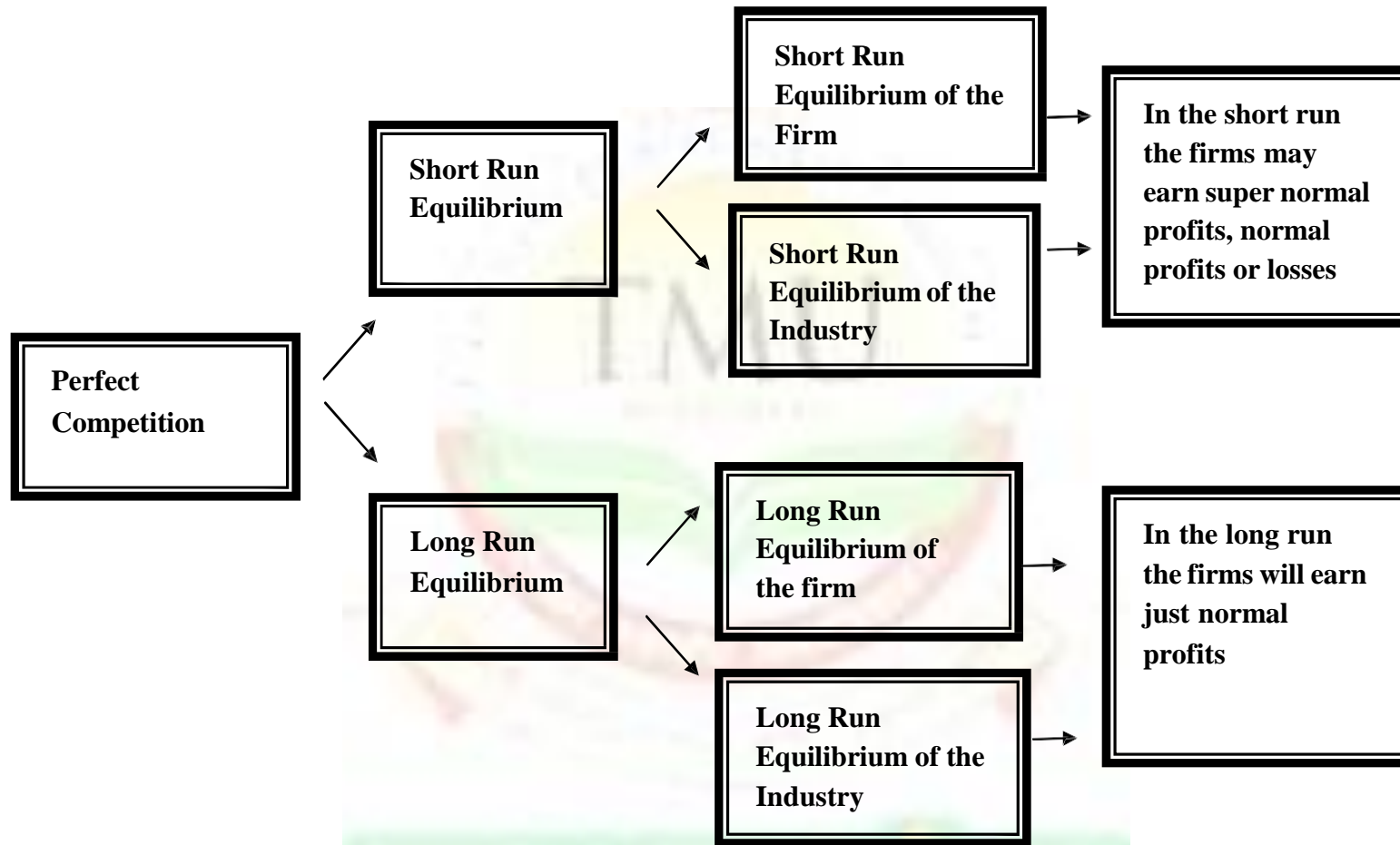
8.11 KEYWORDS

Market, industry, firm, output, total revenue, marginal revenue, average revenue, perfect competition, homogeneous product, demand curve, barriers to entry, large number of sellers and buyers, short run equilibrium, total revenue and total cost approach, marginal revenue and marginal cost approach, normal profits, super normal profits, shut down point, losses in short run, industry equilibrium, long run equilibrium, minimum cost of production, optimum resource allocation.

8.12 ASSESS YOUR PERFORMANCE

Short Questions

Q.1. What is average revenue?

➢ Average revenue is the revenue per unit of output sold. This implies that at what cost a particular unit of output is produced. It is also the demand curve of the firm. If total revenue is Rs. 100 and the total output sold is 10 units then average revenue can be calculated by:

$AR = TR / Q$

$\quad = 100 / 10$

$\quad = Rs. 10$

Q.2. What is Marginal Revenue?

➢ Marginal Revenue is the addition made in the total revenue due to the sale of the additional unit of output. If the firm is originally earning Rs. 100 by selling 10 units of a commodity but now if it sells 11 units and earns say, 110 then the additional revenue earned by selling the additional unit is called as marginal revenue. It can be written as,

$MR = \Delta TR / \Delta X$

$\quad = 10 / 1$

$\quad = Rs. 10.$

Q. 3. Give two assumptions of perfect competition.

➢ Two assumptions of perfect competition are given below:

1. **Large number of buyers and sellers**: Under perfect competition there are large numbers of sellers. This is assumed so that the level of the output supplied by the individual firm is very small in relation to the total quantity of output supplied. Thus, each firm alone cannot influence the prices prevailing in the market. Also, there are a large number of buyers.

2. **Homogeneous products**: All the firms in this industry produce homogeneous product.
   All the features of the product of all the firms are similar. There is no way by which a buyer can distinguish between the products of the different firms. This is necessary to assume otherwise if the products are differentiated then the firms would have some possibility of increasing the price of their product.
   Both these assumptions imply that the firms in the perfect competition are price takers. Price takers imply that the firms cannot influence the price of the commodity. As a result the demand curve of the firm becomes perfectly elastic.

Q.4. What are the two conditions of equilibrium under marginal cost and marginal revenue approach?

➢ In this approach the following two conditions must be fulfilled:
1. MC = MR i.e. at the point of equilibrium marginal cost must be equal to the marginal revenue.
2. Secondly, marginal cost must cut marginal revenue curve from below. If this condition is not fulfilled then the profits will not be maximized.

Q. 5 Give two reasons for the optimum resource allocation under perfect competition.

➢ Given below are the reasons for the optimum resource allocation under perfect competition:
1. In perfect competition the output is produced at a minimum cost of production. This is because in the long run all the firms in the industry operate at the minimum point of long run average cost curve. Thus, all the firms operate at the minimum point of long run average cost curve. In the short run it may happen that the firms are not operating on the minimum point of long run average cost curve. But in the long run all the firms produce commodities with minimum cost of production.

2. Under perfect competition even consumers are benefitted as they pay the minimum possible price. In perfect competition the price that prevails covers just the marginal cost of the product. This is because the conditions of the equilibrium require that the price or the average revenue curve is equal to the marginal cost. So, at the point of equilibrium, price is just covering the cost of producing an additional unit of output. Thus, consumers also avail the benefit of paying the minimum possible price under perfect competition. Due to this reason the consumer surplus is also maximized under perfect competition.

Long Questions

Q.1 What is Perfect Competition? Explain how equilibrium is attained in the short run by the firm.

Q. 2 Explain how a firm attains equilibrium in the short and long run under perfect competition.

Q.3 Discuss how the resources are optimally allocated under perfect competition.

Q.4 Discuss how output is determined under perfect competition in the short run and in the long run.

Q.5 Explain how a firm earns only normal profits in the long run under perfect competition.

8.13 Suggested Readings

Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

Mithani, D.M. (2014), Managerial Economics Theory and Applications, Himalaya Publishing House, Mumbai.

LESSON 9

Monopoly and Discriminating Monopoly

Structure of the Unit

9.1 OBJECTIVES OF THE CHAPTER

The present chapter sets to extend the study of the determination of output and prices under the different forms of market. In this chapter the readers are apprised with the second form of market i.e. monopoly.

9.2 INTRODUCTION

Monopoly is the second pillar of the theory of markets. Monopoly is a situation where there is a single seller of a commodity in the market. This implies that there are no rivals of the monopolist in the market. It further implies that under monopoly there are strong restrictions on the entry of

the firms. This is because if the monopolist does not impose strong barriers then new firms will enter into the market and monopoly of the firm would be lost.

According to Koutsoyiannis,

"Monopoly is a market structure in which there is a single-seller, there are no close substitutes for the commodity it produces and there are barriers to entry."[1]

Koutsoyiannis has mentioned that apart from single seller and barriers to entry, there should be no close substitutes of the product of the monopolist. If this condition is not fulfilled then new firms will enter and produce a close substitute which will demolish the monopoly of the monoplist.

Thus, for monopoly to exist three conditions must be fulfilled. These are single seller, no close substitutes and strong barriers to entry.

There are various reasons for monopoly to exist. These are discussed below:

1. Monopoly arises when the monopolist has the ownership of the strategic raw material which no one else can have. This could also arise due to the exclusive knowledge of the production techniques by the monopolist.
2. If the producer has the patent rights for a product or for a specific production process.
3. Sometimes, policies introduced by the government also lead to a rise in the monopoly. For example, licensing.
4. Sometimes the existing firm in the market indulges in the limit pricing policy. This implies that the monopolist puts strong barriers to entry because of which new producers cannot enter into the market. Thus, monopoly is created in the market.
5. Sometimes the size of the market is such that economies of scale can only be realized only at the large scale of output. This indicates that the size of the market is such that it does not support more than one firm. Usually these are in railways. Such a monopoly is called as „natural monopoly" because the market size naturally supports a monopoly.

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[1] Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

9.3 DEMAND, REVENUE AND COSTS CURVES OF THE MONOPOLIST

In monopoly there is a single seller in the market. Therefore, there is no distinction between the firm and industry in monopoly. The demand curve of the firm is sloping downwards and it is assumed to be linear. In figure 9.3.1 the average revenue (AR) curve of the firm is sloping downwards but it is less elastic. However, in monopoly the average and marginal revenue curves are not same rather these are separate. The marginal revenue curve is also sloping downwards in the figure. However, it is lying below the average curve. This implies that at all levels of output the marginal revenue curve of the monopolist will be less than the average revenue. Since average revenue is equal to the price, therefore, at all levels of output, the marginal revenue will be less than its price. The downward sloping average revenue curve also implies that if the firm wants to sell the additional unit of output then the firm must reduce its price. Figure 9.3.1 shows that initially the firm is selling Ox level of output at Op price. Now, if the monopolist wants to sell Ox1 level of output then he must reduce the prices from Op to Op1.
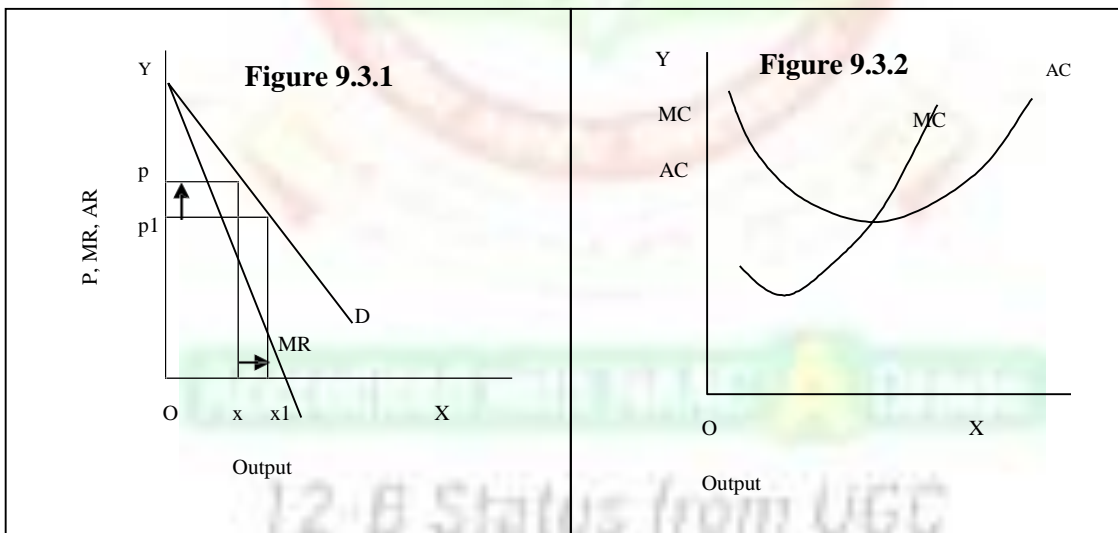
Further, the cost curves under monopoly are the usual U- shaped as given in the traditional theory of costs in chapter 7. The average cost curve, average variable cost curve and the marginal cost curve are U – shaped. These are U – shaped in the short and long run. The marginal cost curve is not the supply curve of the monopolist. In monopoly there is no relation between price and output supplied.

9.4 SHORT RUN EQUILIBRIUM OF THE MONOPOLIST

In this section we shall discuss the determination of the equilibrium of the monopolist in the short run. For determining the equilibrium of the monopolist the marginal cost and marginal principle is applied. This implies that the equilibrium of the monopolist is attained when the following two conditions are met:

1. Marginal cost must be equal to marginal revenue
2. Marginal cost must cut marginal revenue from below

In the short run the monopolist may earn normal profits, super normal profits or losses. First we discuss the case of normal profits. In figure 9.4.1, D is the demand curve of the firm or the average revenue curve of the firm. MR is the marginal revenue curve of the firm. AC and MC are the short run average cost and marginal cost curves of the firm. The equilibrium is at point e where marginal cost is equal to marginal revenue and marginal cost is cutting the marginal revenue curve from below. At this point of equilibrium the firm is producing Ox level of output and the price is given by the average cost curve. At Ox level of output the price is Op. so the firm is just covering the cost of production. Normal profits are covered under the cost of production. Thus, the firms are earning just normal profits.
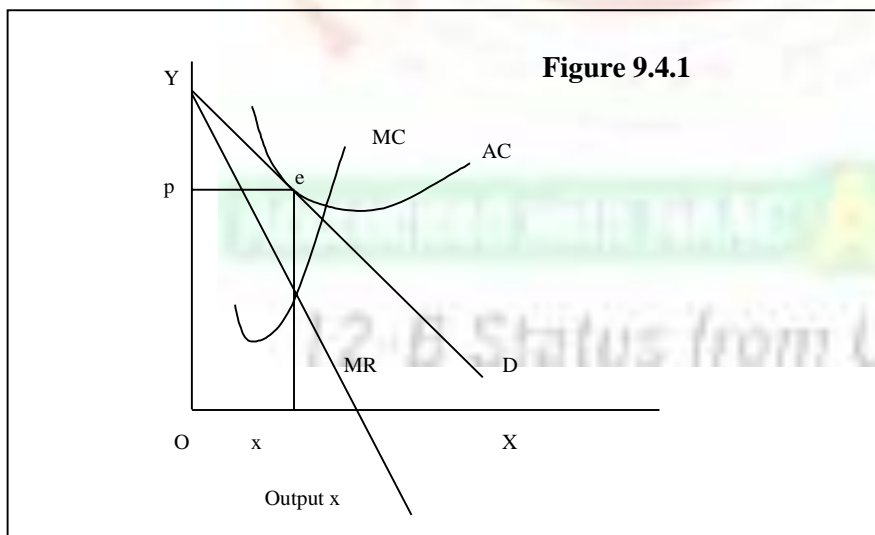
Figure 9.4.1

In the next case figure 9.4.2 shows the situation when the firm is earning losses in the short run. Usually there is a perception that a monopolist always makes super normal profits. However, sometime, in short run, it may happen that the monopolist earns losses. D and MR curves are the

average revenue and marginal revenue curves of the firm. AC is the short run average cost curve and AVC is the short run average variable cost curve. The figure shows that the equilibrium of the firm is at point e. At this point marginal cost is equal to the marginal revenue and marginal cost is cutting the marginal revenue curve from below. At the point of equilibrium the firm is producing Ox level of output and the price at which it will sell the output is given by average variable cost curve. The monopolist will sell Ox level of output at Op price.

Figure 9.4.2
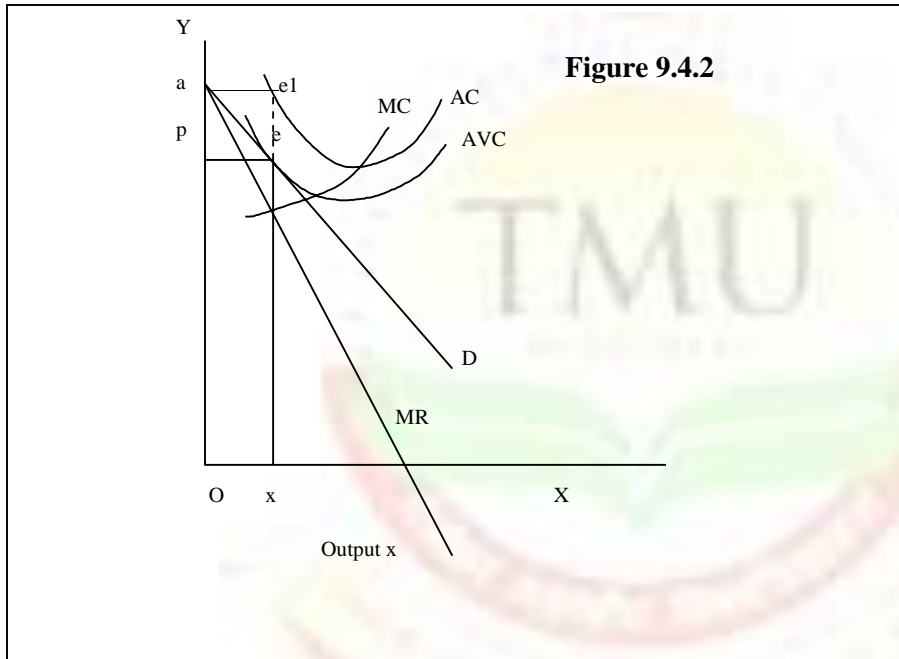
At this price the monopolist is just covering average variable cost. The monopolist is not being able to cover average fixed price. If the price falls below Op then the monopolist will stop the production of output x. At point e, average variable cost is equal to price i.e.

At point e, AVC = Price.

At point e, the losses of the monopolist are given by the average cost curve. We extend the line from point e towards the average cost curve. Thus, point ee1ap becomes the losses that the monopolist is bearing while selling Ox level of output. However, these losses are for only the short run. In the long run the monopolist will not earn losses.

Further, we discuss the situation when the monopolist is earning super normal profits. This is explained in figure 9.4.3. In the figure the short run average cost curve and the short run

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marginal cost curves are given. The equilibrium of the firm is at point e where marginal cost is equal to the marginal revenue and the marginal cost curve is cutting the marginal revenue curve from below. At this point e the price of the output x is given by the average revenue curve. The monopolist will sell Ox output at Op price. At this price the cost for producing Ox output is given by the average cost curve. Thus, for producing Ox output the firm is bearing cx as the cost of production. The profits of the monopolist are equal to the area cdap. These profits are clearly more than the cost of production. The firm is, thus, making super normal profits.

Figure 9.4.3
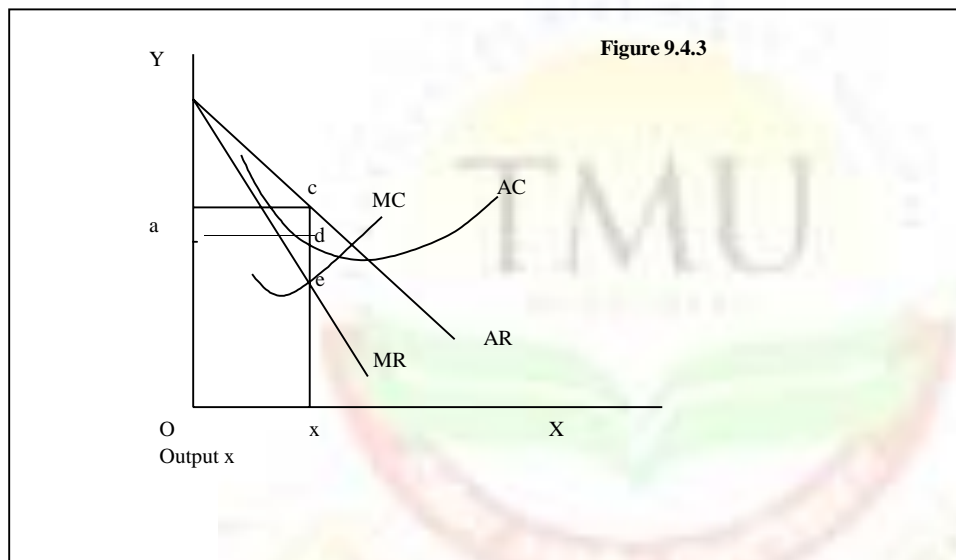
In perfect competition the firm is a price taker. This implies that the firm can decide only the level of output to be produced and it has no control over the price of the product. However, the monopolist is faced with two decisions:

1. Firstly, the monopolist has to decide the level of output to be produced.
2. Secondly, the monopolist has to decide the price at which he is going to sell his output.

But the demand curve or the average revenue curve of the monopolist is downward sloping. This implies that the two decisions of the monopolist pertaining to the level of output and the price of the output are interdependent. The monopolist can set the price at which he will sell the output and the level of the output will be determined simultaneously. Or the monopolist can first decide the level of output to be produced by him and simultaneously the price of the output will be decided. Thus, the monopolist cannot decide the level of output and the price of the output separately.

9.5 LONG RUN EQUILIBRIUM OF THE MONOPOLIST

In the long run the monopolist has to increase the capacity of the plant or he will use his plant at any level but the sole condition that must be fulfilled is that he must maximize his profits. Thus, in the long run the monopolist will neither earn normal profits or losses but he will earn only super normal profits. Thus, his single most objective is to earn super normal profits. As a result of which he will push the objective of utilizing the plant to its optimum capacity in the background. Further, during the short run and long run equilibrium the monopolist will keep full barriers to entry so that no one poses a threat to his long run super normal profits. Thus, in the long run the monopolist will earn super normal profits but may or may not operate at the optimum capacity of the plant given strong barriers to entry. These situations are discussed below:

1. **When the monopolist is earning super normal profits but the plant is being sub –
    optimally used**: Firstly, we are discussing the case when the monopolist is keeping
    strong barriers to entry and also maximizing his profits but is utilizing his plant at it sub –
    optimal capacity. Figure 9.5.1 explains this situation.

Figure 9.5.1
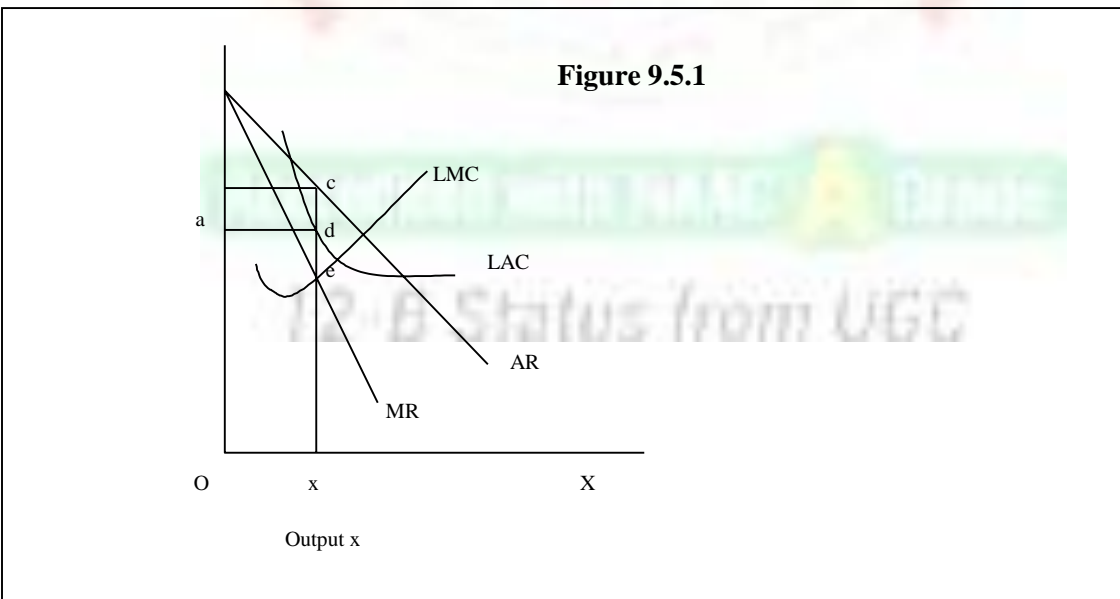
In the figure the equilibrium is at point e. At this point the marginal cost curve is equal to the marginal revenue curve and it is cutting the marginal revenue curve from below. At this point the monopolist produces Ox level of output. The price of the output is given by the average revenue curve. The firm sells Ox level of output at OP price. At this price the firm is producing Ox level of output with dx per unit costs. Thus, the area cdap are the super normal profits of the firm. Note that the firm is operating at the declining segment of the average cost curve which is the sub – optimal capacity of the plant. The optimal capacity of the plant is attained at the minimum point of the average cost curve. But the firm is intentionally producing at the sub – optimal level as the firm is maximizing its super normal profits at this level.

