M.A. Semester –I ECONOMICS

Course Code : ECON 11 Course Credit: 06 (DSC)

MICRO ECONOMICS

Units 1 to 20

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DSC Course Code: MEC-11

MICRO-ECONOMICS

Course Credits: 5

Unit-I

Role and significance of assumption in economic models, Empirical testing of economic models.: The Slutsky theorem; Compensated demand curves; The revealed preference theory. Duality theory, Dual properties of utility and expenditure function, Shepard's Lema inter-temporal choice in consumption.

Unit-II

Recent developments in the theory of limit pricing; Models of Sylos-Labini. F, Modigliani and Bhagwati; Baumol's theory of contestable markets; Public utility pricing; inter-temporal and intra temporal equity. Unit-III

Unit-III

Markets with Asymmetric information: Hidden Characteristics adverse selection and Moral hazards in insurance, Banking, Labour market & second- hand product markets. Pricing and output behaviour under oligopoly: Collusive and non-collusive models: Extensions of the oligopoly: models: Models of Baumol, Marris and Williamson,

Unit-IV

Theory of Distribution: The adding up Problem and Euler's theorem. Modern theory of distribution. Theory of Rent: Ricardian and Modern. IS-LM curve theory of interest, Modern theory of wages; wage determination under trade unionism., Marxian and Kalecki's theories of profit.

Unit-V

Welfare Economics: Marshallian and Robbinsian concepts Pigouvian Welfare Economics. New Welfare Economics: Pareto's optimum and externalities; Compensation principle.

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Unit-1

MICRO-ECONOMICS: MEANING AND SCOPE

Structure

- 1.1 Introduction
- 1.2 Learning Objectives
- 1.3 Meaning and Scope of Micro Economics Self Check Exercise-1
- 1.4 What is an Economic Problem Self Check Exercise-2
- 1.5 Types of Economic Problems
 - 1.5.1 Fixing of Standards
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- 1.6 Summary
- 1.7 Glossary
- 1.8 Answers to Self Check Exercises
- 1.9 References/ Suggested Readings
- 1.10 Terminal Question

1.1 INTRODUCTION

Dear Students,

Let me welcome you to the course on micro-economics which you will be studying through a course of a limited number of lessons.

Before I start explaining to you the meaning and scope of micro-economics which is the subject matter of this first lesson, I would like to tell you what you may expect to receive from us in these lessons and what we expect of you as students of the course. We have to cover the prescribed course in a limited number of lessons only. It is obvious that there is a limit to the length of an individual lesson. Thus we have to attain our objective within the constraints of time and space. In order to achieve this objective in the best possible manner, we have to cut out the nonessentials as well as avoid going too wide and too deep. We, presume, that once you are set on the right track, you will be able to pursue a particular topic further with your own efforts. You have to look upon these lessons as guide posts and not as the key to each and every possible type of problem of micro-economic theory. In brief it is expected of you to supplement these lessons with a study, on your own, of the literature which will be referred to at the end of each lesson.

1.2 LEARNING OBJECTIVES:

After reading this unit, you will be able to:

- To describe meaning and scope of Micro Economics.
- To know nature of Micro economics
- To know what on economic/problem and how it arises.

1.3 MEANING AND SCOPE OF MICRO ECONOMICS

Let us now come to the proper subject of this lesson, namely, the meaning and scope of microeconomics. However, in order to clarify the meaning and scope of micro-economics, we must first, know the nature of economics in general, of which micro-economics is only a branch. The science of economics in general seeks to explain the functioning of an economic system. An economic system may be described as the sum total of all such arrangements, all such forces and relations, which a society creates in order to solve its economic problems, the science of economic analysis, the working of such forces and through this analysis explains, the behaviour of a particular economic system. Micro- economics is a particular branch of such a study which relies on a particular method of analysis to explain the behaviour of an economic system.

Self Check Exercise-1

Q1. What is the meaning of Micro economics?

Q2. Briefly discuss scope of economics.