2. **When the monopolist is earning super normal profits but is over utilizing the plant**: The next situation is when the monopolist is earning super normal profits but is operating at such a point where the plant is being over utilized. The monopolist is again maintaining strong barriers to entry. This situation of over utilization of the plant by the monopolist is explained in figure 9.5.2.

Figure 9.5.2
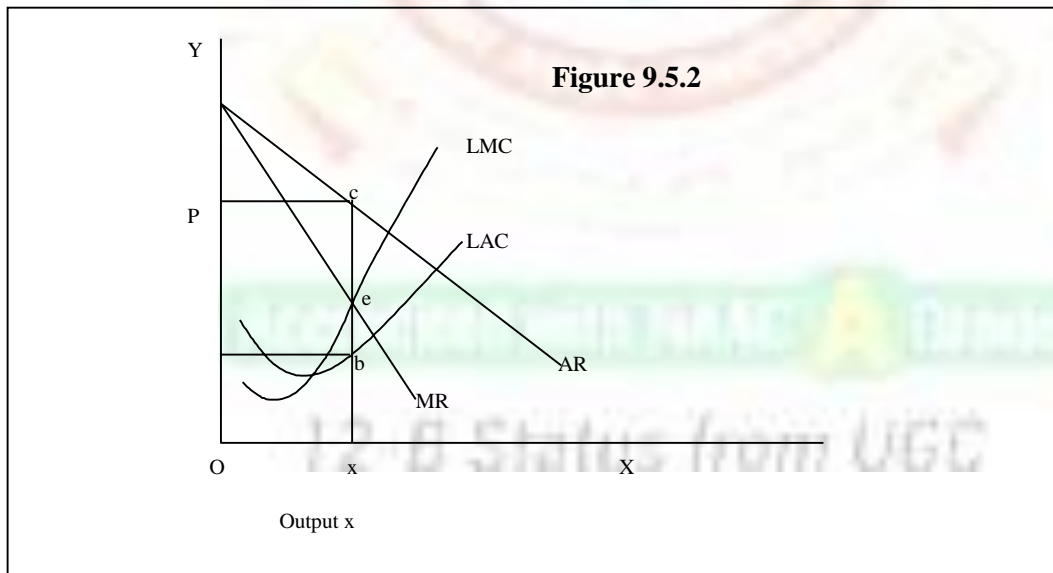
The figure shows that the demand and marginal cost curves are downward sloping. The equilibrium is at point e. At this point the marginal cost curve is equal to the marginal revenue and the marginal cost curve is cutting the marginal revenue curve from below. At point e the firm will produce Ox level of output. The price of the output is decided by the

average revenue curve. The price at which Ox level of output is sold by the monopolist is OP or cx. The average cost curve tells us about the cost for producing Ox level of output i. e. bx. The monopolist is thus making super normal profits as the price per unit is cx and the cost per unit is bx. Thus, the total super normal profits are equal to Pcba. The monopolist is operating at the increasing cost segment of the average cost curve which indicates that the monopolist is over utilizing the plant. This is being done intentionally by the monopolist as he is being able to maximize the super normal profits at this point.

3. **When the monopolist is optimally utilizing the plant**: The third situation pertains to the case when the monopolist is operating at the optimum size of the plant and is still making super normal profits. This is ensured with strong barriers to entry. Figure 9.5.3 shows this particular situation.
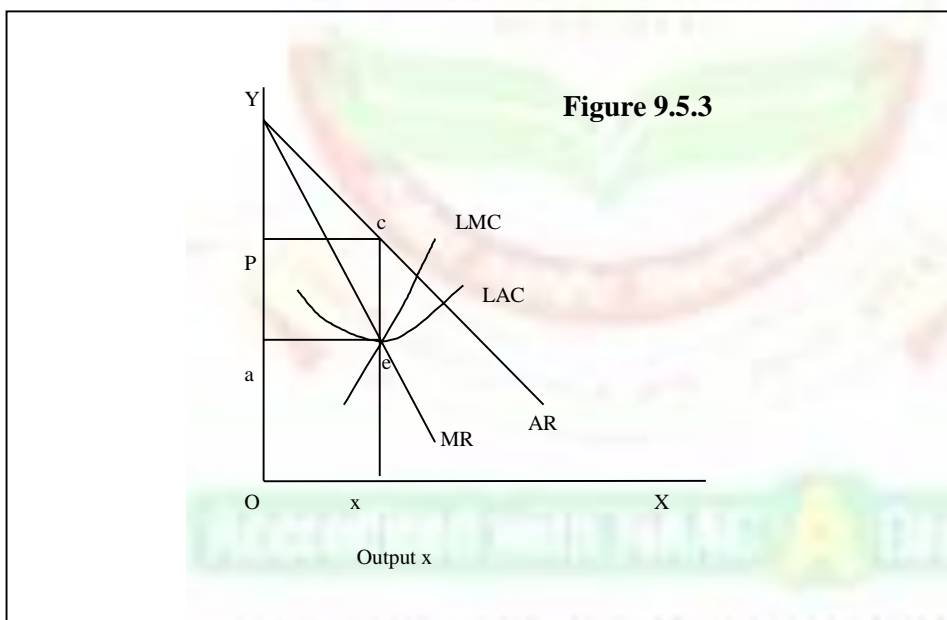
Figure 9.5.3

In figure 9.5.3 the average revenue and the marginal revenue curves are sloping downwards. The marginal cost curve is equal to the marginal revenue curve at point e. At this point marginal cost curve is cutting the marginal revenue curve from below. At e the monopolist is producing Ox level of output. The price of the output is given by the average revenue curve. Thus, the firm sells Ox output at OP price or at cx price. However, the cost of producing x is given by the average cost curve. For producing Ox level of output the monopolist incurs ex per unit cost.

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Therefore, the per unit cost is less than the per unit price. Therefore, the monopolist is earning super normal profits. The super normal profits of the monopolist are given by Pcea. However, at the point of equilibrium e the firm is operating at the optimum level of output. This is because at point e the firm is at the minimum point of long run average cost curve.

Thus, the monopolist always earns super normal profits in the long run. However, he may operate at the optimum level of the plant or he may not operate at the optimum level of the plant. This will depend on the position of the cost curves and on the size of the market. If the size of the plant is large enough where by the monopolist can expand the level of output to the minimum point and also earn super normal profits then he will operate at the minimum point of the cost curve. If the size of the market is such that the monopolist cannot expand the level of output without maximizing his profits then he will operate at the sub – optimal level. Lastly, if the size of the market is such that the monopolist cannot earn super normal profits without expanding the level of the output beyond the optimum level then he will over utilize his plant.

9.6 PRICE DISCRIMINATION BY THE MONOPOLIST

A monopolist can utilize his power by indulging in price discrimination. When a monopolist charges different prices for similar product then it is called as price discrimination and the monopolist is called as discriminating monopolist.

According to Koutsoyiannis,

"Price discrimination exists when the same product is sold at different prices to different buyers."[2]

Thus, price discrimination is done by charging two different prices for the same product. The cost of production for the product may be different or same but the difference in the cost is not so pronounced as much as the difference in the prices of the product. There might be differences in the product also. These differences might be on account of the packaging, styling etc. This can be explained with the help of an example; the different packaging of the toothpastes, the different colours and styling of the soap. However, here again the differences in the prices is more prominent as compared to the product differentiation. In this chapter we will concentrate on the

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[2] Ibid.

case where same product with no differentiation and no differences in the cost of the product, is sold at different prices.

9.6.1 Kinds of Price Discrimination

First let us discuss the kinds of price discrimination. Given below are the types of the same:

1. **Personal price discrimination**: Personal price discrimination exists when the monopolist charge different prices from different customers for the same product. This can be explained with the help of an example: a doctor may charge different prices from his different customers. Such discrimination may arise due to the ignorance of the customers.

2. **Geographical price discrimination**: Geographical price discrimination occurs when the monopolist charge different prices from the customers residing in different areas. In such cases due to the geographical distance involved it becomes difficult for the customers to make out the occurrence of such price discrimination.

3. **Discrimination based on the use of the commodity**: Such discrimination occurs when the monopolist charges different prices from the different customers based on the degree of the usage of the product. For example: the government charges different rates of electricity from the different customers which are based on their usage of the electricity.

9.6.2 Conditions for the Existence of Discriminating Monopoly

The following conditions must be fulfilled for the rise of the discriminating monopolist:

1. **Sub- division of the market**: The monopolist must be able to divide his total market into different sub – markets. This is possible when the demand curve of the monopolist in the different markets is different due to the different price elasticity. The different elasticites of the demand curve depends on several factors. These are discussed below:
   - ➤ **Preferences of the buyers:** If the buyers in the two different markets have different preferences then the demand curves will have different elaticities. The buyers who would have varying preferences will have more elastic demand and the buyers who have fixed preferences will have less elastic demand.

➢ **Income of the buyers:** The elasticity of the demand curve of the monopolist varies with the incomes of the consumers. If his customers have high incomes then the elasticity of the demand curve of the monopolist would be less. If his customers are usually from low income group then the elasticity of his demand curve will be more.

➢ **Location of the buyers:** If the two different groups of buyers are located in different locations then the elasticity of the demand curve of the monopolist for the two markets would be different.

➢ **Ease of the availability of substitutes:** If the monopolist is selling in a market where the close substitutes of his product are easily available then the elasticity of his demand curve would be very high. If the monopolist is selling in a market where no close substitutes are available then the elasticity of the demand curve for his product will be very low.

2. **Effective separation of the market:** There must be effective separation of the markets of the monopolist. This is necessary as otherwise reselling will take place. Reselling implies a situation when the transportation costs between the two markets of the monopolist where he is selling his product at two different prices are very low. Then a person may buy the product from the monopolist at a low price from the market where the monopolist is selling at a low price. Then he will sell the product in another market where the monopolist is selling at a high price. Thus, in order to make sure that such a situation does not arise, the monopolist must ensure that the transportation costs between the two markets where he is indulging in price discrimination must be very high. This also implies that price discrimination is much easier in case of commodities which cannot be resold by the buyer like the services of the doctor etc.

### 9.6.3 Degrees of Price Discrimination

Now, let us discuss how a monopolist indulges in price discrimination. This is explained under the degrees of price discrimination. The different degrees of price discrimination were given by British economist, Pigou. Given below are the different degrees of price discrimination:

1. Third Degree of Price Discrimination
2. Second Degree of Price Discrimination

3. First Degree of Price Discrimination

1. **Third Degree of Price Discrimination:** The third degree price discrimination is explained in figure 9.6.3a.

Figure 9.6.3a
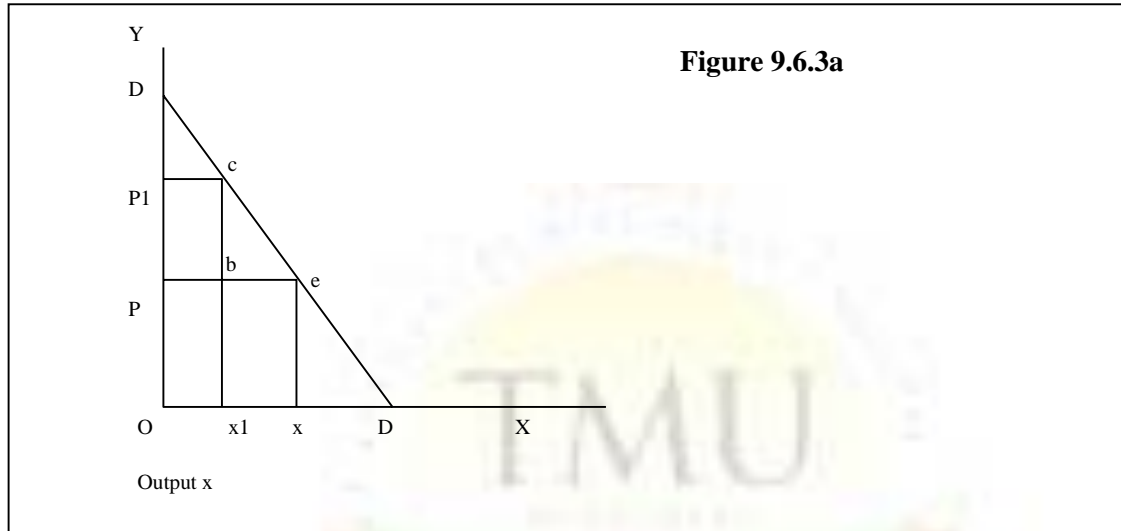
When a monopolist indulges in price discrimination then manages to take away a part of the consumer surplus. In the figure DD is the demand curve of the monopolist firm. If the monopolist does not indulge in the price discrimination then he is selling Ox level of output at OP prices. At this time the surplus with the consumers is equal to area DPe. If he now decides to sell his total output Ox at two different prices then it is called as third degree price discrimination. Now, the monopolist will sell Ox1 level of output at OP1 prices and Ox level of output at OP prices. By indulging in price discrimination the monopolist takes away P1cx1O and bexx1 as consumer surplus. Thus, through price discrimination the monopolist takes away more consumer surplus and it leads to the loss of the consumer surplus. The third degree price discrimination is the mildest form of price discrimination.

2. **Second Degree price discrimination:**

Second degree price discrimination occurs when the monopolist manages to sell the output at more than two different prices. In this case by indulging in price discrimination, the monopolist manages to take away major part of the consumer surplus. This form of price discrimination is more severe than the third degree price discrimination. This type of price discrimination is explained in figure 9.6.3b.

Figure 9.6.3b
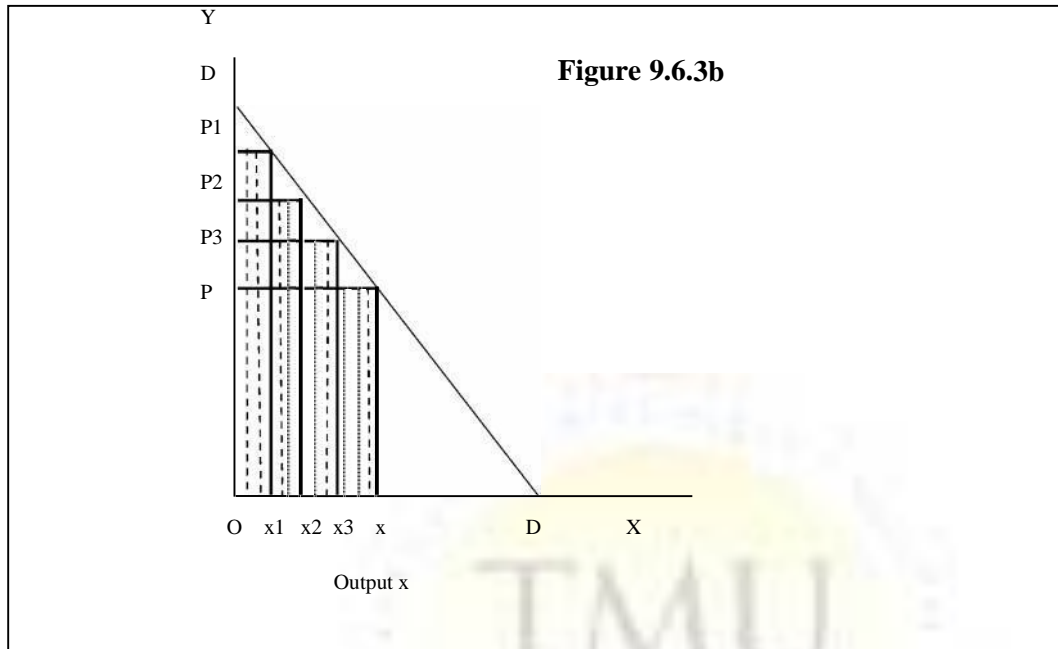
As is shown in the figure the monopolist is now selling his total output at more than two different prices. He is selling Ox1 at OP1 prices, Ox2 at OP2 prices, Ox3 at OP3 prices, Ox at OP prices. By selling the output at more than two different prices the monopolist is exploiting the consumers to a much higher extent. This is revealed in the loss of the consumer surplus. The shaded area shows the total loss in the consumer surplus to the consumers. Thus, under second degree price discrimination there is more loss to the consumer surplus.

3. **First Degree Price Discrimination:**

In this kind of price discrimination, the monopolist deals individually with each customer. As a result he manages to take away the entire consumer surplus. This kind of price discrimination inflicts maximum loss on the consumers. This is shown in figure 9.6.3c. In the figure DD is the demand curve of the monopolist. If the monopolist does not indulge in any price discrimination then he sells total output Ox at OP prices. But now he is dealing with each customer and is selling each unit of the commodity at different prices. This is the most severe form of price discrimination. Under this form the monopolist takes away the whole of the consumer surplus. In figure the whole of the shaded area is the surplus of the consumers and the monopolist takes away the whole of

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it. Thus, under first degree price discrimination there is more exploitation of the consumer.

Figure 9.6.3c
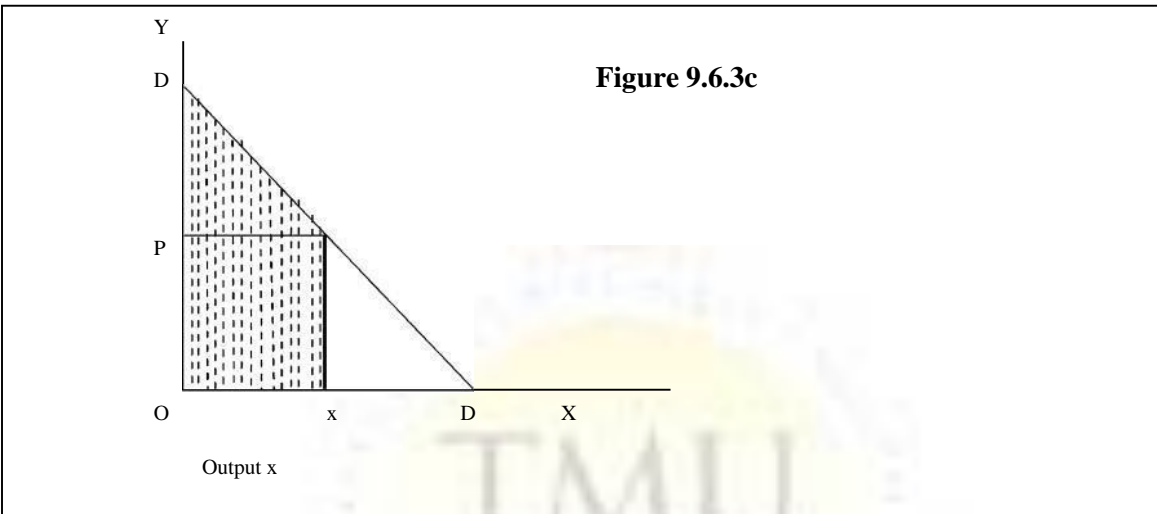
Thus, when the monopolist indulges in price discrimination then it leads to the loss of the surplus of the consumers.

9.7 COMPARISON OF PERFECT COMPETITION AND MONOPOLY

The following points helps us in comparing perfect competition and monopoly:

1. In both the forms of markets the goal of the firm is to maximize profits.
2. In both the models there is no separation between ownership and management.
3. Under perfect competition the product is homogeneous but under monopoly the product may or may not be homogeneous.
4. In perfect competition the number of seller is very large but under monopoly there is single seller.
5. In perfect competition there are no barriers on the entry of the firms. Under monopoly there are strong barriers to entry.
6. In both the models perfect knowledge is assumed.
7. The demand curve of the firm in monopoly is perfectly elastic but in monopoly the demand curve is less elastic.
8. In perfect competition the average revenue and marginal revenue curves are similar. But in monopoly the average and marginal revenue curves are separate.

9. In perfect competition the firm can decide only the level of output to be sold. In monopolythe firm decides the level of output and the price at which it is to be sold.

10. In perfect competition there are zero selling costs. In monopoly the firm can change the styling, packaging of the product. The monopolist can also indulge in heavy advertising.

11. In perfect competition the firm operates at the optimum level of output but in monopoly the firm may or may not operate at the optimum level of output.

12. Firms under perfect competition do not earn super normal profits in the long run but the monopolist surely earns super normal profits.

13. There is no price discrimination in perfect competition but there can be price discrimination in monopoly.

14. There is no exploitation of the consumers in perfect competition. There is exploitation of the consumer in monopoly.

9.8 A QUICK REVISION

Figure 9.8 presents a quick summary of the whole chapter.

Figure 9.8 A Quick Revision

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                    ┌──────────────────────┐      ┌──────────────────────────┐
                    │  Short Run           │      │  In the short run the    │
                    │  Equilibrium of the  │─────▶│  monopolist firm may earn│
                    │  Firm                │      │  super normal profits,   │
                    │                      │      │  normal profits or losses│
                    └──────────────────────┘      └──────────────────────────┘

┌──────────────┐    ┌──────────────────────┐      ┌──────────────────────────┐
│  Monopoly    │    │  Long Run            │      │  In the long run the     │
│              │───▶│  Equilibrium of      │─────▶│  monopolist will earn    │
│              │    │  the firm            │      │  super-normal profits but│
└──────┬───────┘    └──────────────────────┘      │  he may or may not       │
       │                                          │  operate at the optimum  │
       │                                          │  level of output         │
       │                                          └──────────────────────────┘
       │            ┌──────────────────────┐      ┌──────────────────────────┐
       │            │  Discriminating      │      │  ➢ Third Degree Price    │
       └───────────▶│  Monopoly            │─────▶│    Discrimination        │
                    │                      │      │  ➢ Second Degree Price   │
                    └──────────────────────┘      │    Discrimination        │
                                                  │  ➢ First Degree Price    │
                                                  │    Discrimination        │
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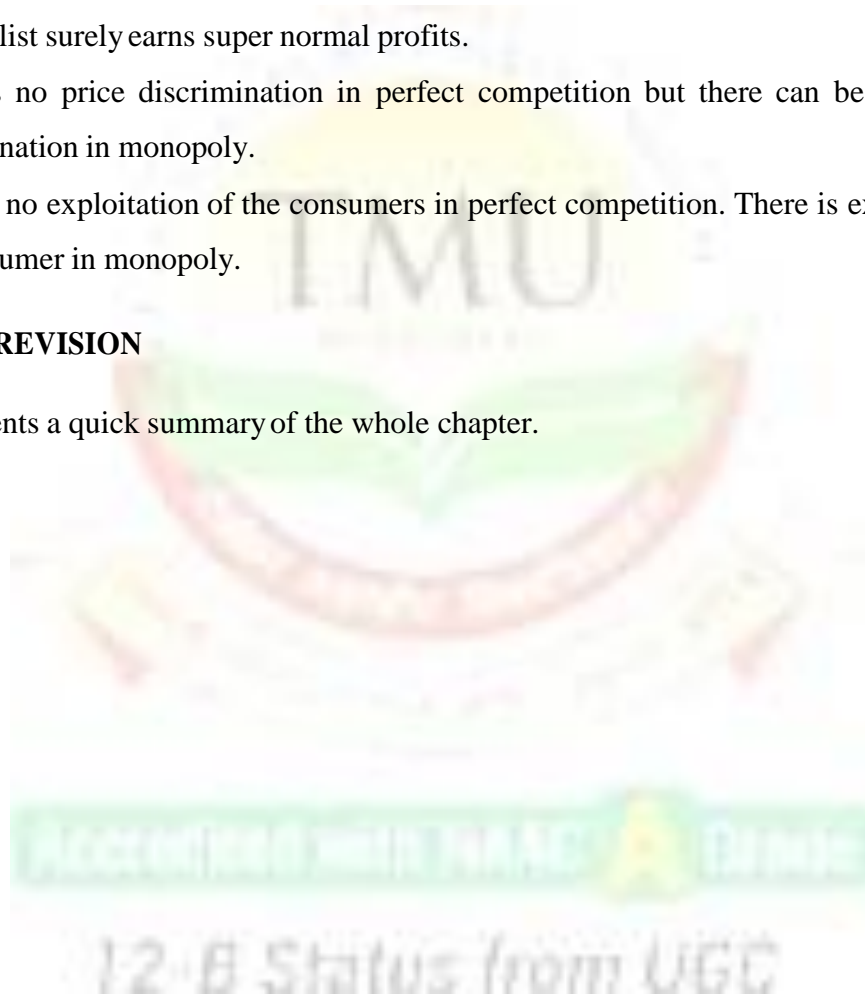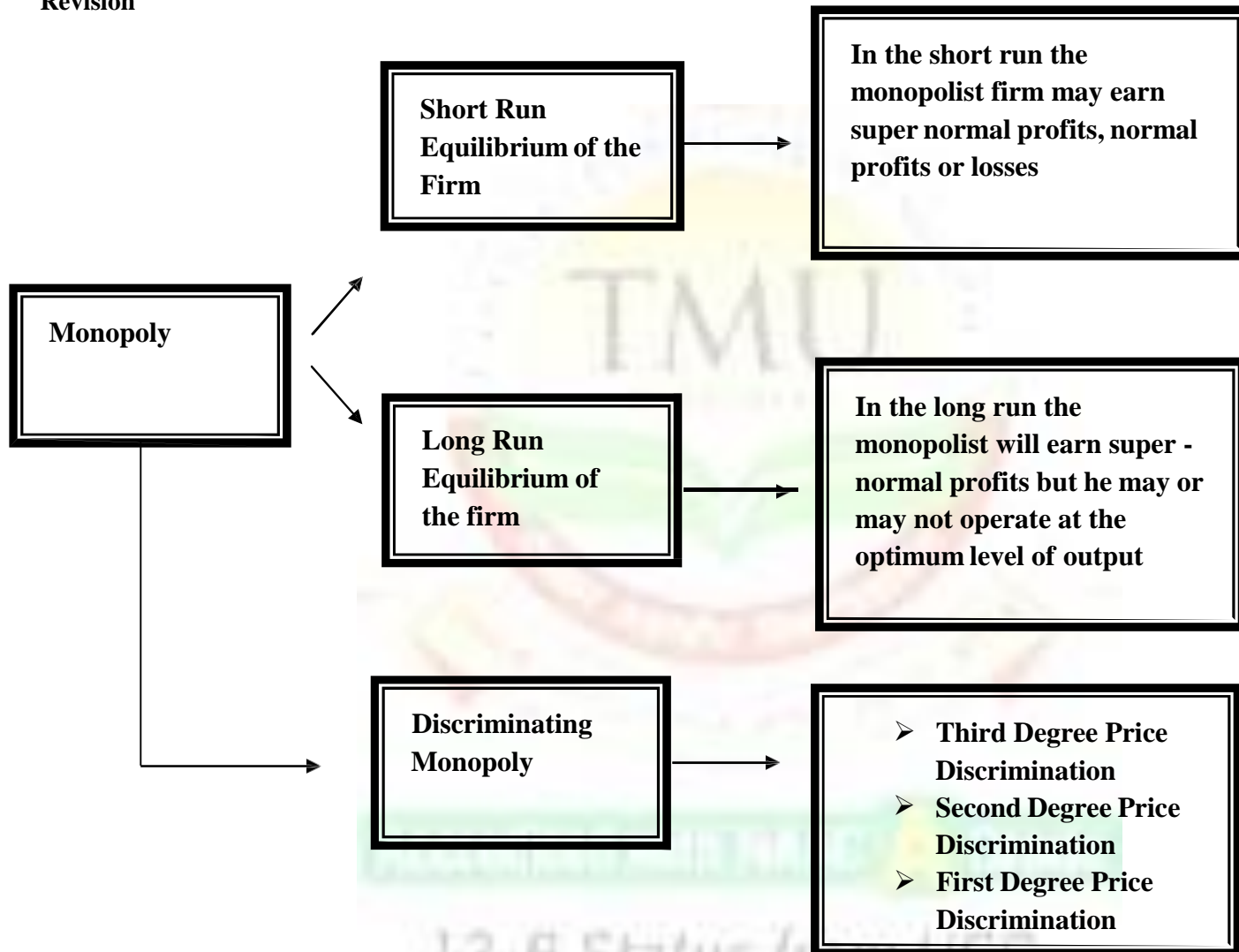## 9.9 KEYWORDS

Monopoly, single seller, large buyers, barriers to entry, homogeneous product, product differentiation, natural monopoly, less elastic demand curve of monopolist, short run equilibrium, super normal profits, normal profits, losses, sub – optimal capacity, optimal capacity, over utilization of plant, price discrimination, third degree price discrimination, second degree price discrimination, first degree price discrimination, consumer surplus, personal price discrimination, geographical price discrimination, discrimination based on use, necessary condition, zero transport costs, different elasticities.

9.10 ASSESS YOUR PERFORMANCE

Short Questions

Q.1. What is monopoly?

➢ Monopoly is a situation where there is a single seller of a commodity in the market. This implies that there are no rivals of the monopolist in the market. It further implies that under monopoly there are strong restrictions on the entry of the firms. This is because if the monopolist does not impose strong barriers then new firms will enter into the market and monopoly of the firm would be lost.

Q.2. What is price discrimination?

➢ When a monopolist charges different prices for similar product then it is called as price discrimination and the monopolist is called as discriminating monopolist.

Q. 3. Give the necessary conditions for price discrimination to succeed?

➢ The monopolist must be able to divide his total market into different sub – markets. This is possible when the demand curve of the monopolist in the different markets is different due to the different price elasticity.

➢ There must be effective separation of the markets of the monopolist. This is necessary as otherwise reselling will take place. Reselling implies a situation when the transportation costs between the two markets of the monopolist where he is selling his product at two different prices are very low. Then a person may buy the product from the monopolist at

a low price from the market where the monopolist is selling at a low price. Then he will sell the product in another market where the monopolist is selling at a high price. Thus, in order to make sure that such a situation does not arise, the monopolist must ensure that the transportation costs between the two markets where he is indulging in price discrimination must be very high.

Q.4 Give two reasons for the rise of monopoly?

➢ Sometimes the existing firm in the market indulges in the limit pricing policy. This implies that the monopolist puts strong barriers to entry because of which new producers cannot enter into the market. Thus, monopoly is created in the market.

➢ Monopoly arises when the monopolist has the ownership of the strategice raw material which no one else can have. This could also arise due to the exclusive knowledge of the production techniques by the monopolist.

Q.5 What is natural monopoly?

➢ Sometimes the size of the market is such that economies of scale can only be realized only at the large scale of output. Thus, the size of the market is such which does not support more than one firm. Usually these are in railways. Such a monopoly is called as „natural monopoly" because the market size naturally supports a monopoly.

Long Questions

Q.1 What is Monopoly? Explain how equilibrium is attained in the short run by the monopolist.

Q.2 Give reasons for the rise of monopoly. Also explain the equilibrium of the monopolist in short and long run.

Q.3 What is price discrimination? Explain how a monopolist indulges in price discrimination.

Q.4 Explain that a monopolist may or may not produce at the optimum level of output but he will earn super normal profits in the long run.

Q.5 Compare monopoly and perfect competition.

9.11 Suggested Readings

Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

Mithani, D.M. (2014), Managerial Economics Theory and Applications, Himalaya Publishing House, Mumbai.

Activity 1

Explain Short run Equilibrium of the Monopolist.

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Activity 2

What is Price Discrimination by the Monopolist?

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LESSON 10

Monopolistic Competition

10.1 OBJECTIVES OF THE CHAPTER

In the present chapter the readers are apprised about the third form of market i.e. monopolistic competition. The equilibrium of the firm is discussed in the short and long run. The aspects of selling costs / advertising costs or non – price competition are also explained.

10.2 INTRODUCTION

Up to the early 1920's economic theory included only two models. These were perfect competition and monopoly. The classical economists believed that these two models were a reality and the models where the producers compete on the basis of non –price competition were rare. However, with the start of 1920's the economists started to question the practical application of perfect competition. The economists were increasingly becoming dissatisfied with the assumption of homogenous products. Under perfect competition, it was believed that the products were homogeneous but in reality the products of the different firms were differentiated on the grounds of technical features, designing, packaging etc. Also, economists started questioning the non-inclusion of the selling and advertising activities of the producers. Firms invested heavily on advertising as a result of which their cost of production went up. Advertising also influenced the demand for the product of the firms. Thus, these selling activities could not be ignored. Also, in perfect competition it is believed that the benefits of the falling costs are realized when the firms go large or produce very high levels of output. However, this assumption under perfect competition gave birth to a controversy in 1920's. The critics of the perfect competition pointed out that firms experienced declining costs much before the high levels of output. This dissatisfaction gave rise to the birth of alternative forms of markets. In 1933, E. Chamberlin worked on providing an alternative form of market and developed the model of „Monopolistic Competition" in his book „Theory of Monopolistic Competition". In this very year J. Robinson also developed the same model with different methodology and it was called as „Imperfect Competition".

In this chapter we shall discuss the theory of monopolistic competition given by Chamberlin.

10.3 ASSUMPTIONS

Given below are the assumptions of monopolistic competition:

1. **Large number of buyers and sellers in the market**: Under monopolistic competition there is the assumption of large number of buyers and sellers. However, large number of buyers and sellers are defined in „group". Group consists of the sellers selling the identical product.

2. **Product Differentiation**: In the monopolistic competition the sellers are not selling the homogeneous product. Their products are differentiated. This differentiation may arise on account of packaging or styling etc. Though the products of the sellers are differentiated yet they are the close substitutes of one another. This gives rise to the formation of the group which includes the products that are close substitutes of one another.

3. **Free entry and exit of firms**: Just like perfect competition, monopolistic competition also assumes that the entry and exit of the firms is free. Hence there are no barriers on the entry of the firms. Firms can enter into the industry and leave the industry whenever they want.

4. **Goal of the firm**: Under monopolistic competition the goal of the firm is the maximization of the profits. This goal remains the same in the short run and in the long run.

5. **Prices of Factors are given**: In the model it is assumed that the prices of the factors of production and the state of technology remain constant.

6. **Behaviour of the firm**: The firm believes as if it knew its demand and cost curves with certainty.

7. **Maximization of short run profits implies the maximization of long run profits**: As per Chamberlin long run includes a number of identical short run periods. Short run periods are assumed to be independent of one another. The decisions taken in one period do not affect the decisions taken in the other period. The optimum decisions taken in one period are the optimum decisions for the other.

8. **Demand and cost curves for all products are uniform in the group**: Chamberlin assumes that in the group all the producers producing the products have the same demand and cost curves. This assumption is done in order to show the equilibrium of the firm and the group in the same diagram. However, this assumption makes the model very restrictive as the costs of the producers may vary.

10.4 COST CURVES IN MONOPOLISTIC COMPETITION

In monopolistic competition the cost curves are as per the traditional theory of costs. The average variable cost curve, marginal cost curve and average cost curve are U – shaped. This implies that

even in the monopolistic competition there is a single level of output that can be produced with minimum costs.

Further, Chamberlin added for the first time in the theory of markets the concept of selling costs. Introduction of the selling costs becomes pertinent as product differentiation is the essential element of the monopolistic competition. Firms incur a lot of advertising and other selling expenses. This is done to differentiate the product of a firm from the product of its rivals. He further, assumed that due to the inclusion of advertising costs the demand curve of the firm becomes less elastic as the buyers will have a fixed preference for the products that are advertised heavily. The selling cost curve is again assumed to be U – shaped. This implies that in selling costs there are economies and diseconomies of advertising as output changes. Initially the expenditure of the firms is low on selling costs that is why the curve is initially declining. But after a particular point the per unit selling costs start to increase. This is explained in figure 10.4.1a.
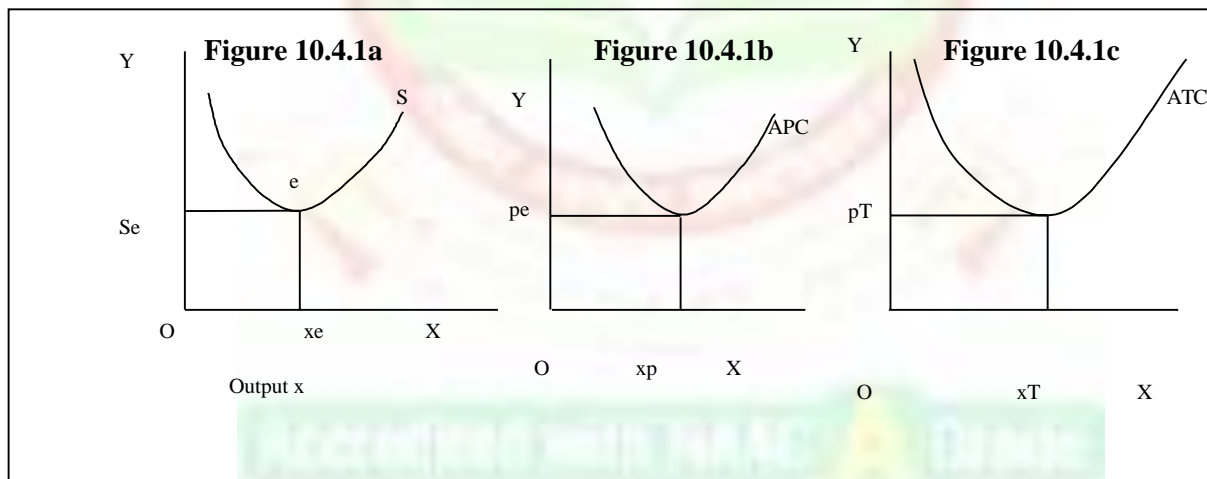
In the figure S is the Selling cost curve. On OX axis we have ouput x and on OY axis we have selling costs. The cost curve S is U – shaped. This implies that it is designed to produce only one level of output as the optimum level. This is reflected through point e. At this point the cost of selling is the minimum i.e. OSe and the Oxe is the optimum level of output.

The selling cost curve is added to the production cost curve. The production cost curve is shown in figure 10.4.1b. APC is the average production cost curve. It is U – shaped. To this production cost curve the selling cost curve is added and the average total cost curve is derived which is

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inclusive of the selling costs. The average total cost curve is given in figure 10.4.1c. ATC is the average total cost curve. This curve includes production and selling costs. It is also U – shape.

10.5 SHAPE OF THE DEMAND CURVE

In monopolistic competition the shape of the demand curve is different from the ones in perfect competition. The reason lies in product differentiation. Though Saraffa had introduced product differentiation but Chamberlin discussed in detail the implications of the product differentiation on the price and output decisions of the producers. As per Chamberlin the demand of the product is affected by the price of the product, the styling of the product, other services related with the product and the selling activities of the firm. The buyers are influenced a lot by the styling and the other services of the product and hence, it becomes an important variable. Thus, the demand curve will shift if:

➢ The style, services or the selling strategy of the firm changes;
➢ Competitors change their price, output, services or selling activities;
➢ Tastes, incomes, prices or selling policies of products from other industries change[1].

Product differentiation can be of two types:

➢ **Real product differentiation**: Real product differentiation occurs when the products are differentiated on account of real differences i.e. the inherent technical features of the product are different from other products. Such a differentiation occurs when there are differences on account of specification of the product, difference in the use of factor inputs or location of the firm. Due to these factors the product of one firm can be distinguished from other.

➢ **Fancied product differentiation:** Fancied product differentiation occurs when the technical features of the product are the same still the products are differentiated on account of differences in the packaging, styling, designing, brand name. Such a differentiation implies selling cost. Through fancied product differentiation efforts are made to establish the product of the firm as unique.

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[1] Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

Thus, product differentiation aims at establishing the products of the firms as unique but still these are close to one another so that these can be included in the group. Due to product differentiation the seller assures brand loyalty of the buyers. As a result he ensures some control over the determination of the prices. Because of product differentiation the demand curve of the firm is downward sloping. Due to product differentiation the producer has some control over the prices of his product which was missing in perfect competition. However, he faces full competition from the other sellers who are selling close substitutes. Thus, monopolistic competition has the elements of both monopoly and perfect competition. The demand curve of the firm is explained in figure 10.5.1.

Figure 10.5.1
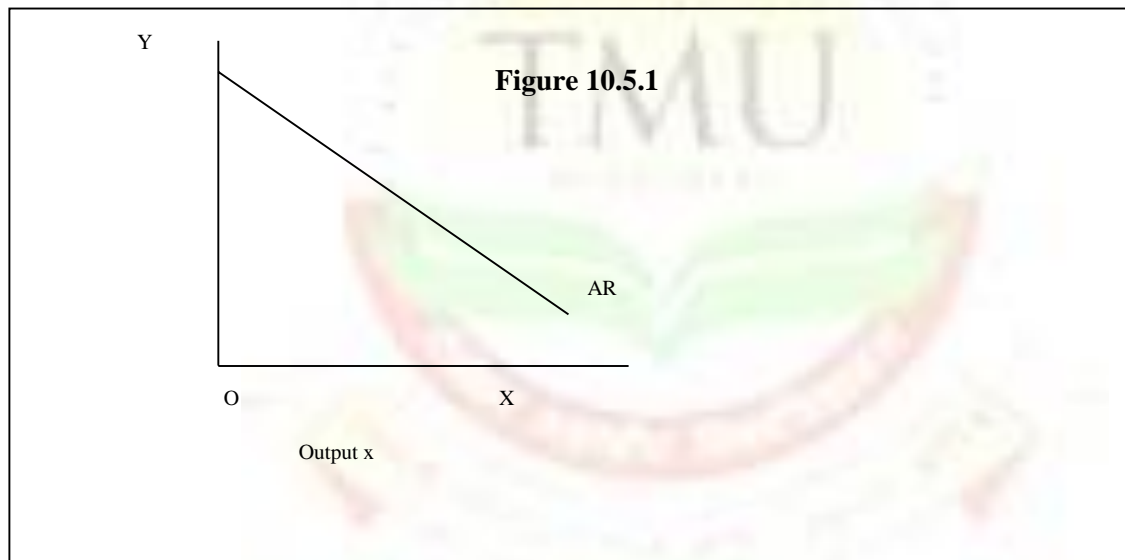
10.6 INDUSTRY AND GROUP

When product differentiation is assumed then it becomes difficult to incorporate it into the model. This is because due to product differentiation the goods become heterogeneous in nature. The demand curves of the individual firms producing heterogeneous goods cannot be added to make it industry demand curve. Therefore, Chamberlin replaced the concept of industry with the concept of product group. A product „group" includes all those goods which are technically and economically substitutes of one another[2]. Technical substitutes are those which meet the same demand and economical substitutes are those that meet the same demand and also have similar

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[2] Ibid

prices. Also in monopolistic competition there is no concept of equilibrium price as here it is replaced by a cluster of prices.

10.7 SHORT RUN EQUILIBRIUM

In the short run the individual firm may earn super normal profits or normal profits or losses. This will depend upon the position of the short run average cost curves of the firm.
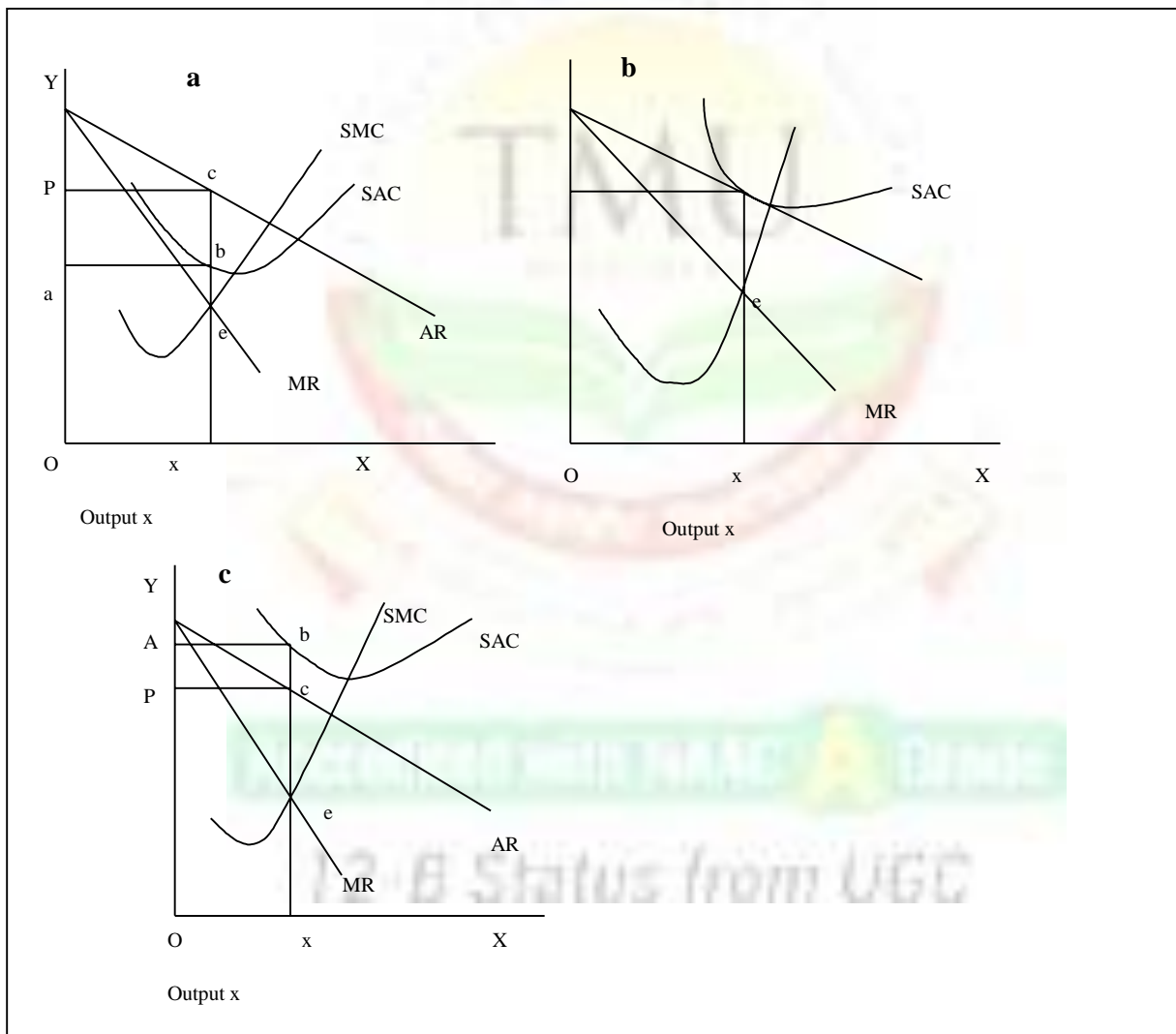
Figure 10.7.1

Figure 10.7.1 part a shows the case of the super normal profits being earned by the firm in the short run. On OX axis we have output x and on OY axis we have prices and cost. Like

monopoly, AR and MR curves are downward sloping but these are more elastic than monopoly curves. The equilibrium of the firm is at point e where marginal cost is equal to marginal revenue. At this point the firm is selling Ox level of output at OP price. At this point the firm is earning super normal profits. The super normal profits of the firm are shown by Pabc. In part b of the figure the firm is earning just normal profits. This is because price is equal to the average cost. In part c of the figure the firm is earning losses. At the point of equilibrium the firm is selling Ox units of output x at OP price. However, the average cost is equal to bx which is clearly more than the price per unit of x.

10.8 LONG RUN EQUILBRIUM OF THE FIRM WITH NEW FIRMS ENTERING INTO THE INDUSTRY

In this case the assumption is that new firms are entering into the industry. However, there is no competition in prices. The short run equilibrium of the firm is also assumed. This case is explained in figure 10.8.1. On OX axis we have output and on OY axis we have prices, cost and revenue. LAC is the long run average cost curve. LMC is the long run marginal cost curve. The demand curve dd1 is the original demand curve of the firm and MR1 is the original marginal revenue curve of the firm. The firm is originally on point c as at this point marginal cost is equal to marginal revenue. The marginal revenue is also cutting the marginal cost curve from below at this point. At point e the firm is earning super normal profits. The super normal profits of the firma are given by P1ceP3. Thus, the firm will have no incentive to change its present position. However, the super normal profits of the firm will attract new firms into the market. As a result the demand curve dd1will start shifting downwards as the share of each firm will decline. It is assumed that there will be no change in the cost of production. Such a shift in the demand curve will continue and the prices will be adjusted accordingly. The process will continue till the demand curve becomes tangent to the average cost curve. In the figure this is shown with the help of dd2 demand curve. The final equilibrium of the firm is at point e. There are no excess profits of the firm and the price is equal to OP3 and the firm will sell Ox2 level of output.