1.4 WHAT IS AN ECONOMIC PROBLEM

But, in order to arrive at the true nature of microeconomics, we must first, know what an economic problem is and how it arises. As Prof. Robbins observed in his now famous work "An Essay on the Nature and Significance of Economic Science" an economic problem arises from a particular aspect of human behaviour, the aspect which is assumed by human behaviour "as a relationship between ends and scarce means that have alternative uses." This implies that an economic problem exists whenever means are scarce in relation to the demand for them and when they are

capable of being put to several uses. It is obvious that if the means are not scarce in relation to the demand for them, there cannot be any economic problem. There is, for example, no economic problem to an Alladin who can make use of the magic lamp to satisfy each and every want as it arises. Friedman has aptly observed in his *Price Theory* that "If the means are not scarce, there is no problem at all there is Nirvana."

However scarcity of means in itself is not a sufficient condition for an economic problem to exist. If the scarce means did not have several uses but could be put to one and only one use, it would give rise to not an economic problem but to a technological problem. If a piece of land can be used only for growing wheat and nothing else, then the problem would be to choose a technology which produces the largest possible quantity of wheat per acre of this land. This is, according to Friedman, a technological problem and not an economic problem. It is only when means are scarce and have, at the same time alternative uses that an economic problem arises.

The above point can be further explained with the help of Adam Smith's famous example of deer and beaver. We know that there is a limit to the maximum number of work-hours for a man in a particular day, for there are only twenty four hours in a day. Let us suppose that Adam Smith's primitive hunter can hunt down on any one day either one deer or two beavers. Here the means, that is, the number of hunting hours in a day are limited or scarce. But at the same time this scarce means has alternative uses either one deer or two beavers. Whether to hunt one deer or two beavers is an economic problem. But supposing there had been no alternative to hunting deer, then the hunter's problem would have been only a technological problem, a problem of how to hunt with the best possible technique so that maximum possible number of" deer are hunted down in a fixed period of time.

Prof. Robbin's definition of an economic problem, as explained above, is rather too general and, therefore, will include even such problems which *ordinarily* are not regarded as belonging to economics. The science of economics as it is, is not concerned with all economic problems in the Robbinsian sense. We should never lose sight of the fact that economics is a social science and, therefore, it studies the economic problems of an organized society alone and not of individuals like a Robbinson Crusoe. But it does not imply that economics does not study the individual behaviour at all. In fact, micro-economics is primarily that branch of economic theory which seeks to understand the behaviour of an economy on the basis of the analysis of individual behaviour. What it means is that economics in far as it is a social science, studies individual behaviour only in so far as the individual's behaviour has implications for or effects upon other individuals." (Friedman). As Friedman rightly points out in his *Price Theory, economics* "is concerned not with an economic problem in the abstract, but with how a *particular* society solves its economic problems."

Self Check Exercise-2

Q.1 What is an economic problem?

1.5 TYPES OF ECONOMIC PROBLEMS

Now that we have explained the basic nature of economic problems, we shall now try to list up the basic types of economic problems that any economic system has to arrange to solve. In this matter we shall do well to. follow Prof. Knight's exposition in his book, Economic Organization. According to him every type of society must make some type of arrangements or the other, in order to solve the following basic types of economic problems:

- 1.5.1 Fixing of standards;
- 1.5.2 Organizing Production:
- 1.5.3 Providing for economic maintenance and progress;
- 1.5.4 Adjustment consumption to production over short periods.

1.5.1 Fixing of standards;

Let us now elaborate on the above listed problems. It was pointed out earlier that the means at the disposal of a society are scarce and, moreover, they are capable of being put to several uses. The 'means' at the disposal of a society refer to its natural resources, its labour resources, its accumulated capital stock, its organizational and technical skills, etc. Each one of these productive resources is limited in relation to the demand for it. Furthermore each one of these is capable of being put to alternative uses. Land, for example, can be employed to produce wheat or rice or sugar cane or some other crop or even to raise buildings on it. Hence every type of society has to make a choice of the use or uses to which a given productive resource is to be put. In other words, every type of society has to decide upon the types of goods and the appropriate product-mix that it must produce with the help of the limited quantities of productive resources which are available to it. We can explain the above point in a better way with the help of the analytical tool of 'production possibility curve.' Scarcity of means implies that a given society has production frontier which cannot be crossed under the given technological conditions.



However, within this frontier or on this frontier movement is possible, that is, a large number of alternative choices are possible within a given state of technology. The problem of fixing standards is, in essence, the problem of making a choice from amongst the alternatives open to the society.