Figure 10.8.1
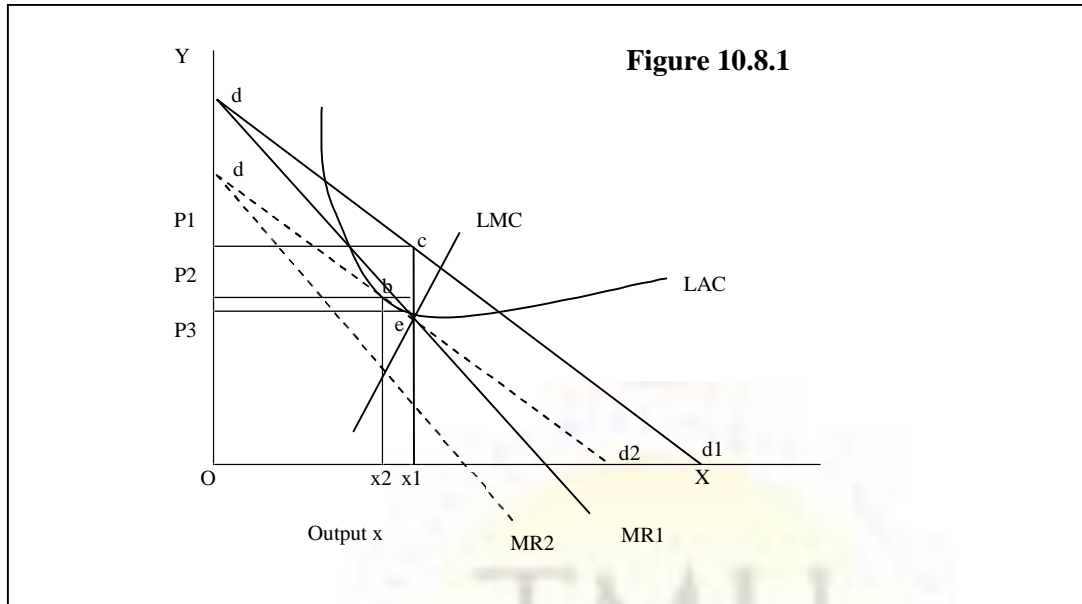
10.9 EQUILIBRIUM OF THE FIRM WITH PRICE COMPETITION

In this model it is assumed that there is no entry and exit of the firms in the long run. However, the price in the short run is assumed to be higher than the equilibrium price. Here a new demand curve is introduced DD which shows the actual sales of the firm after incorporating the adjustments of the prices of other firms in the group. This is explained in figure 10.9.1

Figure 10.9.1
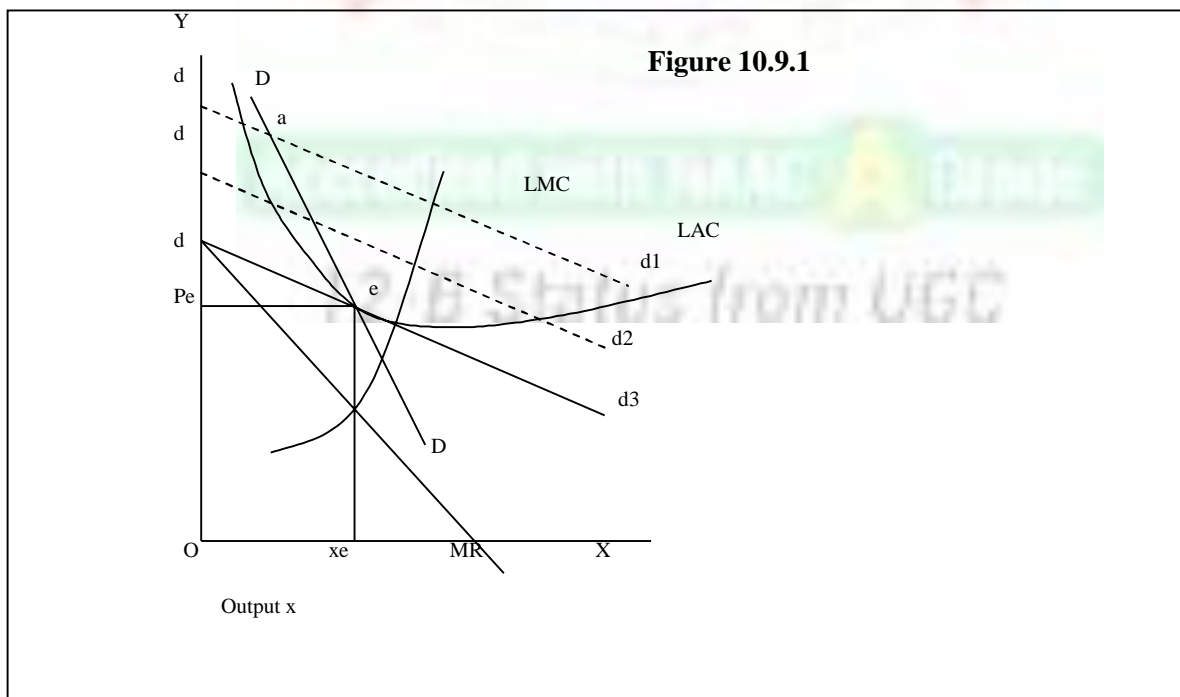
The firm is originally on dd1 demand curve. The firm perceives it to be his demand curve. Initially the firm is at point a on dd1. The firm perceives that it can expand its level of output and maximize profits and it will not affect his competitors as he feels that his share is very small in the market. When the firm expands his level of output the other firms will also do the same and it will lead to the downward shift in the demand curve. The demand curve will continue to shift downwards till it becomes tangent to the long run average cost curve. The final demand curve of the firm is dd3. The DD demand curve is formed by joining the points of shift of the demand curves of the firm (dd1, dd2 and dd3) with the respective prices. The point of equilibrium is shown by point e. At this point the firm"s demand curve is tangent to the long run average cost curve and the DD curve is also cutting the firm"s demand curve. There will be no super normal profits in the long run. Thus, in the whole industry the prices will be OPe. However, this is just a cluster of prices.

10.10 SELLING COSTS AND FIRM'S EQUILIBRIUM

In monopolistic competition, Chamberlin has included the selling costs as part of the total costs. Firms spend heavily on the advertising and selling activities. This is done intentionally to attract more customers. The selling cost curve is assumed to be U – shaped. The production costs are also U – shaped. These are then added together to get the total average costs. This is explained in figure 10.4.1a, 10.4.1b and 10.4.1c. The equilibrium of the firm with selling costs is explained separately in figure 10.10.1. On OX axis we have output x and on OY axis we have OY axis. In OY axis we have prices and costs. AC is the average cost curve which includes both average production costs and average selling costs.

Figure 10.10.1

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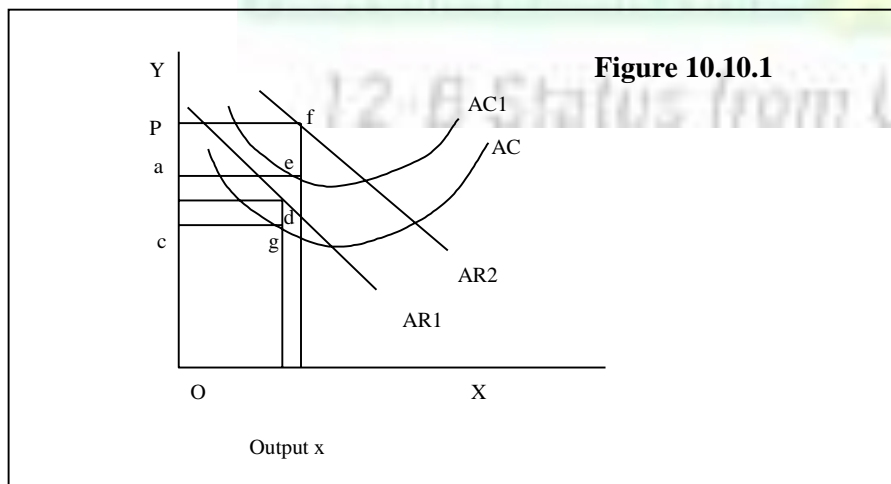
The firm has to decide both the price of the commodity and the selling costs to be incurred. It is assumed that the demand for the product increases with the increase in the selling costs. Because of this assumption the demand curve of the firm shifts to the right. The original average revenue curve of the firm is AR1. For the sake of simplicity it is assumed that the equilibrium is at point g. At this the firm is earning bcgd as super normal profits. Now, if the firm decides to invest more in selling costs i.e. the firm decides to spend more on advertising then the total selling costs will increase. Production costs remaining the same then the average cost curve of the firm will also shift upwards. Thus, the new average cost curve is AR2. Because of the rise in the selling costs the demand curve of the firm also shifts upwards from AR1 to AR2. This shift in the demand curve is due to the assumption that the rise in selling costs leads to an increase in demand. Now, the equilibrium of the firm is at point e. Again it is assumed that at this point the marginal cost curve is equal to marginal revenue and the marginal cost curve is cutting the marginal revenue from below. However, for the sake of simplicity the two curves are not shown here. At the point of new equilibrium e the firm is earning super normal profits again. The super normal profits of the firm are equal to the area Pfea. Thus, with selling costs the firms experience a rise in their demand and also in their super normal profits.

10.11 CRITICISM OF THE MONOPOLISTIC COMPETITION

Given below are the different points of criticism leveled against monopolistic competition:

1. **Inconsistent assumptions**: The theory of monopolistic competition given by Chamberlin is based on inconsistent assumptions. On one side the theory assumes that the products are differentiated and on the other side it assumes independent actions on the part of the competitors. When the firms indulge in product differentiation then they always keep in mind the actions of their rival firms. For example: whenever the company which manufactures „coke" comes with a new advertisement immediately the company manufacturing pepsi also introduces a new advertisement. Thus, in product differentiation the actions of the competitors are always considered by the firm.

2. **Inconsistent myopic behavior of the firms**: In the long run it is assumed that the firms believe that they can earn super normal profits by selling more output. For attaining this purpose the firms tend to reduce their price and sell more output but the rivals also follow the same and the total output in the industry expands and the firm does not reach its target

level of output. However, the firm does not learn from this myopic behavior and in the next time period the firms again resort to this behavoiur. This is an inconsistent behavior. Because some firms will definitely learn from their past mistakes. As a result these firms will correct their behavior but in monopolistic competition there is no provision for the same.

3. **Product differentiation as a barrier to entry**: In the monopolistic competition the assumption of product differentiation becomes inconsistent with the free entry of the firms. When product differentiation is there then the new firms have to attract customers who have their own brand loyalty. For this purpose new firms have to spend huge amounts on advertising and other selling activities which in itself become a strong barrier to entry as it becomes very difficult for the new firms to bear the high costs.

4. **Definition of industry**: In the definition of industry firms manufacturing same homogeneous products are put together. However, in monopolistic competition the firms selling differentiated products are put together in one group. This completely destroys the concept of industry. Each heterogeneous product is an industry in itself.

5. **Number of firms is not specified**: Under monopolistic competition Chamberlin has not specified the total number of firms. He has just mentioned that there are large number of firms but how many are actually there is not explained. This should be clarified so that it could be distinguished from oligopoly.

6. **No precise values of elasticites are given**: In the model Chamberlin has mentioned that the products are close substitutes with high price and cross elasticites. However, he has not mentioned the exact elasticities as a result of which difficulties are faced in classifying the goods in their respective groups.

7. **Definition of the demand curve is not appropriate**: The definition of the demand curve covers only the consumer"s demand. However, it does not cover the demand for intermediate goods and the final demand from retailers. As a result the demand curve of the firms under monopolistic competition remains incomplete.

8. **U – Shaped cost curve**: In the theory of monopolistic competition, the average costs which include the average production costs and selling costs are assumed to be U – shaped. The rise of the monopolistic competition was actually against the U – shape of the cost curves and it was still made a part of the theory.

10.12 CONTRIBUTION OF THE MONOPOLISTIC COMPETITION

Following are the main contributions of the theory of monopolistic competition to economic analysis:

1. **Product Differentiation**: The most important contribution of monopolistic competition is the introduction of product differentiation. Before this theory products were assumed to be homogeneous. However, in reality products are not homogeneous. Each producer tries to differentiate his product from the other on any possible ground. Thus, the theory of monopolistic competition started a new chapter in the economic analysis.

2. **Introduction of selling activities of the firm**: The theory of monopolistic competition is also credited with the introduction of selling activities of the firm. By ignoring selling activities or the advertising activities the economic models were existing in dark. However, Chamberlin opened new horizons of this theory.

3. **Solution to falling costs**: This model gave a solution though it may not be the best for the problem of falling costs. Because of this theory the idea of declining costs could be covered under economic analysis.

4. **First systematic attempt of selling costs**: Chamberlin made the first systematic attempt to introduce selling costs and he also covered the impact of selling costs on the position and the shape of demand curve of the firm.

5. **Contribution in terms of the new demand curve:** Another contribution of Chamberlin is in terms of the introduction of the share of the market demand curve as an important tool of analysis. This demand curve gave rise to the „Kinked demand curve" which has later on become a significant tool of analysis.

10.13 COMPARISON WITH PERFECT COMPETITION

Given below are the different points of comparison between monopolistic competition and perfect competition:

1. **Differences in the equilibrium conditions of both the models:** In perfect competition the equilibrium condition is given by,

   $MC = MR = AC = P$.

   But in monopolistic competition the equilibrium condition is given by,

MC = MR and AC = P but P > MC.

2. **Differences in the price in the two models**: Since there is difference in the equilibrium conditions of the two models therefore, under monopolistic competition price will be higher as compared to perfect competition.

3. **Differences in the output in the two models**: Under perfect competition the firms will produce more output but under monopolistic competition the firms will produce lesser output. Thus, monopolistic competition is not suitable for a just economy.

4. **Differences in the product**: Under perfect competition the product is homogeneous. However, under monopolistic competition the firms are not producing homogeneous product. Each firm is differentiating its product from the product of the other firm either on the grounds of technical features or on account of difference in the styling or packaging of the products.

5. **Differences in the demand curves of the firms**: Both the models are different on the grounds of the differences in the shape of the demand curves. In perfect competition the shape of the demand curve is perfectly elastic i.e. parallel to OX axis. However, in monopolistic competition the demand curve is downward sloping.

6. **Selling costs**: In perfect competition since product differentiation is not included therefore; there is no room for selling costs. However, monopolistic competition introduces the concept of selling costs. Firms spend intensively on the advertising and other selling activities in order to attract more customers.

7. **Differences in the knowledge**: Under perfect competition both buyers and sellers have perfect knowledge of the market conditions. However, in monopolistic competition the firm suffers from myopic behavior. Each firm feels that it can increase its own share and other firms will not come to know about it.

8. **Concept of 'industry' and 'group'**: Under perfect competition since all the firms are producing one product therefore, their demand curves are added to get the demand curve of the industry. However, in monopolistic competition the products of the firms are different from one another. These differences are on account of technical differences or due to the styling or packaging differences. As a result their demand curves cannot be added to get the industry demand curve. Therefore, in monopolistic competition the concept of industry has been replaced by the concept of group.

9. **Cluster of prices**: Under perfect competition there is one price prevalent in the market. But under monopolistic competition there is a cluster of prices. This is because the product of each firm is different from the product of the other firm and all those products that are close substitutes of one another are put together under one group. Therefore, the prices of all the products under one group move together with slight variations.

10. **Control over prices**: under perfect competition the firms do not have any control over the prices. However, under monopolistic competition due to product differentiation firms have control over prices.

10.14   A QUICK REVISION

Figure 10.14 summarizes the complete chapter.

Figure 10.14 A Quick Revision
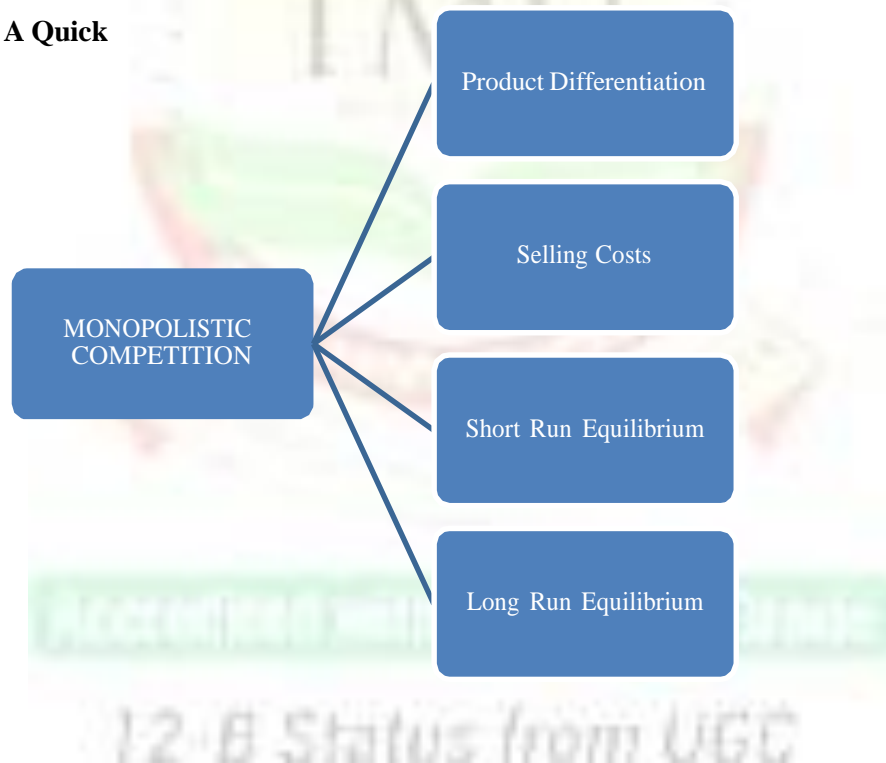
10.15 KEYWORDS

Monopolistic competition, declining costs, cost controversy, selling costs, product differentiation, group, U – shaped cost curves, production costs, cluster of prices, short run equilibrium, long run equilibrium.

10.16 ASSESS YOUR PERFORMANCE

Short Questions

Q.1 Give two types of product differentiation.

➢ Real product differentiation occurs when the products are differentiated on account of real differences i.e. the inherent technical features of the product are different from other products. Such a differentiation occurs when there are differences on account of specification of the product, difference in the use of factor inputs or location of the firm.

➢ Fancied product differentiation occurs when the technical features of the product are the same still the products are differentiated on account of differences in the packaging, styling, designing, brand name. Such a differentiation implies selling cost.

Q.2 Give two points of comparison between perfect competition and monopoly.

➢ Differences in the product: Under perfect competition the product is homogeneous. However, under monopolistic competition the firms are not producing homogeneous product. Each firm is differentiating its product from the product of the other firm either on the grounds of technical features or on account of difference in the styling or packaging of the products.

➢ Cluster of prices: Under perfect competition there is one price prevalent in the market. But under monopolistic competition there is a cluster of prices. This is because the product of each firm is different from the product of the other firm and all those products that are close substitutes of one another are put together under one group. Therefore, the prices of all the products under one group move together with slight variations.

Q.3 What are selling costs?

➢ Chamberlin added for the first time in the theory of markets the concept of selling costs. Introduction of the selling costs becomes pertinent as product differentiation is the essential element of the monopolistic competition. Firms incur a lot of advertising and other selling expenses. This is done to differentiate the product of a firm from the product of its rivals. He further, assumed that due to the inclusion of advertising costs the demand curve of the firm becomes less elastic as the buyers will have a fixed preference for the products that are advertised heavily. The selling cost curve is again assumed to be U – shaped. This implies that in selling costs there are economies and diseconomies of advertising as output changes. Initially the expenditure of the firms is low on selling costs that is why the curve is initially declining. But after a particular point the per unit selling costs start to increase.

Q.4 Give two points of significance of the monopolistic competition.

➢ The most important contribution of monopolistic competition is the introduction of product differentiation. Before this theory products were assumed to be homogeneous. However, each producer tries to differentiate his product from the other

➢ The theory of monopolistic competition is also credited with the introduction of selling activities of the firm. By ignoring selling activities or the advertising activities the economic models were existing in dark. However, Chamberlin opened new horizons of this theory.

Q.5 Give two points of criticism of monopolistic competition.

➢ In the model Chamberlin has mentioned that the products are close substitutes with high price and cross elasticites. However, he has not mentioned the exact elasticities as a result of which difficulties are faced in classifying the goods in their respective groups.

➢ The definition of the demand curve covers only the consumer‟s demand. However, it does not cover the demand for intermediate goods and the final demand from retailers. As a result the demand curve of the firms under monopolistic competition remains incomplete.

Long Questions

Q.1 Explain the contribution of monopolistic competition to economic analysis.

Q.2 Discuss the determination of long run equilibrium under monopolistic competition.

Q.3 What is monopolistic competition? Differentiate it from perfect competition.

Q4. Critically explain price and output determination under monopolistic competition.

10.17 Suggested Readings

Ahuja, H.L. (1980), Modern Economics, S.Chand and Company Limited, New Delhi.

Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

Mithani, D.M. (2014), Managerial Economics Theory and Applications, Himalaya Publishing House, Mumbai.

Oligopoly

11.1 OBJECTIVES OF THE CHAPTER
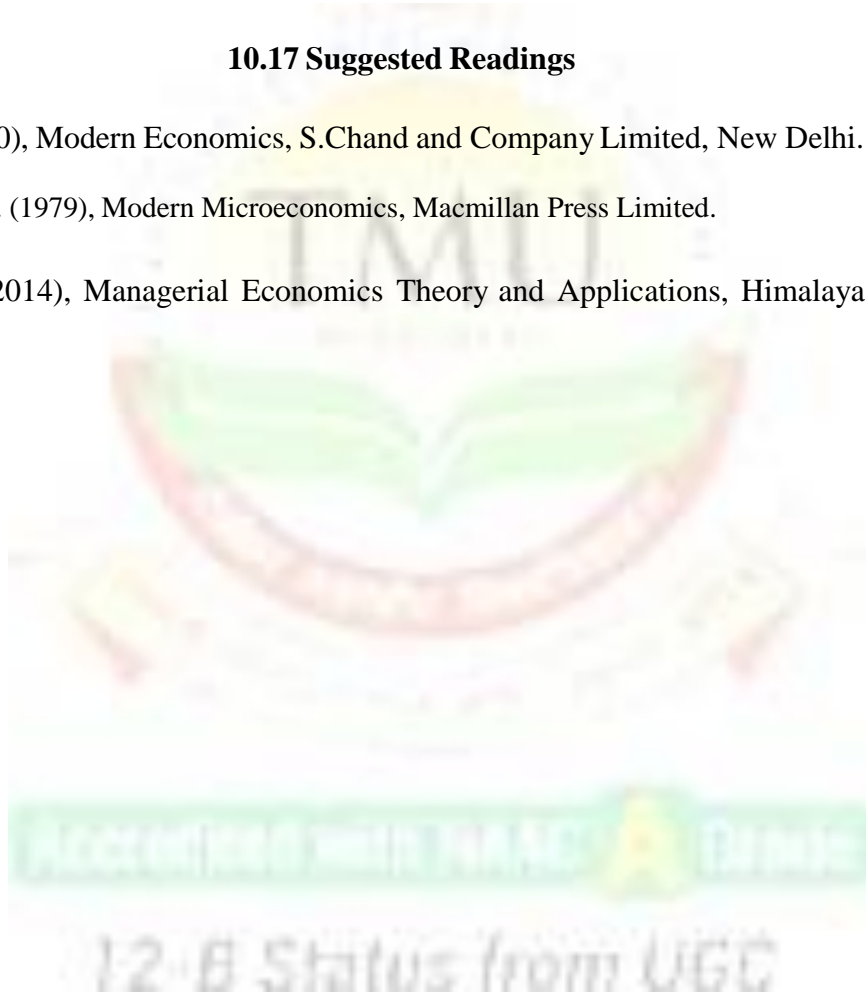
The market forms that have been discussed till now rarely exist in the real world. In this chapter the readers are apprised about the real form of markets i.e. oligopoly. The different models of oligopoly are explained in this chapter.

11.2 INTRODUCTION

Though Chamberlin‟s model of monopolistic competition could not address many issues, however it made a significant contribution to the economic analysis. This model drew the attention of the economists towards the market forms that were close to reality. Such market forms do not have large number of sellers and these may or may not sell homogeneous products. In these market forms the number of sellers is limited and they may also sell differentiated products. This kind of market form has been called as oligopoly. The word oligopoly has been

derived from Greek words „oligi" which means „few" and „polien" meaning „sellers"[1]. The first oligopoly model was developed by a classical economist Augustin Cournot in 1838.

In this chapter we shall discuss the various models that explain the price and output determination by the firms that are working in oligopolistic structure.

11.3 OLIGOPOLY

Oligopoly is a case of markets where the number of sellers is restricted. Thus, there are not many sellers of a commodity. Also the product that these sellers are selling may or may not be homogeneous i.e. the sellers may also sell differentiated products. For example, the noodle industry in India is a case of oligopoly. There are only a few sellers of this product. However, till recently, Nestle (Maggi) had a major share in this industry and now ITC (Yippez) also has a dominant share.

According to D. N. Dwivedi,

"Oligopoly is a form of market organization in which there are a few sellers selling homogeneous or differentiates products"[2].

According to Koutsoyiannis,

"In an oligopolistic market there is a small number of firms, so that sellers are conscious of their interdependence. Thus, each firm must take into account the rivals reactions. The competition is not perfect yet the rivalry among firms is high, unless they make a collusive arrangement. The products that the oligopolists produce may be homogeneous or differentiated. In the latter case the elasticity of the individual demand curve is smaller than in the case of the homogeneous oligopoly"[3].

Thus, from the above definitions, the following forms of oligopoly have come to the forefront:

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[1] Dwivedi, D.N. (2003), Microeconomics Theory and Applications, Pearson Education, Singapore.
[2] Ibid.
[3] Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited

1. **Pure Oligopoly:** Pure oligopoly is a form of market where the oligopolist firms are selling homogeneous products. For example: industries producing bread, steel, cement etc.

2. **Differentiated Oligopoly**: Differentiated oligopoly is a form of market where the oligopolist firms are selling not homogeneous but differentiated products. For example the firms in the car industry are selling differentiated products. As the product of each firm is different from the product of the other firm.

3. **Collusive Oligopoly**: Collusive oligopoly implies that the firms enter in to an agreement with each other. Such agreements may pertain to both price and output, or either price or output.

4. **Non – Collusive Oligopoly**: Under non collusive oligopoly the firms do not enter into any agreement with each other. If a firm has to decide its own output and price then the firm has to keep in mind the decisions of its rivals and their reactions to his own decisions.

Another classification of oligopoly has been done on the basis of number of firms in the market. If there are just two firms in the market then it is called as duopoly whereas in the other form of oligopoly there are more than two sellers.

11.4 REASONS FOR THE RISE OF OLIGOPOLY

Given below are the reasons for the rise of oligopoly:

1. **Huge investment**: The oligopolistic markets are characterized by the presence of huge investments to be made in the market. As a result it becomes possible only for big firms to enter into this industry.

2. **Economies of scale**: The already existing firms produce huge levels of output due to which they enjoy economies of scale. These economies of scale reduce the cost of production of the existing firms and these can only be realized at very high levels of output. Thus, it becomes very difficult for a new entrant to compete with these firms as the new entrant cannot reap these economies immediately.

3. **Patent Rights**: Sometimes the exclusive patent rights give the producers of the certain output an edge over the others. For the particular period of time the producers with the patent do not have threat of entry.

4. **Control over specific raw material**: If the producers have control over the specific raw material then the others might not be encouraged to enter into the industry.

11.5 FEATURES OF OLIGOPOLY

Given below are the main features of oligopoly:

1. **Small number of firms**: Under oligopoly the number of firms selling the product is not large. There are a few sellers of the product in the market. However, the exact number of sellers has not been specified by the economists. This usually depends on the size of the market. But this is for sure that the number of firms is so small that each firm has a significant share of the market or a single firm has the dominant share by which it can influence the price and output decisions of the rival firms.

2. **Interdependence of the firms**: In oligopolistic markets the firms are mutually dependent on one another. Since the number of sellers is small so the firms must take into account the decisions of their rival pertaining to price and output. The firm also has to consider the reactions of their rivals to its own decisions. Thus, each firm's decisions on price and output are dependent on the rival firms decisions and reactions.

3. **Barriers to entry**: Under oligopoly the number of sellers is restricted. Such barriers to entry exist due to certain reasons: the new entrants would have to make huge investments so as to match the production capacity of the existing firms. The new entrant will have to face such rival firms that are already enjoying huge economies of scale. The already established firms have a strong consumer loyalty due to the brand name of the existing firms. Thus, it will not be easy for the new entrant to take away the customers of the established firms. For example in the noodle industry before the launch of „Yippez" noodles by ITC, Nestle's „Maggi" used to have a dominant share. Though there were other brands also like „Top Ramen" but these firms could not affect the share of Nestle. Thus, when ITC entered the noodle market it had a difficult task ahead as the almost the whole of India was used to having „Maggi". Also „Maggi" was a „must have" household item since many years. Thus, ITC had barriers in the form of brand name, customer

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loyalty. So to claim a dominant share ITC strategically spent on advertising. Thus, advertising was also a big barrier. It became possible for ITC to fight such barriers as ITC in itself is a well - established brand with huge financial support. But for a small investor it is not possible to spend huge amounts and compete with such firms. Thus, these barriers restricted the entry of many firms in noodle industry and „Nestle" enjoyed the dominant share for many years. Hence, oligopolistic markets have strong barriers to entry.

4. **Price and output are not determinate**: If oligopolistic firms enter into collusion then it becomes possible to derive the demand curve of the firm which then makes the determination of price and output easy. However, such collusion may not last longer. Also in case of non - collusive oligopoly it becomes very difficult to derive the demand curve of the firms which leads to difficulties in the determination of price and output of the firms.

11.6 OLIGOPOLY MODELS

In oligopoly the firm takes into consideration the reactions of the rival firms and their price and output decisions. As a result the decisions of the firms related to price and output keeps on changing. This makes the economic analysis of the firms under oligopoly a difficult process.

According to Baumol,

"Under these circumstances, a very wide variety of behaviour pattern becomes possible. Rivals may decide to cooperate or at the other extreme may try to fight each other to the death. Even if they enter an agreement, it may last or it may breakdown".[4]

Since, in oligopoly there is high degree of interdependence among the firms, therefore, it becomes very difficult to study the behavior of such firms. There are models that assume that the firms will go for collusion and decide their price and output mutually. These are: the cartel models, the game theory, prisoner"s dilemma etc. There are other models that do not consider collusion and firms compete with each other. These include: Cournot"s duopoly model,

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[4] Baumol, W.J. (1985), Economic Theory and Operations Analysis", Prentice Hall, New Delhi, as mentioned in Dwivedi, D.N. (2003), Microeconomics Theory and Applications, Pearson Education, Singapore.

Chamberlin‟s oligopoly model, Sweezy‟s kinked demand curve etc. In this chapter we shall discuss some of these oligopoly models.

11.6.1 Cournot's duopoly model

The first oligopoly model was developed by Augustine Cournot in 1838. It was a model given for two firms, hence, the name „duopoly‟. Following are the main assumptions of Cournot‟s model:

1. There are two firms in the market. Each firm has a mineral water well.
2. The firms are operating their wells at zero marginal cost.
3. The demand curves of both the firms are downward sloping.
4. Each firm believes that his competitor will not react to any changes in his decisions.

Cournot‟s duopoly model is explained in figure 11.6.1.

Figure 11.6.1
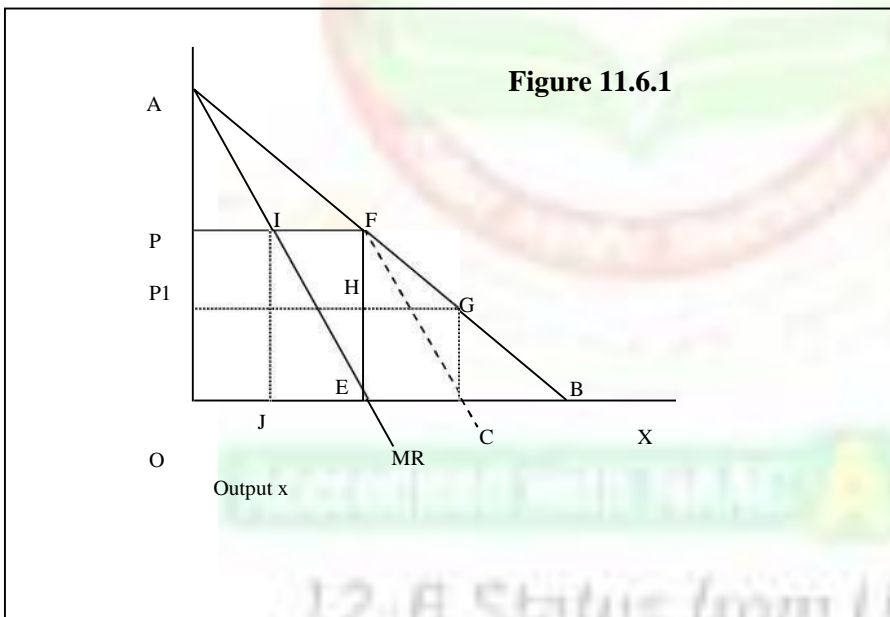
The demand curve of the industry producing mineral water is given by AB. The marginal revenue curve is MR in the figure. There are two sellers in the market say Y and Z. Initially there is only firm Y in the industry. At point E the marginal cost is equal to zero and it is further, equal to marginal revenue. The firm Y will now produce OE level of output at EF prices. By selling this output the firm would be making OEFP as profits. Now, the firm Z will enter into the market. This firm will perceive AF to be the demand curve of firm Y and perceives that the

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remaining demand curve i.e. FB as his demand curve. The point F is equi-distant from both the sides. Thus, Y and Z will have equal share in the output. Here, Z assumes that if he will produce EB level of output then firm Y will not react. Now, the demand curve of Z is FB and his marginal revenue curve is given by FC. FC is cutting EB at its mid-point so that EC = CB. Now, firm Z will sell EC output at OP1 price. Note that Z is supplying one fourth of the total output. As a result of the entry of firm Z the price in the market has fallen to OP1. Due to the entry of firm Z and the consequent fall in the price, firm Y will anticipate a fall in his profits. His anticipated profits would be OEHP1. When firm Y is faced with this situation then it assumes that if he changes his output decision then firm Z will not react and continue to produce EC level of output. Therefore, now firm Y will assume that since firm Z is having ¼ th share of the market, therefore, firm Y has ¾ th share of the market available to him. So, now the firm Y will try to maximize his profits and will produce $3/8^{th}$ of the market. As a result of this the share of firm Y has fallen from $1/2^{th}$ to $3/8^{th}$. As a result of the assumption both Y and Z will supply only half of the total available market. Now, Z will assume that Y will produce $3/8^{th}$ of the market and will not react to any changes done by Z. therefore, Z feels that the market now available to him is 1- 3/8 = 5/8. However, he would actually produce $5/16^{th}$ share of the total market. Now, firm Y will react. And this process will go on. In this process firm Y will lose his market share and firm Z continues to gain from his rivals reactions. Slowly, situation will come where each of the firms will have 1/3 of the market share.

Though this model of oligopoly is a stable model and it can also be extended to general oligopoly where the number of firms is more than two. However, there are certain limitations of the same. These are discussed below:

1. In Cournot's duopoly model it is assumed that each firm feels that the rival firm will not react to any changes in their price and output decisions. This is a wrong assumption. Firms in the real world do learn from their mistakes. However, in this model the firms continue to do the same mistakes.

2. In this model of oligopoly the marginal costs are assumed to be zero. This is not a practical assumption as firms have positive marginal costs. With marginal costs to be positive the analysis of the oligopoly becomes more complex and challenging. Thus, when Cournot's duopoly model is tested on these grounds then it fails.

11.6.2 Chamberlin's Model of Oligopoly: The Small Group Model

Chamberlin rejected the assumption in Cournot's model that firms do not react to the actions of the rivals. According to Chamberlin the firms under oligopolistic markets are not independent of the actions of their rivals. Rather the decision of one firm to expand or contract demand or to increase or decrease price is dependent on the actions and reactions of its rivals. Firms do recognize their interdependence and do not assume that their rivals will not react.

According to Chamberlin,

"When a move by one seller evidently forces the other to make a counter – move, he is very stupidly refusing to look farther than his nose if he proceeds on the assumption that it will not".[5]

Chamberlin used Cournot's model as his base to explain the price and output determination in oligopoly while recognizing each other's interdependence. He believed that the firms in oligopoly do look into the reactions of their rival firms. He says that when a firm decides to change its level of output or price then there can be two types of effects of the decision of the firm. These are:

Direct effects: The direct effects are those effects which would occur when the firms do not react to changes in their rivals output or price.

Indirect effects: As per Chamberlin indirect effects occur when firms do not remain silent and react on the changes introduced by the rival firms in their price and output.

Chamberlin believes that if the firms in oligopolistic markets recognize their interdependence and act accordingly, then a stable equilibrium can be attained. At this stable equilibrium each firm will charge the monopoly price and will also share the output equally. At this situation the profits of the firm would be maximized. In figure 11.6.1 Cournot's duopoly model is explained. Since, Chamberlin made Cournot's model as his base therefore, we will explain this model in figure 11.6.1. There is firm Y in the market. Firm Y is producing OE level of output at FE prices because at point E the marginal revenue is equal to zero and marginal cost is also assumed to be equal to zero. This can be explained as,

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[5] Dwivedi, D.N. (2003), Microeconomics Theory and Applications, Pearson Education, Singapore

MC = MR = 0.

Now, firm Z enters into the market and it assumes that the available market demand curve for him is FB. So, now the firm Z will produce EC level of output and will charge OP1 price. From this point onwards there lies a difference between the two models. In Cournot's model it is assumed that the firms do not react to the changes in the rivals output but Chamberlin assumes that firms do recognize their interdependence and as a result the firms will react to the changes in their rivals output. As a result firm Y will make a compromise and reduce its level of output from OE to OJ and charge the price OP. Now, firm Z will also recognize its dependence on firm Y. As a result the firm Z will also reduce its output from EC to JE and will charge the monopoly price OP. The total output of both the firms Y and Z is,

OJ + JE = OE,

which is the monopoly output. Thus, both the firms are now producing monopoly output and selling it at the monopoly price. Thus, this equilibrium becomes stable as the firms recognize their interdependence and thus, realize that both of them stand to gain when they stick to monopoly price and monopoly output.

Chamberlin's theory has been credited as it recognized the mutual dependence of the firms on one another. However, in this theory both the firms reach at the monopoly price and monopoly output which is implicitly based on the assumption that the firms now their rivals cost and demand functions. However, there is no such assumption in the Chamberlin's model. Therefore, it does not give us any concrete solution to the problem of price and output determination of the firms in oligopoly.

11.6.3 Sweezy's Model: Kinked Demand Curve

Paul Sweezy popularized the concept of kinked real demand curve in 1939. Originally kinked demand curve was given by Chamberlin while explaining theory of monopolistic competition. However, he did not use to explain the behavior of the firms under oligopolistic markets. Later on Hall and Hitch used the kinked demand curves to explain the rigidity of the prices under oligopoly. But the real credit for popularizing kinked demand curve as a tool of analysis in oligopolistic markets goes to Paul Sweezy. Paul Sweeezy, however, did not use kinked demand

curve to explain the determination of price and output in oligopoly. Once the firms decide a particular level of output then they do not prefer to change their decisions. Sweezy"s model seeks to explain the reasons behind these. So, the kinked demand curve is used to explain the reasons behind the stickiness of the prices at the already determined level.

In this model it is believed that if a particular firm reduces the price then the rival firms will also reduce their prices and this will neutralize the expected gains of the firm. However, if a firm increases the price then the rival firms will either maintain the same prices or will go for price cutting. As a result of this the firm which has increased its price will stand to lose. Therefore, the firms would not prefer to deviate from the already established price because they anticipate a loss due to the actions and reactions of their rival firms.

In order to explain the model, the following assumptions are made:

1. There are four firms in the oligopolistic market i.e. A, B,C, D.
2. All the firms are in equilibrium.

The model is explained in figure 11.6.3. On OX axis we have output and on OY axis we have price and cost. The market demand curve is given by dd". If firm A decides to change the price then there can be three reactions from its competitors. These are discussed below:

1. First reaction can be that if A increases or decreases the price then the rivals also do the same. Then the firm A will move on the demand curve dd". There will be no loss or gain to the firm A.
2. Secondly, when any action of firm A does not bring any reaction from its rivals. In this case if firm A raises its price and other firms do not increase the price then firm A will lose its customers to the rivals. This is because they are charging a lower price. Then the firm will move on PB demand curve. If firm A reduces the price then the rival firms will lose some of their customers to A. As a result the demand curve of A will be PB".
3. The third situation is when rivals do not react to any changes in the rise in the prices of A but when A reduces his price then the rivals react by reducing their price in equal terms or more. When firms do not react to the rise in the price of A then A moves to BP demand curve. When A reduces price then he cannot take advantage because he knows that rivals will also reduce their price. Therefore now A will move to Pd" demand curve.

Thus, the relevant demand curve of A is BPd". This curve has a kink at point P because of which this model is called as „kinked demand curve".

Between J and K there is a kink in the demand curve of A and marginal revenue curve of A. The marginal revenue curve of A is BJKL. If the marginal cost curve of the firm is MC1 then the equilibrium of the firms would be between J and K because before J marginal revenue is greater than the marginal cost and after K the marginal cost is greater than marginal revenue. Thus, equilibrium will be between K and J but the exact position cannot be specified. However, the profits are maximized on any point between K and J. The firms will prefer to remain between K and J because they know that they are maximizing their profits here and any deviation from this situation will not be maximizing their profits.

Figure 11.6.3
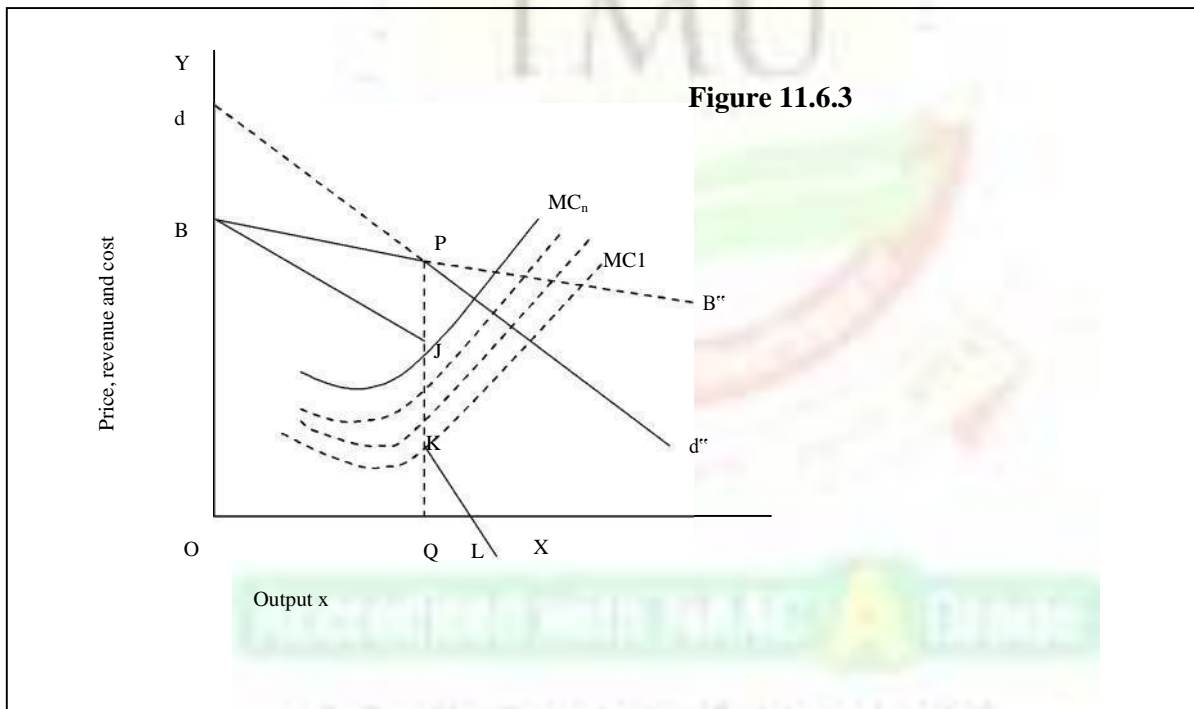
Thus, the prices will remain sticky. The firms will change their equilibrium position only if the marginal cost curves shift beyond point J. If any shift in the cost curves occurs between J and K then it will not cause the firms to change their equilibrium position.

Though, Sweezy"s model of oligopoly helps us in explaining the stickiness of the prices, however, it has its own weaknesses. These are discussed below:

1. Does not explain the determination of the prices: Sweezy"s model does not explain the determination of prices. It just explains the reason for the prices to be sticky even when the cost curves change their position.

2. No justification for the rise of Kink: The model given by Sweezy explains the reasons for the occurrence of the kink but it does not explain when this kink will appear. The level of output at which this kink will appear is not explained.

3. No empirical justification: There is no empirical support for the kink in the demand curves of the firms under oligopoly. Thus, Sweezy"s theory has been rejected by many economists.

11.6.4 Cartels

The oligopoly models that we have discussed till now are meant to explain the behavior of the firms who react on the actions of their rivals. However, there are other models that assume that firms do not react to the changes in the decisions of their rivals. Rather firms in the oligopolistic markets form a group and take joint decisions related to either price or output or both. The firms would be more interested in forming collusive models because such models reduces the uncertainty and ensures profit maximization. It also reduces the risk of competition between the firms and entrusts upon the firms the power to control and regulate the prices and output. Also, collusion creates a kind of barrier for the entry of new firms into the market.

Cartels refer to the direct (open or secret) agreement between the firms in the oligopolistic market so as to reduce the uncertainty which arises from the mutual interdependence between the firms. Though cartels are mostly illegal yet they still exist in the form of associations etc. the cartels may decide price for the firms or the share of each firm. Thus, cartel can be discussed under two heads:

1. **Cartels leading to joint profit maximization**: In this kind of cartel, the firms form a cartel. The firms in this kind of market are assumed to produce homogeneous product. The objective assigned to the cartel is to lead to the joint profit maximization of the profits. The cartel collects the data pertaining to the present share of the each firm so as to arrive at the total output of the industry. It also collects data on the costs of production of all the firms and then it arrives at the total marginal cost curve of the industry. The cartel

also collects data on the price of the product prevailing in the market. Such data are collected from the respective firms by the cartel. Cartel then calculates the marginal cost and marginal revenue curves and finds out the point of equilibrium. The point of equilibrium occurs at a point where marginal cost is equal to marginal revenue of the firm. Depending on the position of the cost curves the firms then decide their individual level of output. However, firms are not allowed to increase their price beyond the price which is decided by the cartel. This kind of cartel is similar to the multi plant monopoly.

In this kind of oligopoly it is very difficult to correctly estimate the market demand curve as each firm feels that its own demand curve is very elastic than the market demand curve. This is because the products of the firms are substitutes of one another. Secondly, the market conditions keep on changing. As a result the marginal costs of the firms also keep on changing. Thus, it may happen that while the cartel is estimating the share of each firm then by that time the marginal costs curves of the firms change. Thus, the estimates of the cartel would be wrong then.

2. **Market sharing cartels**: The market sharing cartels are very common and acceptable as these cartel give flexibility to the individual firms. In such cartels the price of the product is decided and the decision pertaining to the output is left with the individual firms. The firms are also allowed to compete with one another on the basis of non- price competition. This implies that the firms can indulge in styling, packaging, advertising and other selling activities. Such cartels can be of two types:

   ➢ **Non-price cartels**: In this case the cartels decide the price of the product. The individual firms can sell any level of output at that price. This gives flexibility to the individual firms. However, these are not allowed to charge a higher price than the cartel price.

   ➢ **Quota System**: Under this kind of cartel system a share or quota of each firm is fixed. Thus, the firms are expected to sell only as per the assigned quota. The allotment of the quota is done on the basis of the bargaining ability of the firms and the market share of the individual firm. Clearly the dominant firm gets the maximum share. However, such a cartel still suits the other small firms as it

avoids uncertainty and assures a market for them. It also saves them from potential entry of new firms.

11.7 A QUICK REVISION

Figure 11.7 presents a brief summary of the whole chapter.

Figure 11.7 A QUICK REVISION


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                    ┌─────────────────────┐          ┌─────────────────────────────┐
                    │ COLLUSIVE OLIGOPOLY │──────────│           Cartels           │
┌──────────────┐    └─────────────────────┘          └─────────────────────────────┘
│              │────
│  OLIGOPOLY   │
│              │────                                  ┌─────────────────────────────┐
└──────────────┘    ┌─────────────────────┐          │   Cournot's Duopoly Model   │
                    │    NON COLLUSIVE    │──────────│     Chamberlin's Model      │
                    │      OLIGOPOLY      │          │ Sweezy's Kinked Demand Curve│
                    └─────────────────────┘          └─────────────────────────────┘
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11.8 KEYWORDS

Large number of buyers, limited number of sellers, barriers to entry, collusive oligopoly, non – collusive oligoply, pure oligopoly, differentiated oligopoly, cartels, kinked demand curve, duopoly model.

11.9 ASSESS YOUR PERFORMANCE

Short Questions

Q.1 What is differentiated oligopoly?

➤ Differentiated oligopoly is a form of market where the oligopolist firms are selling not homogeneous but differentiated products. For example the firms in the car industry are selling differentiated products. As the product of each firm is different from the product of the other firm.

Q.2 What is non – collusive oligopoly?

➤ Under non collusive oligopoly the firms do not enter into any agreement with each other. If a firm has to decide its own output and price then the firm has to keep in mind the decisions of its rivals and their reactions to his own decisions.

Q.3 Give two reasons for the rise of oligopoly.

➤ The oligopolistic markets are characterized by the presence of huge investments to be made in the market. As a result it becomes possible only for big firms to enter into this industry.

➤ The already existing firms produce huge levels of output due to which they enjoy economies of scale. These economies of scale reduce the cost of production of the existing firms and these can only be realized at very high levels of output. Thus, it becomes very difficult for a new entrant to compete with these firms as the new entrant cannot reap these economies immediately.

Q.4 Give two features of oligopoly.

➢ Under oligopoly the number of firms selling the product is not large. There are a few sellers of the product in the market. However, the exact number of sellers has not been specified by the economists. This usually depends on the size of the market. But this is for sure that the number of firms is so small that each firm has a significant share of the market or a single firm has the dominant share by which it can influence the price and output decisions of the rival firms.