Let us suppose that a given society, whose technical knowledge is given and constant, is capable of producing OP' quantity of good A, if all of its available productive resources are devoted to its production alone. Similarly, we suppose that if all these resources are devoted to the production of another good B alone, only a maximum of OP of it can be produced. On the other hand, if the society wants to produce both the goods, it can produce the various combinations of A and B but only in such a way that more of one good can be produced only by reducing the production of the other. When we join all such combinations of the given pair of goods, we shall get a curve like PP' in the above figure 1.1. Such a curve is known as the 'production possibility curve' or the 'production frontier. Thus production possibility curve may be defined as the locus of all such combinations of a given pair of goods which the society can produce with its given stock of productive resources under a given, and constant technology.

1.5.2 Organizing Production

The production-possibility curve has two important attributes. Firstly, it slopes downwards to the right indicating that an increase in the production of one good must need go with a decrease in the production of the other good. Secondly, it is concave to the origin indicating that the more we produce of a given good, the larger is the quantity of the other good that will have to be given up in order to produce an additional unit of the former. In other words, production-possibility curve is drawn on the assumption that there are diminishing returns or increasing costs in production.

If all the available resources of the society are fully and most efficiently employed, the society will be operating on the production frontier PP'. It may be on any point like a or b or c or any other on the curve PP'. But it cannot produce a combination liked which is beyond the production frontier. When it is operating at a point like e within the production frontier, the society is employing its available resources either less than fully or inefficiently or both. However, we shall assume that the economy is operating at full employment and full efficiency, so that it must be on PP' curve in the figure. But the question is at which point on the PP' curve it will be operating. Through some mechanism or the other, every society has to make the choice as to at what point on its production-possibility curve it should operate. It has to fix some standards with reference to which such a choice could be made. Different economic systems have different arrangements for fixing these standards which determine the goods that are to be produced and the relative quantities in which they are to be produced. This is what is meant by 'fixing of standards' problem in Prof. Knight's list of the basic problems of an economic system.

1.5.3 Providing for economic maintenance and progress;

Once the choice of goods to be produced is made, there has to be some arrangement or mechanism for organizing the production of the desired goods. This is another type of problem which an economic system has to tackle. But the economic problems of a society are not finished as soon as the desired goods are produced. An allied problem is how much of each good produced should go to the individual members of the society. That is, the total product of the society has to be distributed among its members. Thus, every type of economic system has to make some sort of arrangement for distributing the total product of the economy. It should also be obvious that there is wear and tear of the productive resources during the process of production. If the-productive capacity of the economy is to be maintained, the society. must make some arrangement to provide out of the total product, enough to replace the worn out productive equipment. This is the problem of providing for economic maintenance.

1.5.4 Adjustment Consumption to Production Over Short Periods.

All the three types of economic problems discussed above are the problems of a static society. Still another static problem that a society has to solve is the last in the list of Prof. Knight, namely, the problem of adjusting consumption to production over short periods. Over a short period, the available supplies of various kinds of consumer goods are fixed and since they must be scarce in relation to the demand for them, there must be some institutional arrangement for rationing these goods in order to adjust consumption to production over a short period. However, over a long period we have to provide for growth too. Firstly, population will increase over time and if increasing population is to be provided for even at the prevailing standard of living, the total product of the economy must also grow proportionately over time. Secondly, economic progress implies a rising standards of living for the people, which further underscores the necessity of a growing total product. This will require arrangements of some kind or the other to increase the productive resources or improve technology or both so that the production frontier of the economy is pushed outwards. This is the problem of providing for growth of progress which Knight has tagged on to the problem of providing for maintenance discussed above.

Knight's view, to which a society has to solve only the above explained five types of economic problems, is rather based on an implicit assumption which is also the implicit assumption of microeconomics, namely, that the economy always operates at full employment and at full efficiency. But ever since the publication of Keynes's General Theory of Employment Interest and Money (1936), this assumption has been questioned. It is generally recognized that there might be times when the economy is

not operating at full employment. Indeed, many may argue that, oftener than not, it operates at less-than-full-employment level, that is, it usually functions not on the production frontier PP' in the diagram 1.1, but within it on a point like e. If it is so, some resources must be lying idle and unemployed. A society has to look after this problem also. It has to make arrangements to attain full employment of resources. Thus, we may add this sixth type of problem to Knights' list of five.