➢ In oligopolistic markets the firms are mutually dependent on one another. Since the number of sellers is small so the firms must take into account the decisions of their rival pertaining to price and output. The firm also has to consider the reactions of their rivals to its own decisions. Thus, each firm"s decisions on price and output are dependent on the rival firms decisions and reactions.

Q.5 Give two points of criticism of Cournot"s duopoly model.

➢ In Cournot"s duopoly model it is assumed that each firm feels that the rival firm will not react to any changes in their price and output decisions. This is a wrong assumption. Firms in the real world do learn from their mistakes. However, in this model the firms continue to do the same mistakes.

➢ In this model of oligopoly the marginal costs are assumed to be zero. This is not a practical assumption as firms have positive marginal costs. With marginal costs to be positive the analysis of the oligopoly becomes more complex and challenging. Thus, when Cournot"s duopoly model is tested on these grounds then it fails.

Long Questions

Q. 1 What is Oligopoly? Expalin the different features of oilgopoly and also give reasons for its rise?

Q2. Critically expalin how Cartels function.

Q.3 Discuss the Cournot"s Duopoly model.

Q.4 Critically discuss the kinked demand curve model.

Q.5 Expalin the non collusive models of olligopoly.

11.10 Suggested Readings

Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

Dwivedi, D.N. (2003), Microeconomics Theory and Applications, Pearson Education, Singapore

Activity 1

What are the features of Oligopoly?

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Activity 2

What do you understand by Kinked Demand Curve.

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LESSON 12

Distribution

12.1 OBJECTIVES OF THE CHAPTER

This chapter introduces the readers to the theory of factor pricing. The main objective of this chapter is to explain how the prices of the different factors of production are determined under economics.

12.2 INTRODUCTION

Till now we have discussed how the prices of the products are determined through the interaction between the consumers and producers. Chapter 12 and 13 focus on the different factors of production. The main factors of production are land, labour, capital and entrepreneur. Under distribution we study how the national product or national income is distributed between the different factors of production. Thus, under this we determine the prices of the different factors of production i.e. determining the rent, wages, interest and profits in the economy.

There are several theories for studying the distributive shares of the different factors of production but we shall study the theory of factor pricing.

The theory of factor pricing essentially concerns the determination of the prices of the different factors of production. Just as the prices of the products are determined by the forces of demand and supply, likewise the prices of the factors of production are determined by the forces of demand and supply. Thus, the theory of factor pricing explains the different determinants of the demand for and supply of the factors of production. However, the demand for factors of production is a derived demand. It is derived from the demand for goods and services. For example, the demand for a house is a direct demand but the demand for labour, land and raw material to construct the house is a derived demand. Thus, the demand for factors of production is different.

The theory of factor pricing was given by J.B.Clark. It is also called as the marginal productivity theory of factor pricing. The theory of factor pricing can be applied to all the factors of production. But in this part we will discuss the theory with reference to the determination of wages. In the theory of factor pricing, the share of the factors is determined through the forces of demand for and supply of factors. This is explained in the next sections.

12.3 DEMAND FOR A FACTOR

As is already explained the demand for a factor of production is a derived demand. It is derived from the demand for goods and services that the factor of production produces. Thus, for the generation of the demand for a factor of production two things are important:

➢ **Demand for the product that the factor produces**: It is very important that the product that the factor of production is producing must be in demand. Because only then there will be a demand for the factor of production. The labour must be very skilled but if it is producing a product which is not demanded that there shall be no demand for that labour.

➢ **Productivity of a factor**: Another significant factor that determines the demand for the factor of production is the productivity of the factor. If the factor of production is not productive then there may not be any demand for that factor of production.

The productivity of a factor can be worked out through the concept of marginal revenue productivity. In fact, for a firm the decision on the exact quantity of the factor of production to be employed is dependent upon the marginal revenue productivity and the price of the factor. Marginal revenue productivity of a factor can be defined as the revenue that a firm can earn by

employing one additional unit of a factor. Marginal revenue productivity of a factor can be calculated by multiplying the marginal physical product of the factor with the price of the product. This can be written as,

$MRP_L = MPP_L . P$

Where, MRP_L = marginal revenue productivity of labour, MPP_L = marginal physical productivity of labour and P = price of the product.

Marginal physical productivity of labour implies the additional output produced by the additional unit of labour. If we assume that there is only one variable input and there are decreasing returns to the labour then the marginal physical productivity and marginal revenue productivity curves are shown in figure 12.3.1a and 12.3.1b.
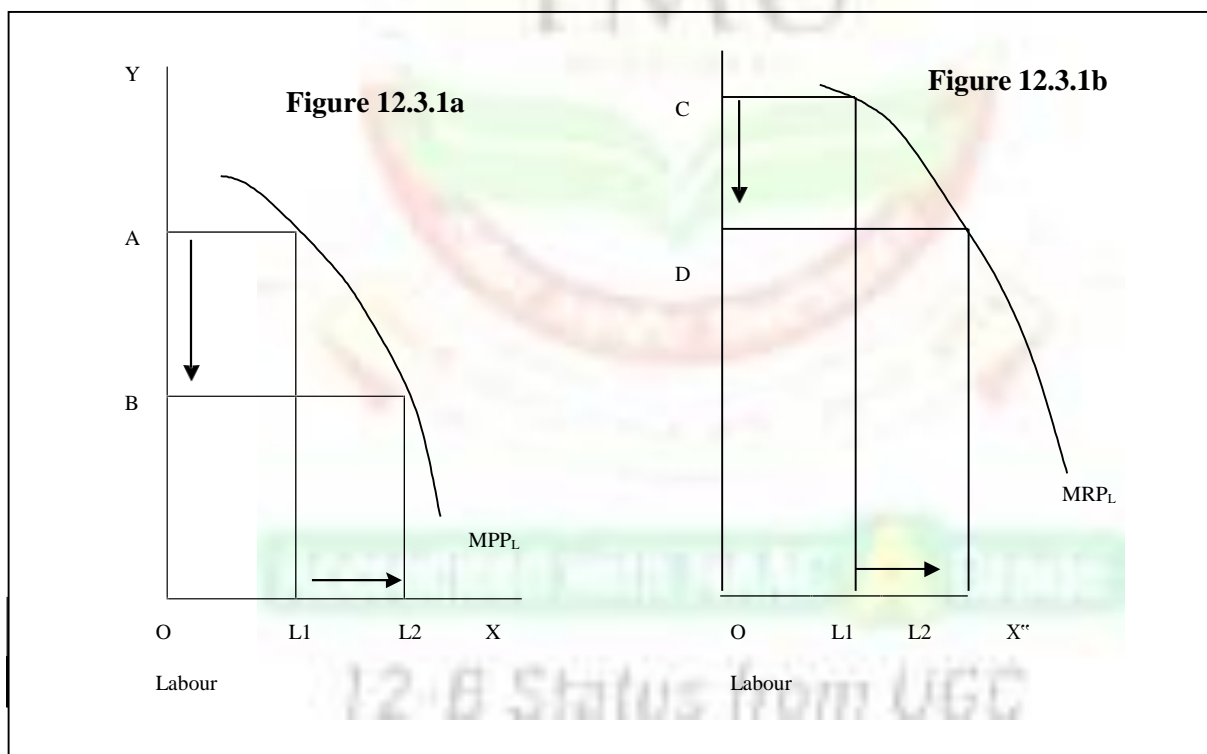

Figure 12.3.1a shows the marginal physical product curve of labour. As is shown in the diagram it is downward sloping. When initially the firm hires OL1 of labour then the marginal physical product is very high i.e. OA. As the firm employs more and more of labour then the marginal physical product declines. In the figure as the firm employed additional L1L2 units of labour the

marginal physical product declines to OB. In figure 12.3.1b the marginal revenue product curve is given. The marginal revenue product curve is obtained by multiplying the marginal physical product with the prices that are assumed to be constant. The marginal revenue product curve is also downward sloping. As the firm employs OL1 units of labour the marginal revenue product is high at OC and when the firm hires more units of labour i.e. OL2 then the marginal revenue product declines to OD. The marginal revenue productivity curve is the base thorugh which the demand for a factor of production is determined.

Since the demand for the factor of production is determined with the help of marginal productivity, therefore, the theory of factor demand is also called as the marginal productivity theory. The marginal productivity theory is regarded as the most significant theory of factor pricing. Though the concept of marginal product was discussed by many economists, however, it was J.B. Clark who used the concept of marginal product in order to explain the demand for a factor of production. Many other economists like Marshall, Wicksteed, Jevons etc also contributed to this theory.

Marginal productivity theory briefly states that in equilibrium the price of each factor is equal to the value of the marginal product. Thus, when the price of the factor of production is less than the value of the marginal product then the firm will demand more of that factor of production. If the price of the factor of production would be greater than the value of the marginal product then the firm will not demand that factor of production. Thus, the firm will be in equilibrium at a point where the two are equal. This theory is briefly explained in figure 12.3.2. The figure shows the marginal revenue productivity curve (MRP_L) which is downward sloping. The wages of the workers are assumed to be constant. Initially the wage rate is OW2 and it is assumed to be the same for all the units of labour. The firm will demand OL2 units of labour because at this point the wages of the workers are equal to the marginal productivity. If however, the wages fall to OW0 then if the firm still continues to employ OL2 units of labour then it will be losing revenue equal to the area e2ae0. Therefore, the firm will employ OL0 units of labour because at this the wages or the price of the labour is equal to the value of the marginal product of the labour.

Figure 12.3.2
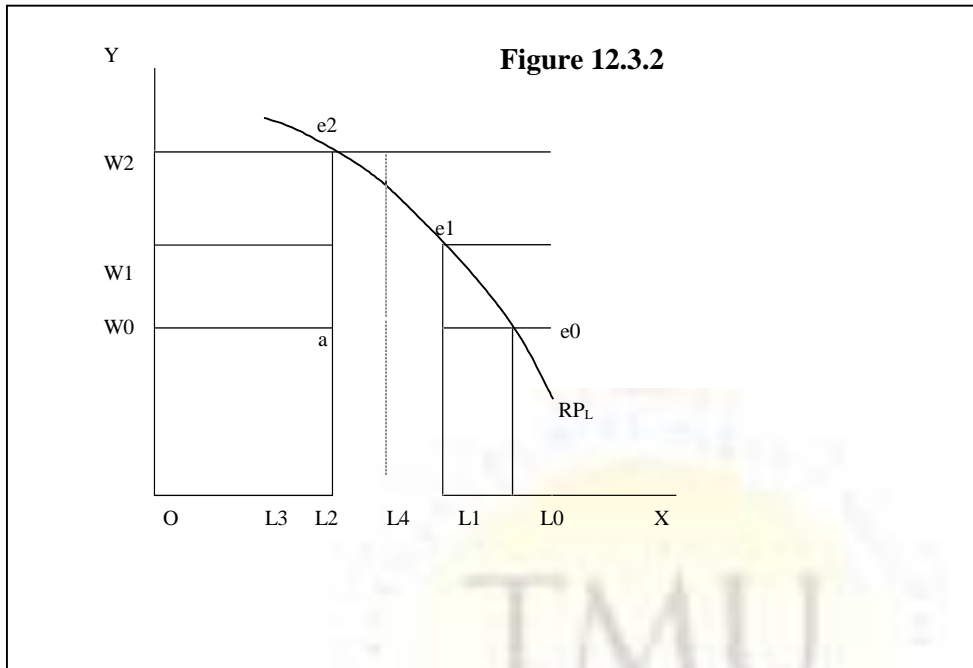
12.4 DETERMINATION OF WAGES UNDER PERFECT COMPETITION

In this section we shall discuss the determination of wages under perfect competition. This is explained through the forces of demand and supply of the factor of production. In this section it will be explained for labour, however, it could be generalized to other factors of production also.

12.4.1 Demand for labour

Here the derivation of the demand for labour is done for and individual firm and then for industry. As is already explained the demand for labour of an individual firm depends on the marginal revenue product curve of labour. However, the demand of the frim for labour can be discussed under two heads:

Demand for labour when labour is the only variable factor

In this case labour is the only variable input i.e. capital is constant. In such case the demand for labour curve of the firm is derived under the following assumptions:

1. The firm is producing a single commodity x.
2. The supply of labour is perfectly elastic.
3. Labour is the only variable factor.
4. The objective of the firm is to maximize profits.

5. There is perfect competition in the factor market. So the wages are given.

Under the given assumptions the demand for labour curve for an individual firm is determined with the help of value of the marginal product curve of the labour. Under perfect comeptiiton and with the price of the commodity being constant, the marginal revenue product curve is equal to the value of the marginal product of labour. It can be written as,

$$VMP_L = MPP_L.\bar{P_X} = MRP_L$$

Thus, the value of the marginal product of labour is equal to the marginal physical product of labour multilplied by the price of the commodity x (which is constant). This is same as the marginal revenue product of labour. This is explained in figure 12.3.2. The value of the marginal product curve of labour is represented by the MRPL curve. It shows the productivity of the labour at the different levels of employment. The equilibrium of the firm is determined where the maginal revenue of the factor is equal to its marginal cost. This implies that the equilibrium of the firm is at a point where the value of the marginal product curve is equal to the wage. Thus, if initially the firm is on OW2 wage rate then the equilibrium of the firm is at point e2. At this point the VMPL is equal to the wages. The firm is employing OL2 units of labour. If the firm, however, decides to employ anything less than OL2 of labour then it would not be maximizing its profits. For example if the firm employs OL3 units of labour then the productivity of the additional factor is more and the wages are less. This will then prompt the firm to employ more of labour so the firm will move towards point e2. If the firm decides to move beyond point e2 i.e. the firm decides to employ OL4 units of labour then the firm would be paying more wages but deriving less productivity. Thus, OL2 unit of labour is the equilibrium level of labour for the firm. If the wage rate curve shifts to OW1 then the equilibrium of the firm shifts to point e1. Likewise, if the wage rate shifts to OW0 then the equilibrium of the firm shifts to point e0. Thus, by joining e2, e1 and e0 we can get the demand for labour curve of the firm when labour is the only variable factor of production.

**Demand for labour when labour is not the only variable factor**

In the real world, labour is not the only variable factor. Other factors or capital also vary with the change in the level of output. The factors of production are dependent on one another. The demand for one factor leads to the generation of the demand for the other factor of production. If

the firm employs labour but no capital then this would not be rational decision. Because labour without machinery is not of any value. Thus, the hiring of labor creates a demand for capital also and vice –versa. Whenever the price of one factor changes it affects the demand for the other factor in three different ways:

- Substitution effect
- Output effect
- Profit effect

The first two effects i.e. the substitution and output effects are the direct result of the change in the prices of the factors of production. These are discussed below in detail:

- **Substitution effect**: The substitution effect implies that when the price of one factor of production changes and the price of the other factor of production remains constant then one factor becomes relatively cheaper and the other factor becomes relatively expensive. Then the firm will substitute the relatively cheaper factor to the relatively expensive factor of production. This impact on the employment of one factor due to a change in the prices of the other factor is called as substitution effect.
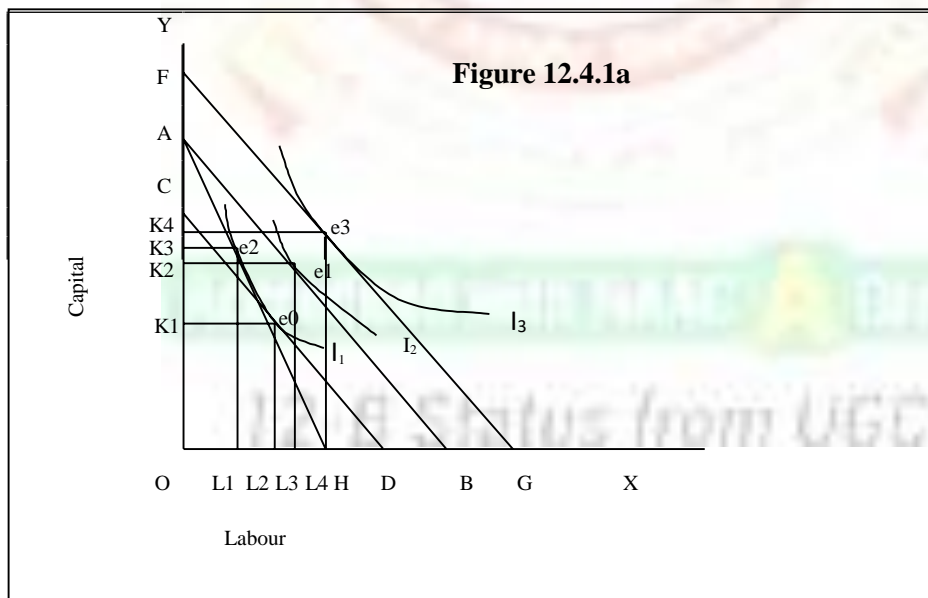
Figure 12.4.1a

This is explained in figure 12.4.1a. In this figure, on OX axis we have labour and on OY axis we have capital. I_1, I_2 and I_3 are the different isoquants. Isoquants are the curves that show the

different combinations of labour and capital that produce the same level of output. AB, AH, CD, FG are the different isocost lines. Isocost lines show the different combinations of labour and capital that can be hired with the given money with the entrepreneur and the prices of the factors of production. The concepts of isocost and isoquants have already been explained in the chapter on the theory of production. Initially the firm is in equilibrium at point e_2. The firm is initially on the isocost line AH and isoquant I_1. At this point of equilibrium the firm is employing OL1 of labour and OK3 of capital. Now, if the price of labour falls and the price of capital remains the same. This implies that the firm can now have more of labour given the price of capital. Then the isocost line will shift from AH to AB. As a result the producer will move to a higher isoquant I2. At this isoquant the firm is now producing more level of output and the firm is in equilibrium where the isocost line AB is tangent to the isoquant I2. Thus, the new equilibrium of the firm is at point e1. At this point e1 the firm is now employing OL3 of labour and OK2 of capital. thus, the firm is now employing L1L3 of additional labour. This movement from e2 to e1 is called as the price effect. Thus, the firm is now employing additional labour due to price effect. This price effect can be broken into substitution effect and output effect. For this purpose the hypothetical isocost line CD is drawn which is parallel to AB and is lying below AB. This implies that the isocost line CD is offering the same prices of labour and capital to the firm as the AB price line but the income effect has been held constant. This is done to bring back the consumer to the original isoquant. Now the isoquant I1 is tangent to the isocost line CD at point e0 and to the isocost line AH at point e2. Thus, now the firm can choose to be at e0 or at e2. At e2 the firm is buying the factors of production at higher prices and at e0 the firm is buying the factors of production at reduced prices (this is because the prices of the factors of production at CD are similar to the prices at AB as they are parallel). So now the labour is cheaper at e0 and expensive at e2. So now, the firm will move to point e0 and substitute the cheaper factor of production to the expensive one. Thus, e2 to e0 is the substitution effect.

- Output effect

  Output effect is equal to the total price effect minus the substitution effect. Thus, in the figure 12.4.1a e0 to e1 is the output effect. Finally the firm will be at e1 where it will employ more of both labour and capital and this will shift the value of marginal product curve to the right.

- Profit effect

The above said figure does not explain the profit effect. Whenever the wages fall there is an impact on the profits of the producer. With the reduction in the wages the marginal cost curve shifts downwards. This is explained in figure 12.4.1b.

Fi ure 12.4.1b
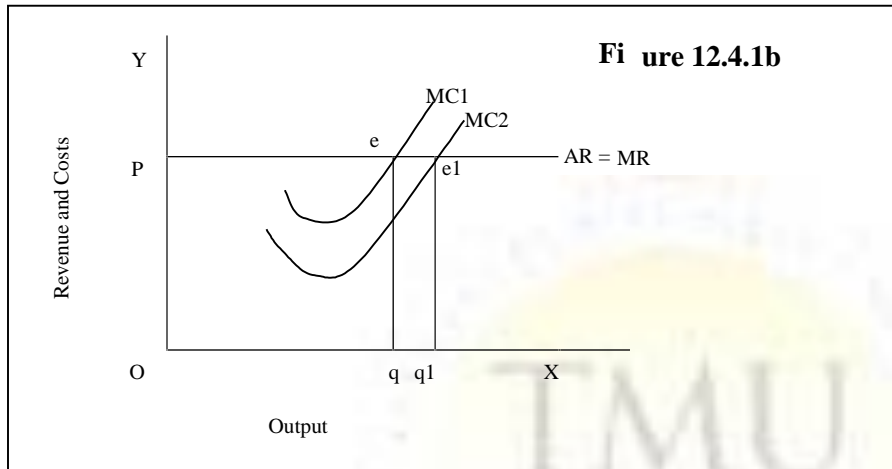
In the figure on OX axis we have output and on OY axis we have revenue and costs. MC1 is the initial marginal cost curve of the firm. AR is the original average revenue curve or the price of the firm. Since, there is perfect competition therefore; the average revenue is equal to the marginal revenue. The initial equilibrium of the firm is at point e. at this point e marginal revenue is equal to marginal cost. The firm is producing Oq level of output and is selling it at OP prices. Now, if the wages go down then the marginal cost curve will shift downwards from MC1 to MC2. As a result of the downward shift in the marginal cost curve the equilibrium of the firm will also shift from e to e1. Now the firm is selling Oq1 of output at OP prices. Since now the firm will be producing the additional qq1 level of output therefore, the firm will now need to hire more factors of production. As a result the total expenditure of the firm will increase and the firm will shift to a new higher isocost line FG in figure 12.4.1a. As a result of this the firm will now move to a higher isoquant I3 and a new equilibrium at point e3. Thus, due to a downward shift in the marginal cost curve the firm has now attained a new equilibrium.

Thus, e2e0 is the substitution effect, e0e1 is the output effect and e1e3 is the profit effect. Since, we are now employing more of labour and capital as a result the marginal productivity of the factors will increase and the value of the marginal product curve of labour will shift outwards. This is explained in figure 12.4.1c.

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Figre 12.4.1c
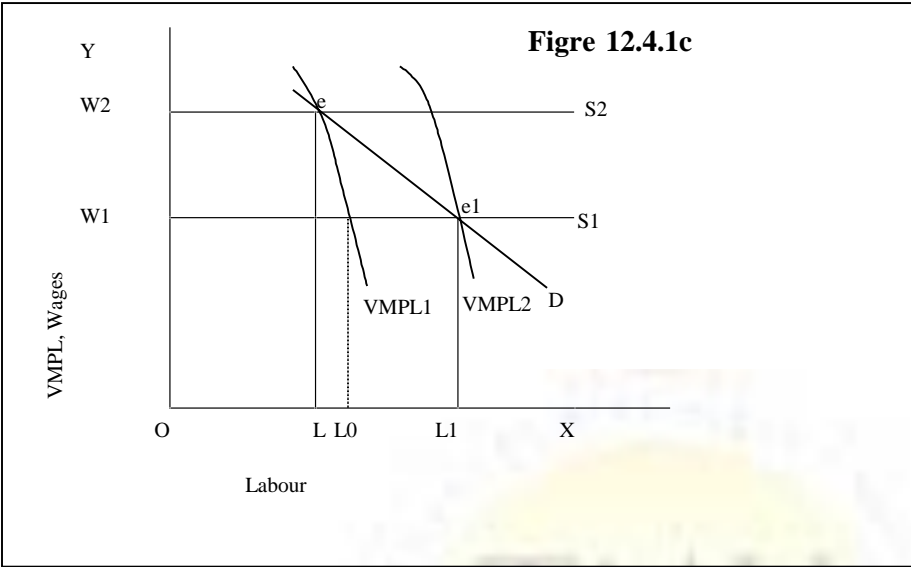
In the figure on OX axis we have labour and on OY axis we have value of marginal product and wages. VMPL1 and VMPL2 are the value of marginal product curves. S1 and S2 are the supply of labour curves. The firm is in initially at VMPL1 and the initial supply of labour curve is S1. The initial point of equilibrium is e. at this point the firm is now employing OL of labour. Now, when the wage rate has fallen to OW1 then the firm moves to VMPL2. The new equilibrium of the firm is at point e1. This shift in the VMPL curve has happened because the demand for the factors of production is interdependent. The rise in the demand for labour gives rise to the demand for capital. As a result the firm moves to a new equilibrium at point e1. Had the demand for the factors of production not been independent or labour was the only variable factor of production then the firm would have stayed at the VMPL1 and the additional demand for labour would have been LL0. However, now since both labour and capital are demanded more therefore, the additional labour hired is LL1. Therefore, the demand for labour curve of the firm can be derived by joining points of equilibrium i.e. e and e1. Thus, D is the demand for labour curve of the individual firm.