However, we have to add a seventh type also to the above list in order to make it tentatively exhaustive An economy, may be operating within the production frontier a point like e in fig. 1.1, not because some productive resources are unemployed or underemployed but because they are Inefficiently employed. Naturally, then, the society has to see to it that the resources are not only fully employed, but are also efficiently employed. This is known as the problem of efficiency or optimum use of productive resources.

This economics, in general, studies the behaviour of an economic system when it is engaged in solving the various economic problems enumerated and explained above. Micro economics studies how an economic system based on a free-market economy, solves some of the above economic problems. Here you must note two important points with regard to the nature of micro-economics that you are going to study. In the first place, micro-economics is the study of the functioning of free market economic system-a system in which the various economic problems are solved through the free working of the market forces, which settle the relative prices of goods, and factors. One should, therefore, always be wary of applying its conclusions blindly to economies where there is no free market of goods and factors of production. Secondly, micro- economics does not study the behaviour of a free market economy or a price system with respect to all the seven types of functions referred to above. It definitely studies how a free market economy tries to solve the first three types of problems in Knight's list that is to say, it does study how a freely working price system arranges to solve the problems of (i) fixing of standards, (ii) organizing of production, and (iii) distributing of the total product. It also studies the behaviour of a freely working price system with respect to the fifth type of the problem that is, how such an economic system adjusts consumption to production over short periods. But the study of the problems of progress and growth is outside its scope. They make the subject matter of a separate branch of economics that has come to be known as the Economics of Development and Growth. Similarly, problems of levels of employment and of full employment are outside the scope of micro-economics. The study of these types of problems make up the subject matter of another distinct branch of economics which has come to be known as Macro-economics or, alternatively, the Theory of Output and Employment.

Strictly speaking, the problem of efficiency or optimum use of resources is also outside the scope of micro-economics, because the matters related to this problem

are the subject matter of a separate branch of economic science that goes by the name of *Welfare Economics*. However, since its technique of analysis is very much similar to that of micro-economics, it has become quite customary to tag welfare economics courses in micro-economics. That is why you too are required to study welfare economics within the course on micro- economics.

It has been observed above that micro- economics seeks to explain how a free market economy tries to solve some of the basic economic problems such as fixing of standards, organizing of production, distributing of the product, providing for maintenance of capital stock, and adjusting consumption to production over short periods. Now a free-market economy tries to solve these problems through the free working of the price mechanism. The problem of standards is solved by the relative price of goods which reflect the relative preferences of the individuals making up the society. A rise in the price of one good in relation to the prices of others is an indicator that the society prefers to have more of the former good in relation to the other goods. Thus, the relative prices of goods reflect the society's choice of goods to be produced and the relative quantities in which they are to be produced.

The next problem of organizing production to meet these choice is also solved in a free-market economy through the working of the price mechanism. It is the interaction of two sets of prices, the prices of goods and the prices of factors of production which helps to solve this problem within the frame-work of a free market economy. The basic problem of organizing production has two aspects: (i) how the available productive resources are to be allocated among industries producing different goods and (ii) how the different factors within an industry are to be combined. The first of these two problems is solved with reference to the prices of final goods in relation to those of the factors of production. More of the factors of production will be directed into the industries where the prices of goods produced in relation to the factor prices are greater. The second problem is solved in the light of the relative factor prices in conjunction with the relative productivities of the factors. As you will learn, at a proper place in the lessons that will follow, in any given productive enterprise the factors are combined in such a proportion that the ratio between their marginal productivities equals the ratio between their respective prices.

The problem of distributing the total product is also solved through the price system in a free-market economy. An individual's share in the national product equals the sum of the products of the quantities of factor services supplied by him and the respective prices of those factor services. Thus the distribution of the total product in a free-market economy depends on the factor prices, on the one hand, and on the distribution of ownership of those supplies, on the other.

The adjustment of consumption to production over short periods also comes about through the price mechanism in this type of economic system. This type of adjustment essentially involves rationing of more or less fixed supplies of goods. The prices of the relatively more scarce goods would rise in this type of economic system under the pressure of competition among the buyers. The rise in their prices would reduce the demand for each good to make it equal with its available supply.

Although the problems of growth are many and very much complicated, yet one of the determinants of growth is the capital stock of the economy or, rather, the growth of this stock. The maintenance as well as the growth of the capital stock of an economy depends on a type of price which is known as the rate of interest. It is this price which induces the people to save and it is the savings of the people which is the source of providing for the maintenance and growth of the capital stock.

It should be clear now that all the economic problems of a free market economy which make up the subject matter of micro-economics are solved through the working of the price system. Therefore, the function of micro-economics ultimately boils down to the explaining of the working of the price system. In other words, its basic function is to explain how relative prices of goods and factor services are determined because it is these prices which serve as a guide to what goods should be produced and how these goods should be produced. In so far as the basic task of micro- economics is to explain the determination of relative prices, it can be described as the price theory or the science of prices. However, it should be noted that it is a theory of relative prices and not of absolute prices. While the description of this particular branch of economic theory as 'price theory is indicative of its subject matter, its description as 'micro-economics' is indicative of its particular methodology, its technique of analysis, which seeks to understand the behaviour of the economic system as a whole on the basis of the analysis of the behaviour of its individual units, such as a consumer and a firm. The details of this particular methodology will be discussed in the next lesson.

Self Check Exercise-3

- Q.1. What do you mean by Fixing of standards?
- Q.2. What do you understand Organizing Production

1.6 SUMMARY

Before I close this lesson, I would like to emphasize one more point relating to the scope of microeconomics. Micro-economics belongs to that part of economic studies which is described as positive economics, as distinguished from normative economics. As positive economics, it simply explores and explains the phenomena pertaining to its field of study which has already been clarified in the preceding sections of this lesson. In this capacity, that is, as positive microeconomics, its scope does not go beyond analyzing casual relationships among the relevant micro variables. In brief, as à part of positive economics, microeconomics is concerned only with the problems of "what is". The problems involving "ought", that is the study of questions of "what ought to be" are normative questions and they, therefore, lie outside the scope of positive micro-economics.

1.7 GLOSSARY

- **1.7.1 SCARCITY:-** Scarcity is a situation where the resources available for satisfaction of our wants are less than the resources required for the satisfaction of our wants.
- 1.7.2 PROBLEM OF CHOICE:- Problem of choice is related with the allocation of resources. Scarcity and choice are inseparable. They always go together. Where there is a scarcity, there was to be a choice. It relates to choosing among alternative uses of the resources for the satisfaction of our wants.
- **1.7.3 PRODUCTION POSSIBILITY CURVE:-** PPC is also known as transformation curve. PPC is a curve showing different possibilities of production of a set of two goods with the given resources and technology.

1.8 ANSWERS TO SELF CHECK EXERCISES

Self Check exercise -1

Ans.1. Refer to Section 1.3

Ans. 2. Refer to Section 1.3

Self Check exercise -2

Ans.1. Refer to Section 1.4

Self Check exercise -3

Ans.1. Refer to Section 1.5.1

Ans. 2. Refer to Section 1.5.2

1.9 REFERENCES/ SUGGESTED READINGS

- 1. F.H. Knight: The Economic Organization (pp. 3-30) Also reprinted as Reading No. I in Briet and Hochman (eds.) Readings in Microeconomics.
- 2. M. Friedman Price Theory, Chapter I.
- 3. Lipsey: Positive Economics, Part II.

4. L. Robbins: An Essay on the Nature and Significance of Economic Science, Chapter I.

1.10 TERMINAL QUESTION

"Scarcity is the root of the problem of choice which every system has to fare". Discuss this basic problem of an economic system, illustrate your answer with the use of PPC.