As now, we have derived the demand for labour curve for the individual firm; therefore, we will now derive the demand for labour curve for the industry. The derivation of the demand curve of the industry is not just the simple horizontal summation of the demand curves of the individual firms. This is because when the price of the factor of production (say labour) i.e. wages fall then the individual firms will hire more of labour as labour becomes relatively cheaper. Since all the

firms will now increase the employment of labour, therefore, the production of the commodity will increase. This will cause a downward shift in the total supply curve of the industry. Since the demand for the product will remain the same therefore, the price of the product will fall. This fall in the price of the product will reduce the demand for additional labour. Therefore the VMPL curve of the labour will shift downwards and the demand for labour curve of the firm will also shift downwards. The derivation of the demand curve of the labour for the industry is given in figure 12.4.1d.
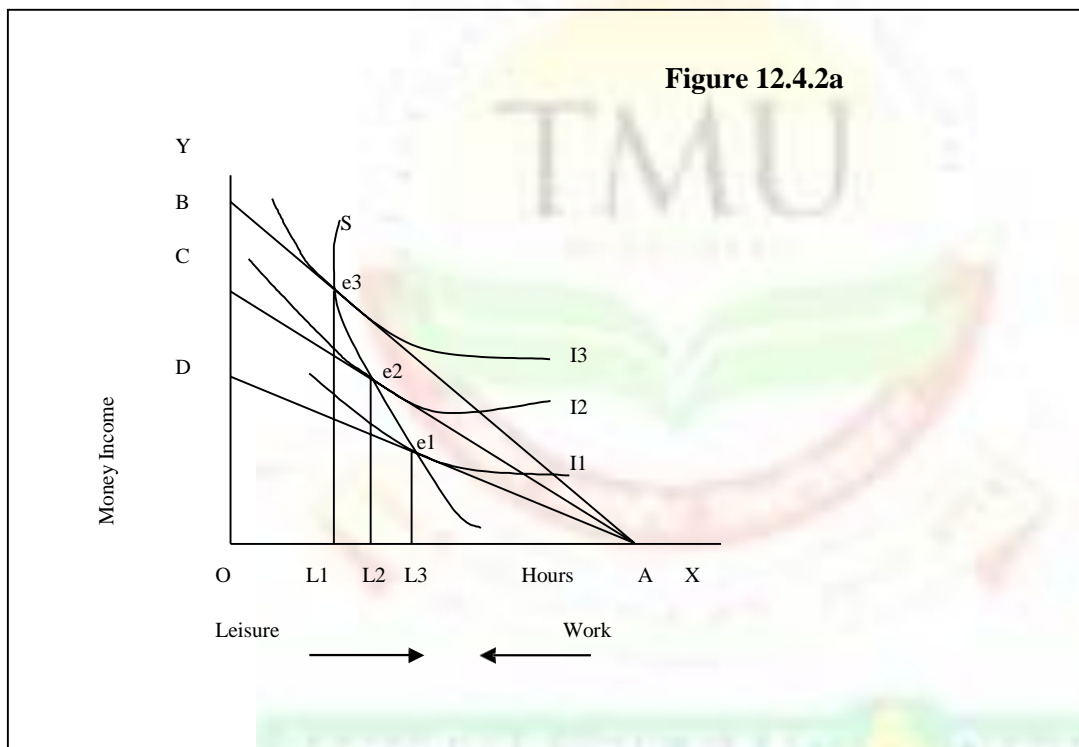
Figure 12.4.1d
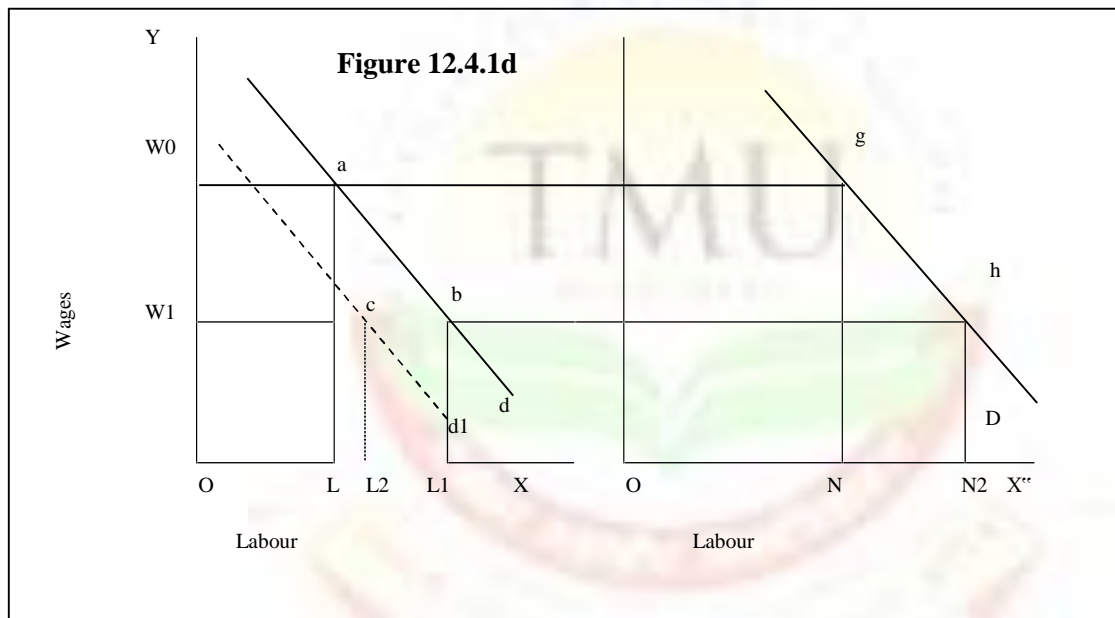
The labour is shown in on OX axis of the both the figures. On OY axis we have wages in both the parts of the figure. In the first part of the figure d is the individual demand curve of the firm. In the second part of the figure D is the original demand curve of the industry. Initially the firm is at d curve. When the wage rate is OW0 the firm demands OL of labour . At this wage rate the industry‟s demand curve for labour is ON. If the wage rate falls to OW1 then since the labour has become cheaper as a result the firms will employ more of labour. Due to this the production of the commodity will increase. Since, the supply of the product remains constant then the price of the product will fall which will lead to a fall in the production of the commodity. As a result the firm will demand lesser labour. Therefore, the demand curve will shift downwards from d to d1. The firm will now move to new equilibrium at point c. at this point the firm is demanding only OL2 units of labour. Had there been no reduction in the demand for labour and hence, no downward shift in the demand curve then the demand of the firm for labour would have

increased to OL1. However, due to the downward shift the firm is now demanding only LL2 additional labour. Thus, at this the total industry"s demand which is calculated by summing up the demand of all the firms is ON2.
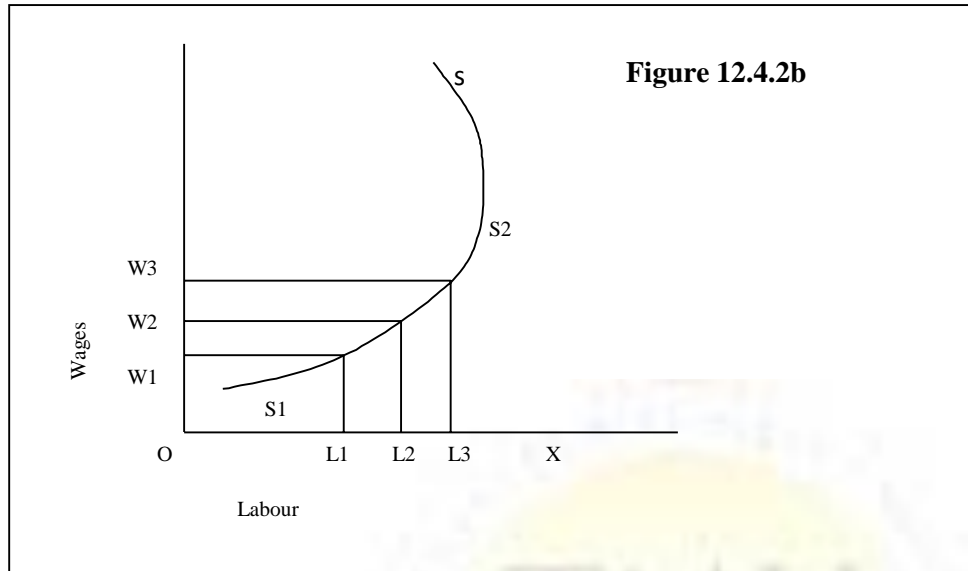
12.4.2 Supply of labour

In this section we shall explain the derivation of the supply curve of labour. First we shall explain the determination of the supply curve of the individual firm and then the determination of the supply curve of the industry.

Figure 12.4.2a

The individual supply of labour curve is drawn with the help of the wage – work offer curve. Wage – work offer curve is drawn in figure 12.4.2a. S is the wage work offer curve. In the figure on OX axis we have the total hours of work of the workers. The workers divide the total hours of work into work and leisure. When we are moving from O to X on the OX axis then we are measuring leisure. As we are moving from X to O on the OX axis then we are measuring work. Hours of work are measured by subtracting the hours of leisure from the total hours of work. On the OY axis we are measuring money income. Here we assume that the total hours available to the worker are OA. These hours can now be divided between work and leisure. If the prevailing

wage rate is w then if the worker decide to work for OA hours and opts for no leisure then he can earn an income equal to OD. If the worker decides to not to work and just have leisure then his income will be zero i.e. he will be at point A on the OX axis. If the worker decides to work for some hours and take leisure for the remaining hours then he can have income on any point on the AD line. AD line is, thus, the income – leisure trade off line. It gives us the income level that the individual can earn by choosing several combinations of work and leisure. The indifference curves I1, I2, and I3 are the leisure- income preference curves of the individual worker at the different wage rates. Thus, these are called as leisure-income indifference curves. On the indifference curve the worker is substituting work for leisure and he is deriving the same level of satisfaction. Now, for equilibrium the indifference curve is super imposed on the income – leisure trade off line. The equilibrium is on point e1. At this point the indifference curve is tangent to the income – leisure trade off line. Thus, the worker is devoting OL3 hours as leisure and AL3 hours as work. At this indifference curve he is earning w wage rate. If now the wage rate rises to w1 then the income leisure line shifts from AD to AC as he can have more income now. The worker moves to a higher equilibrium and hence he is at point e2. At this point he is devoting OL2 hours as leisure and AL2 hours as work. If the wage rate increases further to w2 then the worker would move to a higher indifference curve i.e. at I3 and the new equilibrium point is e3. The worker is now devoting OL1 hours to leisure and AL1 hours to work and receiving w2 wages. If we now join the equilibrium points i.e. e1, e2 and e3 then we get a curve which is called as the wage – work offer curve of the worker. It shows the different hours that a worker would be willing to offer at the different levels of wages.

From this wage work offer curve we can derive the supply curve of the workers. At the different levels of the wages the hours of work of all the workers can be plotted. This is done in figure 12. 4.2b. On the OX axis we are measuring labour and on OY axis we are measuring wages. S1S is the total supply of labour curve. When initially the wages are OW1 then the labour supply is less at OL1. As the wage rate increases to OW2 and then to OW3, the supply of labour also increases to OL2 and then to OL3. However, at very high levels of wage rate the supply of labour curve will become backward bending. The reason is that the workers would prefer to enjoy leisure and not work. This is reflected in the S2S segment of the supply of labour curve.

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Figure 12.4.2b

The backward bending segment of the supply of labour curve is specifically relevant in developed countries. In such countries the individuals reach a very high level of income and hence, they prefer to work for fewer hours in a day. However, for our analysis we need S1S2 segment of the supply curve.

12.4.3 Equilibrium

For attaining equilibrium we need the market supply of labour curve and the demand for labour curve from the industry. Thus, we super impose these two curves in order to determine the equilibrium of the industry. This is explained in figure 12.4.3a. D is the demand for labour curve and S is the supply of labour curve. The two curves intersect each other at point e. at this point the demand for labour is equal to the supply of labour curve. The industry will employ OL of labour at Ow wages. If there is any displacement from equilibrium say to Ow2 then the equilibrium shall be restored. As at this point supply of labour is more than the demand for labour, therefore, the workers will be willing to work at reduced wages. So the wage rate will come down to Ow. If the wage rate decreases to Ow1 then the equilibrium will be restored again.
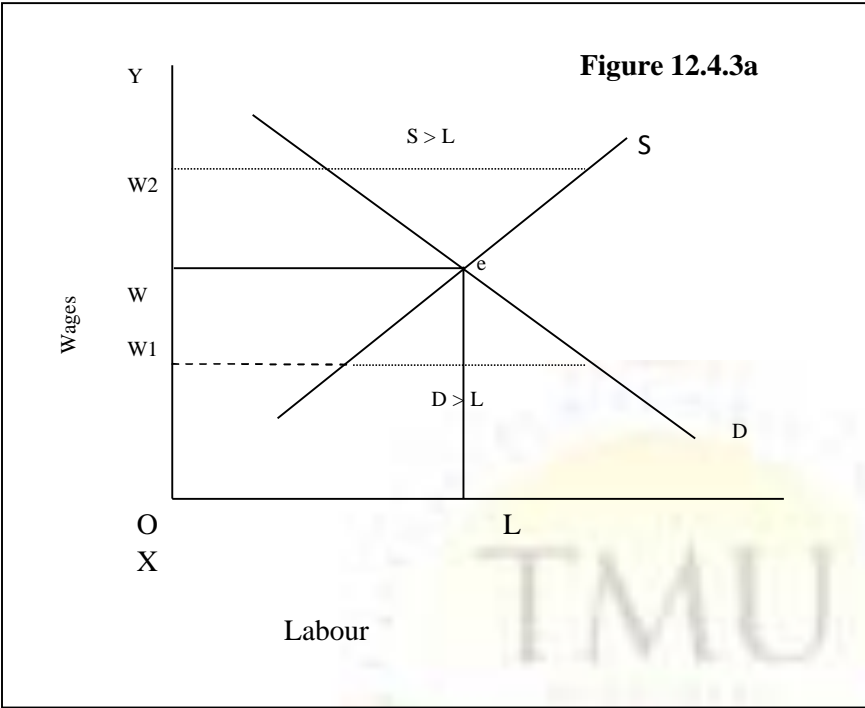
Figure 12.4.3a

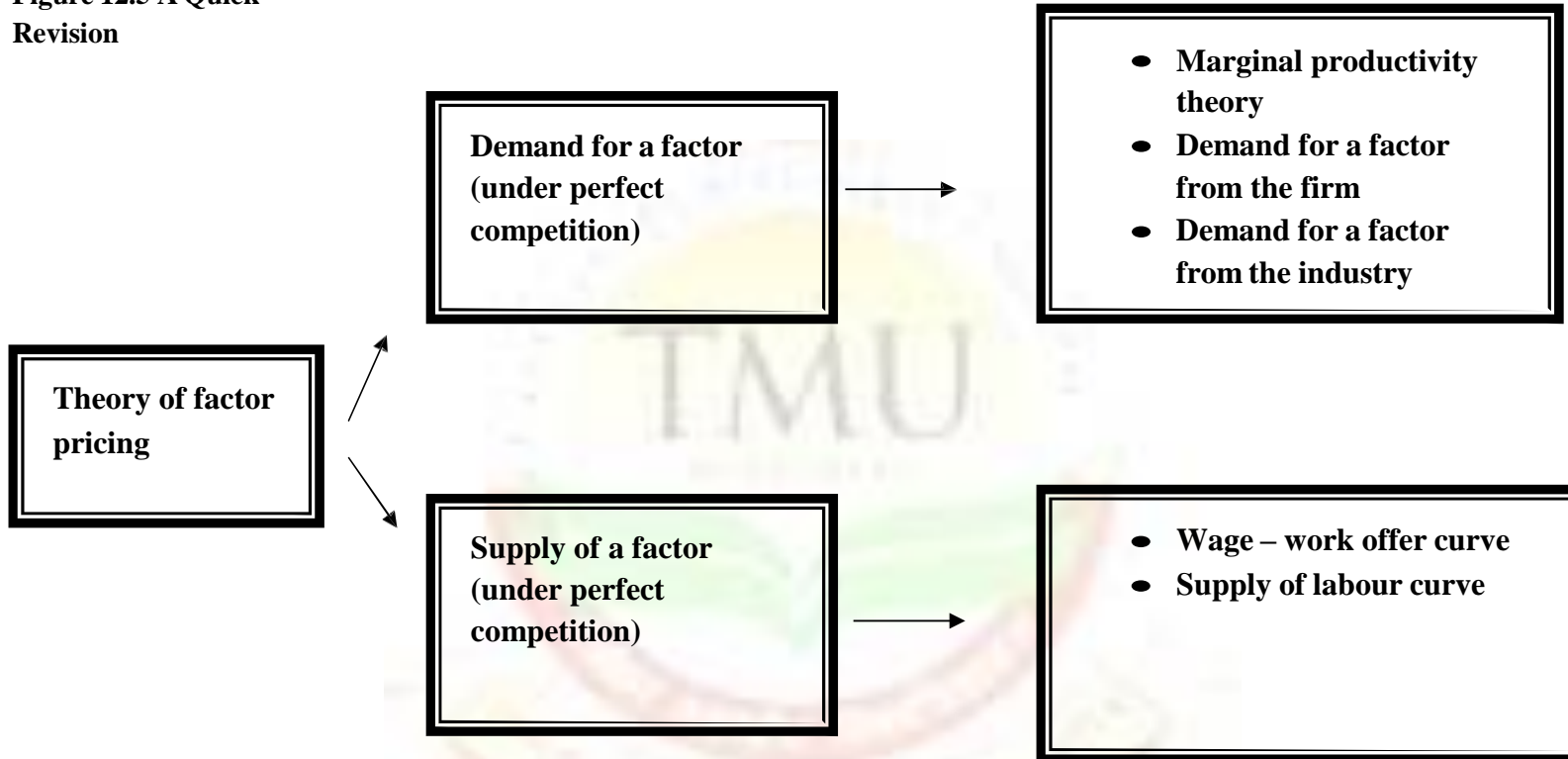## 12.5 A QUICK REVISION

Figure 12.5 shows the brief summary of the whole chapter.

12.6 KEYWORDS

Distribution, factor pricing, demand for a factor, supply of a factor, marginal product, marginal revenue productivity, value of marginal product, marginal physical product, substitution effect, output effect, profit effect, price effect, wage – work offer curve, income – leisure trade off line.

Figure 12.5 A Quick Revision

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                          ┌─────────────────────┐        ┌──────────────────────────────┐
                          │ Demand for a factor │        │ • Marginal productivity      │
                          │ (under perfect      │ ────►  │   theory                     │
                          │ competition)        │        │ • Demand for a factor        │
                          │                     │        │   from the firm              │
                          └─────────────────────┘        │ • Demand for a factor        │
  ┌─────────────────┐                                    │   from the industry          │
  │ Theory of factor│                                    └──────────────────────────────┘
  │ pricing         │
  └─────────────────┘
                          ┌─────────────────────┐        ┌──────────────────────────────┐
                          │ Supply of a factor  │        │ • Wage – work offer curve    │
                          │ (under perfect      │ ────►  │ • Supply of labour curve     │
                          │ competition)        │        │                              │
                          │                     │        │                              │
                          └─────────────────────┘        └──────────────────────────────┘
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12. 7 ASSESS YOUR PERFORMANCE

Short Questions

Q.1 What is marginal revenue product?

➢ Marginal revenue productivity of a factor can be calculated by multiplying the marginal physical product of the factor with the price of the product. This can be written as,
$MRP_L = MPP_L \cdot P$
Where, MRP_L = marginal revenue productivity of labour, MPP_L = marginal physical productivityof labour and P = price of the product.

Q.2 What is marginal physical productivityof labour?

➢ Marginal physical productivity of labour implies the additional output produced by the additional unit labour.

Q.3 What is the shape of the supply of labour curve?

➢ The supply of labour curve is initially increasing but after a particular level the supply of labour curve starts bending backwards. This is because at very high wage rate the workers reach a particular level of income and they prefer leisure to work.

Q.4 What is the substitution effect of a change in the prices of the factor of production?

➢ The substitution effect implies that when the price of one factor of production changes and the price of the other factor of production remains constant then one factor becomes relatively cheaper and the other factor becomes relatively expensive. Then the firm will substitute the relatively cheaper factor to the relatively expensive factor of production. This impact on the employment of one factor due to a change in the prices of the other factor is called as substitution effect.

Q. 5 What is the output effect of a change in the prices of the factor of production?

➢ Output effect is equal to the total price effect minus the substitution effect.

Long Questions

Q. 1 Explain how the demand for a factor is determined when the markets are perfectly competitive markets.

Q.2 Expalin how the theory of factor pricing determines the prices of the factors of production under perfect competition.

Q.3 Disucss the determination of supply curve of labour in the perfectly competitive markets.

Q.4 Explain the substitution and output effects of a change in the price of a factor on its demand.

Q.5 Explain the meaning of marginal revenue productivity and its role in the determination of the demand curve for labour under perfect competition.

12.8 Suggested Readings

Dwivedi, D.N. (2003), Microeconomics Theory and Applications, Pearson Education, Singapore.

Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

LESSON 13

Determination of Rent, Interest and Profits

13.1 OBJECTIVES OF THE CHAPTER

In this chapter the readers are apprised about how the prices of land, capital and entrepreneurship are determined. The price of land is called as rent, the price of capital is called as interest and the price of the entrepreneurship is called as profits. Thus, in the last chapter the wages were determined and in this chapter the prices of the remaining factors of production are determined.

13.2 INTRODUCTION

There are broadly five factors of production: land, labour, capital, raw materials and entrepreneurship. In the last chapter through the theory of distribution we determined the price of labour i.e. wages. Though the theory of distribution is applied to all the factors of production, however, we will discuss some of the theories on the determination of the prices of the reaming factors of production. The value of raw material is deducted from the value of output and thus, is not covered under theory of distribution. In this chapter we shall focus on the determination of

the prices of the remaining factors of production. We will study how the prices of land, capital and the remuneration to the entrepreneur are determined.

13.3 DETERMINATION OF RENT

In this section we shall discuss the determination of rent. This is explained through the Ricardian theory of rent. David Ricardo was a classical economist and thus, this theory is also called as the classical theory of rent. In the beginning of the nineteenth century the food prices in England had increased drastically. The rise in the prices was due to the Napoleanic wars and also due to the increase in the population. Due to both these factors there was a rise in the demand for food products and hence it percolated the prices of the food. As a result the government formed a committee to look into the causes of the rise in the prices of food and the committee found that the reason for the rise in prices was deeply related with land. The rent of the land was high and hence the cost of production of food was high. Because of this the food prices were also high. However, the economists like Ricardo, Malthus, Torrens were of the view that the high rents were not the reason for the rising food prices rather the high rents were because of the rising food prices. As per these economists due to the wars and the rise in the population there was an increase in the demand for food because of which the profitability from cultivation increased. As a result there was an increase in the demand for land for cultivation. Because of this reason there was an increase in the rents of the land. Later on Ricardo had put forward his own theory to explain the determination of the rent on land.

Ricardo defined rent as,

> "That portion of the produce of earth which is paid to the landlord for the original and indestructible powers of the soil"[1].

As per Ricardo rent was due to the niggardliness of nature. Ricardo believed that the land was fixed in supply. As a result when the population increases then the land becomes scarce. The scarcity of land forces the cultivators to explore some other options for the cultivation of land. As a result the farmers move to the less fertile land. Ricardo said that rent arises because of the

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[1] Dwivedi, D.N. (2003), Microeconomics Theory and Applications, Pearson Education, Singapore.

rise in the demand for the land and because of the differences in the fertility of land. The more fertile land will earn a rent over and above the less fertile land.

This theory is based on the principles of demand and supply. The supply of land is fixed by the nature. The supply of land includes many categories of land. There is fertile land and there is infertile land. Even within the fertile land there are different categories owing to the differences in the fertility of land.

In the words of Ricardo,

"If all lands had the same properties, if it were unlimited in quantity and uniform in quality, no charge could be made for its use, unless where it possessed peculiar advantages of situation"[2].

However, initially when man starts cultivation then first the most fertile land is explored in the economy. The demand for land comes from people. Land is demanded to cultivate various kinds of crops. As the population grows the demand for land increases then this pressure forces the cultivation of less fertile land. It is due to these inherent differences in the fertility of land that rent arises.

Ricardo said,

"Rent is chargeable because land is not unlimited in quantity and uniform in quality and because (due to increase in population), land of an inferior quality, or less advantageously situated, is called into cultivation"[3].

Ricardo explained the theory with respect to two types of cultivation:

> **Ricardian theory of rent with respect to extensive cultivation**
> **Ricardian theory of rent with respect to intensive cultivation**
> **Ricardian theory of rent with respect to extensive cultivation**: Extensive cultivation implies that when the pressure of population increases then the cultivation of the different categories of land is done. Thus, the movement from the superior land to the inferior land for cultivation is called as extensive cultivation. As per Ricardo rent on a superior land is

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[2] Ibid.
[3] Ibid.

calculated by the difference between the produce from the superior land and the produce from the most inferior land. This can be explained with the help of an example. Ricardo took the example of corn. Suppose that there are three categories of land i.e. A, B and C. A is the most fertile land then B is the next fertile land and C is the least fertile land. Firstly land A is cultivated with some labour and capital. Ricardo believed that there would be no rent occurring till now because the fertile land is in surplus. The economy is producing say, 100 kilograms of corn. However, slowly the population increases and the demand for additional food increases and hence, the demand for additional land for cultivation increases than the available supply of the most fertile land A. Then the economy would be forced to cultivate the next fertile land i.e. land B. It is now that the rent would occur to land A. Now, let us assume that the same amount of labour and capital is applied to B. However, since land B is less fertile than land A, therefore, it will produce lesser amount. Let us say that with the same quality and quantity of labour and capital B is producing only 80 kilos of corn. These differences in the yields of land A and B gives rise to rent on land A. The rent on land A is equal to the yield on land A minus the yield on land B. This can be written as,

Rent on Land A = yield on land A – yield on land B

$$= 100 \text{ Ks} – 80\text{Ks}.$$

$$= 20\text{Ks}.$$

Thus, the rent on land A equals the value of 20 kilos of corn. However, during this time land B will not earn any rent as its demand is still less than its supply.   But as the economy grows and the population increases then the demand for additional land for cultivation will increase and there will be a situation when the supply of land B will be less than the demand for land. Then the economy would be forced to cultivate land C. Let us assume that if the same quality and quantity of labour and capital is applied on land C then it produces only 60 Kilos of corn. Thus, this difference in the fertility of land will affect the economy in two ways. Firstly, land B will start earning rent as it is more superior to land C. Secondly, the rent of land A will also increase as it is much superior to land B and land C. The rent of land A and land B are given below:

Rent on Land A = yield on land A – yield on land C

$$= 100 \text{ Ks} – 60\text{Ks}.$$

$$= 40\text{Ks}.$$

Thus, the rent of land A is equal to the value of 40 Ks of corn.

Rent on Land B = yield on land B – yield on land C

$$= 80 \text{ Ks} – 60\text{Ks}.$$

$$= 20\text{Ks}.$$

Thus, the rent of land B will be equal to the value of 20 Ks of corn. Hence, both A and B will earn rent. However, land C will not earn any rent as it is the most inferior land. This is explained below:

Rent on Land C = yield on land C – yield on land C

$$= 70 \text{ Ks} – 70\text{Ks}.$$

$$= 00\text{Ks}.$$

Thus, there will be no rent on land C.

➢ **Ricardian theory of rent with respect to intensive cultivation:** At that time economists pointed out that the Ricardian theory is faulty as it is assumed that when the pressure of demand increases then the economy will move from the most fertile land to the less fertile land. However, in reality the economy prefers to be on the most fertile land and thus, it finds ways to continue to produce from land A. This is done by employing more of labour and capital on the same category of land. This is called as intensive cultivation. However, Ricardo said his theory is also applicable in the case of intensive cultivation. He said though the economy applies more of labour and capital but the produce from land A cannot be increased. Because doubling inputs does not necessarily double outputs. There is the inherent assumption of the application of the law of diminishing returns. He said after applying more of labour and capital on land A the produce will be less. Thus, rent will still accrue to land. Let us assume that now land A produces only 95 Kilos of corn. Even then A will earn rent which is given below:

Rent on Land A = yield from land A before intensive cultivation – yield on land A after intensive cultivation

$$= 100 \text{ Ks} – 90\text{Ks}.$$

$$= 10\text{Ks}.$$

Thus, now land A will earn rent equal to the value of 10 Kilos of corn. Now, the rent on land will continue to exist because the economy would increasingly apply more and more

of capital and labour on land A. This will be done till the yield from the additional units of capital and labour are equal to the yield from land B. when the economy arises at this situation then the economy can choose whether to continue production from land A or to move to land B. Thus, the rent on land A will further increase. Eventually the economy would move to land B and then land C. As a result land B will also earn rent. However, land C will not earn any rent. Thus, the Ricardian theory of rent is applicable in both extensive and intensive cultivation and the origin of rent is traced to the fertility of land.

Though the Ricardian theory of rent attached the rent on land to the fertility of land and thus, it opened different dimensions of the concept yet there has been severe criticism of the theory. The criticism of this theory is explained below:

1. **Economists did not accept the 'original and indestructible powers of the soil'**: The Ricardian theory is based on the concept of the original and indestructible powers of the soil. Power of the soil refers to the fertility of the land. However, economists challenged the concept as they believed that the fertility of the land is not original as it can be created through various scientific techniques. Likewise, the fertility of land can also be destroyed through the continuous soil erosion, intensive cultivation etc.

2. **Economists regarded that the concept of rent is not specific to land only**: Economists regarded that the concept of rent is not specific to land only. Since it is a differential surplus, therefore, it accrues to other factors of production also.

3. **Role of alternative uses of land**: Ricardo believed that there was only one role of land i.e. land was found suitable for growing only corn. As a result the transfer earning of land and the economic rent are similar. However, in reality there are alternative uses of land also. Such alternative uses of land give rise to the generation of transfer earnings. Hence, the economic rent and transfer earnings of the land are different. However, this concept was not considered by Ricardo.

4. **The supply of land is not fixed**: Ricardo believed that the supply of the land is fixed. However, for an individual producer the supply of land is not fixed rather it is elastic. Though it is fixed for an economy at a point of time but it may vary for individuals.

Other concepts of rent

Following Ricardian theory, economists have put forward various concepts of rent. Some of the most important concepts of rent given are discussed below:

- ➤ **Transfer Earnings:** The concept of transfer earnings is based on the concept of opportunity cost. It is also called as reservation price. Transfer earnings are defined as the earnings that a factor must receive in order to be in its present employment. Or it also implies the amount that a factor might earn if it is employed in its next best job. The concept of transfer earning can be explained with the help of an example: if a doctor is earning Rs. 40, 000 per month from hospital A and other hospitals are offering him Rs 30, 000 per month. Thus, his next best alternative foregone is Rs. 30,000 per month. So in order to remain in hospital A he must get at least Rs. 30, 000 per month. This is his transfer earning.

- ➤ **Economic rent:** Economic rent is the excess of actual rent of a factor over its transfer earning. It can be written as:

  Economic rent = actual rent – transfer earning

  Thus, in the above example economic rent is equal to Rs. 10, 000 per month.

- ➤ **Quasi - rent**: The concept of quasi- rent was introduced by Marshall. It explains the short run earnings of the factors of production. Marshall gave it for all the factors of production he said the supply of capital is fixed in the short run and if there is any increase in the demand for the same then this will lead to the generation of rent on capital equipment. He preferred to call it as Quasi rent instead of normal rent. He defined it as the excess of total revenue over the variable costs of the factors of production. In the short run, when the demand for a particular output increases then in order to meet this excess demand the firm will demand additional factors of production. However, in the short run the supply of capital equipment is fixed and hence, the supply of output cannot be increased. This pushes up the prices of the commodities and the factor earns a rent. However, in the long run since the supply of capital equipment becomes elastic, therefore, the supply of output can also be increased. Thus, the factor of production does not earn any rent in the long run.

13.4 DETERMINATION OF INTEREST

In economics capital is used to imply two things: physical capital and money capital. Physical capital is also called as real capital. Physical capital refers to land, buildings, machineries, tools equipments etc. It is also called as real capital. Money capital refers to the deposits of the banks, shares, debentures etc. The income earned over these is called as interest. Ultimately money capital becomes real capital as the loan taken from a bank by the producer is utilized for buying machineries etc. and interest becomes a part of the cost of capital. Owing to this classification of capital there are two categories of theories on interest. However, here in this chapter we shall discuss the monetary theories of interest. Here we have two main theories:

➢ **Classical theory of interest**
➢ **Neo- classical theory of interest**
➢ **Keynesian theory of interest**

Classical theory of interest: Classical theory of interest was given by classical economists like Marshall, Tausig, Walras etc. According to the classical economist rate of interest is a monetary phenomenon. It is determined by the forces of demand and supply. The demand side is determined by the demand for investment. Classicals believed that money in the economy is demanded for investment in production. Thus, the producers borrow money from the market and in return they have to pay a price for using the money. That price is called as interest. Investment is thus, made to depend on interest. The investment function is explained below:

I = f(r)

Where, I = level of investment in the economy,

f = function, r = rate of interest.

The level of investment in the economy is inversely related with rate of interest. This implies that when the rate of interest is high producers will demand lesser money and hence, will make fewer investments. Likewise, when the rate of interest is low the producers


Figure 13.1

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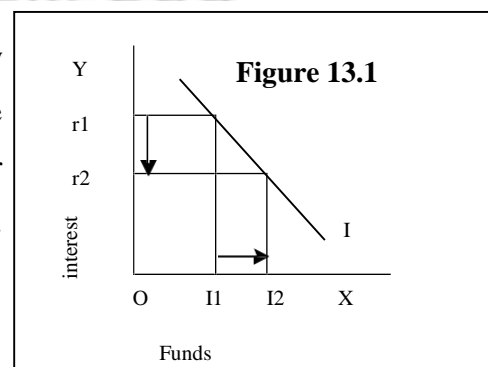
will demand more money and hence, the level of investment will increase in the economy. Figure 13.1 explains the investment curve. I is the investment curve. It is downward sloping from left to right. This implies that as we increase the rate of interest the level of investment decreases and as we decrease the rate of interest the level of investment increases. In this figure when initially the rate of interest is Or1 then the level of investment is OI1 but when the rate of interest decreases to Or2 then the level of investment increases to OI2. Thus, there is inverse relationship between the two.

Further, the supply side of rate of interest is determined by the savings. Households make savings and then these are supplied for investment. Savings are also made to depend on rate of interest. These are directly related with the rate of interest. When the rate of interest increases then households expects good return on their savings therefore, they prefer to save more. However, when the rate of interest decreases then the households anticipate reduced returns therefore, they are discouraged to save more. Hence, savings will decline. The saving function is expressed as,

S= f (r)

Where, S = Savings

The saving curve is explained in figure 13.2. S is the saving curve. It is upward sloping. This indicates that as the rate of interest increases then the savings decrease and vice – versa. In the figure when the rate of interest is Or1 then savings are high at OS1 but when the rate of interest decreases to Or2 then savings are low at OS2. The investment shows the preferences of the demand side and savings show the preferences of the supply side. However, for determining the equilibrium rate of interest we superimpose figure 13.1 over 13.2. This is explained in figure 13.3. On OX axis we have funds and on OY axis we have rate of interest. Equilibrium rate of interest is determined at point e where investment is equal to savings. The equilibrium rate of interest is Or0 and at this rate of

Figure 13.2

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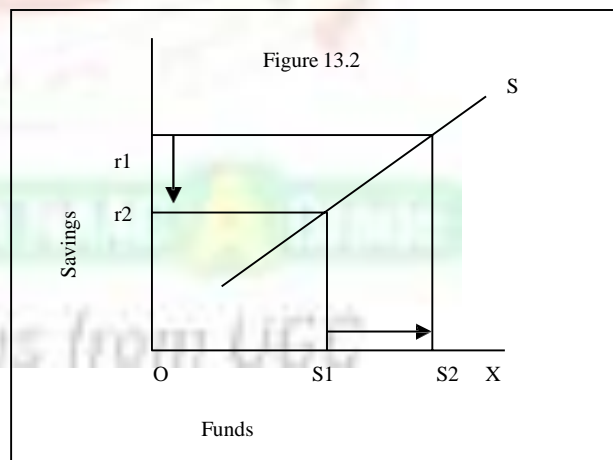
interest OD0 funds are demanded and supplied. If the rate of interest falls to Or2 then the automatic adjustment will restore equilibrium. At Or1 rate of interest savings are greater than investment; this implies that supply of funds is greater than the demand. Therefore, there will be competition between those who supply funds to give their funds for loans. And because of this the suppliers would bid down the rate of interest. And the economy will come back to Or0 rate of interest. If the economy moves to Or2 rate of interest where investment is greater than savings then there would be competition between those who are demanding money. Because of which they will bid up the rate of interest. Therefore, the economy will come back to e and the equilibrium will be restored.

Figure 13.3
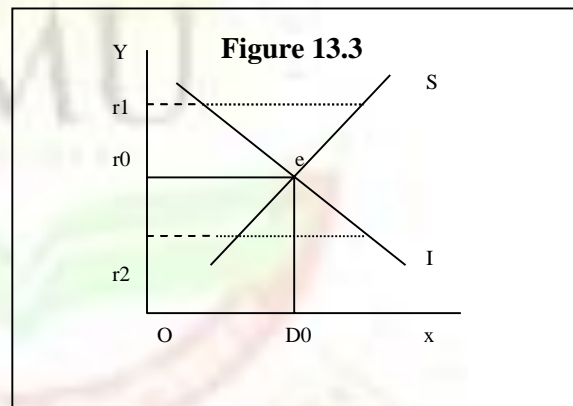
The classical theory of rate of interest was criticized by J.M.Keynes. He said that savings is not a function of rate of interest but it is a function of income. Households save not on the basis of the market rate of interest but on the basis of the income of the consumer. Further, Keynes said that there is no inbuilt flexibility in the system which will restore equilibrium in the economy. He believed that rate of interest is determined not by savings and investment but by the demand and supply of money.

Neo Classical theory of interest:

Neo – classical theory of rate of interest is another variant of the classical theory. It was developed by Ohlin, Robertson, Wicksell etc. Neo classical believed in the classical thinking but they tried to improve upon this theory. This theory is also called as lonable funds theory. As per them the rate of interest is determined as per the demand and supply of lonable funds. The demand for lonable funds is dependent on the following factors:

- Investment
- Consumers demand for lonable funds for consumer goods
- Demand for lonable funds for hoarding

People demand lonable funds for investment for capital goods, consumption goods and for hoarding. This can be written as,

$$D = I + C + H$$

Where D = demand for lonable funds

I = investment

C = consumer goods

H = hoarding.

The supply of lonable funds comes from those who are willing to supply funds at the prevailing market rate of interest. It is determined by the following factors:

- Savings
- Bank money
- Dishoarding

Savings come from the households. Bank also gives money for loans. Also, dishoarding is a big source of supply. At a very high rate of interest people who have kept money as hoarding will bring their money into the market for giving as loan. This is called as dishoarding.
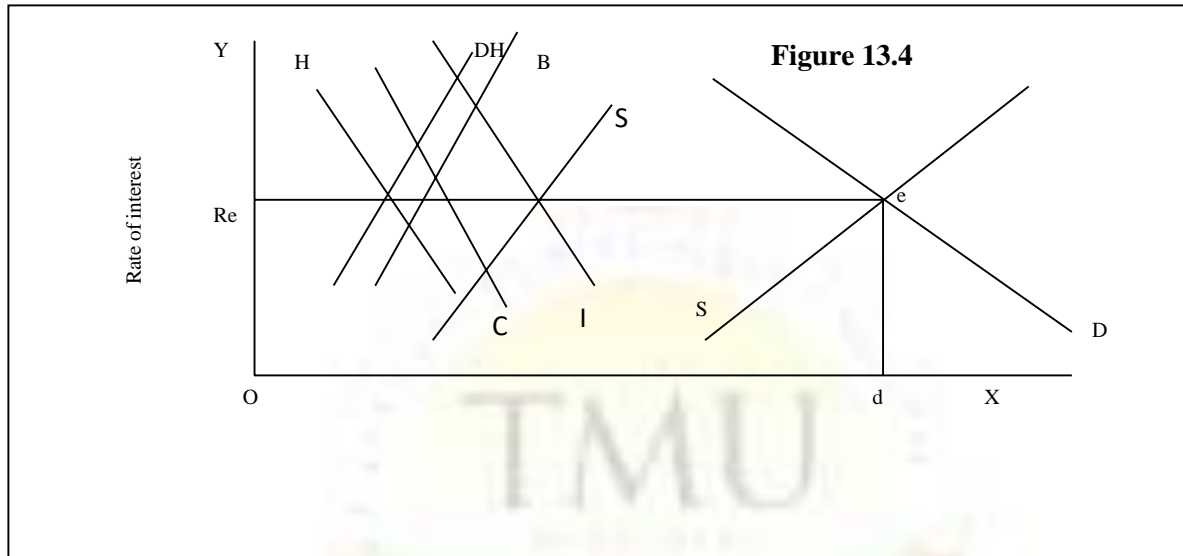
$$S = S1 + B + DH$$

Where S = supply

S1 = savings

B = bank money

DH = dishoarding.

In equilibrium demand is equal to supply,

$$D = S$$

$$I + C + H = S1 + B + DH$$

Figure 13.4

The equilibrium is explained in figure 13.4. The equilibrium is at point e where demand for lonable funds is equal to the supply of lonable funds. At this point the equilibrium rate of interest is ORe and Od is the equilibrium lonable funds.

Though the neo – classical economists have tried to improve upon the theory of the classicals yet there are some inherent limitations of the same. In this theory savings are again made to be a function of interest whereas as per Keynes savings are not dependent on rate of interest. He believed that savings are dependent on the level of income. As the income of the consumer increases then the savings of the individual also increases. Thus, there is inverse relationship between the two. Thus, Keynes rejected this theory.

Keynesian theory of interest: While rejecting the classical and neo –classical theories of interest determination, Keynes had put forward his own theory. Keynesian theory is called as the liquidity preference theory of rate of interest determination. As per Keynes rate of interest is the reward for parting with liquidity. And the rate of interest is determined at a point where demand for liquidity and supply of liquidity are equal. He believed that money is demanded because of three reasons. These are: demand for money for transactionary purposes, precautionary purpose

and lastly, for speculative purpose. He believed that the demand for money for transactionary and precautionary purposes is dependent on the income of the consumer. The relationship between the two is positive. When the income of the consumer increases then the demand for money for transactionary and precautionary purpose also increases. The demand for speculative purpose is dependent on the rate of interest and the relationship between the two is inverse. When the market rate of interest is high then the demand for money for speculative purpose is low because people will then prefer to give money on loan and not invest in speculative activities like shares, bonds etc. The supply of money is exogenously determined by the central bank of the economy. The equilibrium is determined at a point where the demand for liquidity preference is equal to the supply of liquidity.

13.5 DETERMINATION OF PROFITS

Profits are an integral part of the theory of distribution as these are the reward of the entrepreneur for undertaking risk, combining different factors of production and also for being more efficient than the others. In normal sense profits are the simple share of the entrepreneur. However, in economics profits are defined differently. Profits in economics also include the opportunity cost of the producer for forgoing some other alternative. Some have also defined profits as the reward for undertaking risk and responsibility. The following theory explains the determination of profits:

Clark's theory of profit determination:

J.B.Clark propounded the dynamic theory of profit determination. This was given in 1900. Since this theory takes into consideration the determination of the profits under dynamic conditions therefore, it is also called as the dynamic theory of profits. He believed that profits accrue to the entrepreneurs under dynamic conditions and not under the static state. Clark believed that static state is the one in which the production process, population, capital are constant. There are no inventions and there is free movement of the market forces. Commodities are homogeneous in nature and no mobility of the factors of production takes place as the marginal products of the factors are similar in all the industries. There is no uncertainty relating to the economic decisions in the static world. Clark believed that since there is no uncertainty and there is no risk involved in static state, so there is no existence of profits under such a state.

Clark believed that there exists a distinction between entrepreneur and manager. In a static state competition does not allow the manager to earn more than his wages. And the wages of the entrepreneur are equal to his marginal product. Thus, there would be no surplus and hence, no profits will accrue to the manager.

Clark regarded dynamic world as the one in which the factors of production remain static for a while but then undergo a change. Such a change from the static state to the dynamic state is governed by certain generic changes. As per Clark generic changes include the following: rise in the wants of the consumers due to the rise in population, improvements in the techniques of production and in the production process, improvement in the productivity of capital and lastly, changes in the form of business organization.

He believed that in a dynamic state the entrepreneur takes advantage of the generic changes. With these changes the entrepreneurs tend to promote their business and indulge in innovations and improvements in techniques of production. This causes the costs of production to decrease and it differentiates the product of one entrepreneur from the other. This gives rise to the generation of profits. However, such profits exist only for a short period of time. This is because gradually the other producers will imitate and as a result they will also produce the commodities. This will lead to a generation of more demand for capital and labour. Such an increase in demand will push up the prices of the factors of production which ultimately increases the cost of production for all the producers. Therefore, the profits will disappear. However, the generic changes will continue in a dynamic state and the profits will continue to appear and disappear.

13.6 A QUICK REVISION

Figure 13.6 briefly sums up the whole chapter.

Figure 13. 6 A Quick Revision
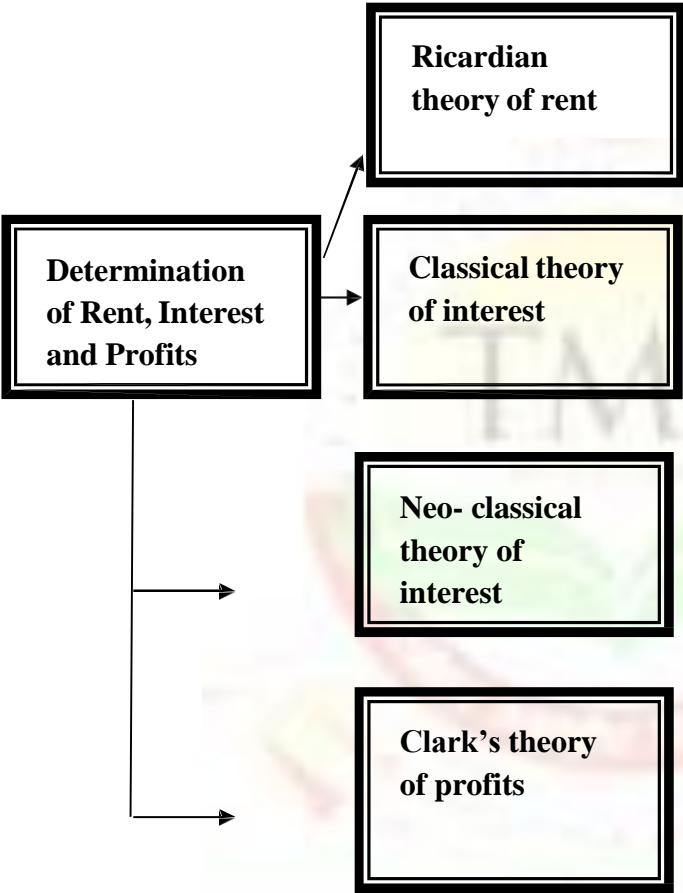
13.7 KEYWORDS

Factors of production, rent, interest, profits, transfer earnings, quasi rent, economic rent, fertility of land, original powers of the soil, opportunity cost, savings, investment, lonable funds, demand for lonable funds, supply of lonable funds, hoarding, bank money, dishoarding, demand for liquidity, supply of liquidity, transactionary demand for money, precautionary demand for money, speculative demand for money.

13.8 ASSESS YOUR PERFORMANCE

Short Questions

Q.1 What is Quasi rent?

➤ The concept of quasi- rent was introduced by Marshall. It explains the short run earnings of the factors of production. Marshall gave it for all the factors of production he said the supply of capital is fixed in the short run and if there is any increase in the demand for the same then this will lead to the generation of rent on capital equipment. He preferred to call it as Quasi rent instead of normal rent. He defined it as the excess of total revenue over the variable costs of the factors of production.

Q.2 What is economic rent?

➤ Economic rent is the excess of actual rent of a factor over its transfer earning. It can be written as:

Economic rent = actual rent – transfer earning

Q.3 What are transfer earnings?

➤ The concept of transfer earnings is based on the concept of opportunity cost. It is also called as reservation price. Transfer earnings are defined as the earnings that a factor must receive in order to be in its present employment. Or it also implies the amount that a factor might earn if it is employed in its next best job.

Q.4 Explain the saving function as per classical economists.

> As per classical economists, savings are a function of rate of interest. The relationship between the two is direct. As the rate of interest increases people have a tendency to save more. And as the rate of interest decreases people have a tendency to save less.

Q.5 Give one point of criticism of Clark"s theory of profits.

> The critics pointed out that Clark"s contention that profits accrue under dynamic conditions is not acceptable. This is because profits may accrue even under normal conditions. There have been situations where the dynamic state of the business has long surpassed but still the business enterprises experience profits.

Long Questions

Q.1 Expalin the Ricardian theory of rent.

Q.2 Critically discuss the Classical theory of rate of interest determination.

Q.3 Compare the Classical and Neo- classical theory of rate of interest determination.

Q.4 Discuss the Keynesian theory of rate of interest determination.

Q.5 Discuss the theory of profits as explained by Clark.

13.9 Suggested Readings

Dwivedi, D.N. (2003), Microeconomics Theory and Applications, Pearson Education, Singapore.

Koutsoyiannis, A. (1979), Modern Microeconomics, Macmillan Press Limited.

Activity 1

Define determination of Rent.

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Activity 2

Explain Keynesian theory of interest.

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