SOME METHODOLOGICAL CONCEPTS

STRUCTURE

- 2.1 Introduction
- 2.2 Learning Objectives
- 2.3 Economic Models Self Check Exercise-1
- 2.4 Model Building Self Check Exercise-2
- 2.5 Empirical Testing of Economic Model Self Check Exercise-3
- 2.6 Assumption in Economic Theory (Their Role and Significance) Self Check Exercise-4
- 2.7 Concept of Equilibrium Self Check Exercise-5
- 2.8 Stable Equilibrium Self Check Exercise-6
- 2.9 Unstable Equilibrium Self Check Exercise-7
- 2.10 Partial Equilibrium and General Equilibrium Self Check exercise-8
- 2.11 Summary
- 2.12 Glossary
- 2.13 Answer to Self Check Exercises
- 2.14 References/ Suggested Readings
- 2.15 Terminal Questions

2.1 INTRODUCTION

In this lesson we shall introduce you to some important concepts related with the methodology of the science of economics. One of the most important and frequently occurring concept is the concept of a model.

A model dealing with the working of an economy or a part of it or an aspect of it is described as an economic model. But what is exactly meant by a model as such? A model is an abstracted picture which encaptures the essential variables and their inter-relationship as they occur in a phenomenon which a scientist wants to study and explain. Take the case of a map, say the road map of a country. It is a sort of model. In the first instance, it is an abstraction in the sense that it assumes away hundreds of facts related to the country and chooses to depict only a particular phenomenon in it, namely, the network of roadways existing in the country. and their inter linking. There are numerous other things in the country, such as railways, rivers, streams, canals, mountains, various kinds of forests, etc. but they are all eliminated from the road map of the country as they are not relevant to the objective. It is in this sense that a model is said to be an abstract picture which encaptures only the relevant elements of the phenomenon under study and their inter- relationships. Here we have given a most simple example of a model from the field of geography. Though such a road map can predict where a road traveler will end up, if he follows a particular route, yet this is essentially an example of a descriptive model as distinguished from an analytical model.

2.2 LEARNING OBJECTIVES

After going through this chapter you will be able to:

- What is Model building
- The Process of Empirical Testing of Economic Model.
- What is Equilibrium
- Difference between stable equilibrium and unstable equilibrium.
- Difference between Partial and General Equilibrium.

2.3 ECONOMIC MODELS

However before we proceed further to explain the intricacies of models and model building, let us see an example of a simple economic model also. It should be remembered that models can be presented in verbal form or graphical form (diagrams, pictograms, etc.) and mathematical form. Although very simple models can be presented-in either of these alternative forms without making any significant difference, yet more complicated models are best handled in mathematical form which imparts to the model precision and brevity as well as avoids the muddling of the verbal form when the variables are a little too many to be conveniently handled by the medium of language. When the variables are more than three, they are not at all amenable to geometrical representation since there are only three dimensions available to us and even three dimensional diagrams may prove to be quite confusing.



What we are going to give below as an example of a most elementary economic model is the diagrammatic model of the flow of the overall economic activity taking place in a free-market economy which model too is essentially a very simple descriptive model of a free-market economy, though some inferences regarding the consequences of certain actions can be drawn even from such a simplified model.

The diagram below presents an abstract picture of the flow of economic activity in a free-market economy.

The above diagrammatic model of a free-market economy is an abstract picture of the working of a free-market economy. A real world free-market economy is a very complicated affair but the above model of it eliminates all complications (that is it abstracts from all non-essentials) and encaptures only the most important essentials from the point of view of understanding the over-all working of a free-market economy. It describes to us the most basic types of economic activities taking place all the time in this system and their mutual Inter-relationship. It broadly tells us that the economy consists of two sectors, the household sector and the business sector. The householders spend their money incomes on purchasing of goods in the goods market. Their expenditure flows into the business sector. It also comprises two markets, the goods market and the factor services market. In real life there are as many markets as there are final goods and factor services, but these details are irrelevant to the objective of this simple model of a free-market economy which seeks to bring out the most basic features of its over-all working. This model tells us that consumption is done by the householders who spend their incomes on the goods produced by the business firms. Production of goods is carried on by these firms making up the business sector from where the goods are supplied in the goods market. On the other hand, the income which the business firms receive through the sale of their goods to the household sector is utilized to purchase factor services in the

factor market. These factor services are supplied by the householders against which they receive their incomes from the business sector. Thus, what they spend comes back to them which they again spend on goods in the next period starting the circle again. Thus, this simplified picture brings out the circular character of economic activities as well as the significant fact that the household sector and the business sector are mutually interdependent and sustain each other through their expenditures. These are the descriptive elements of the model. But it can also predict the consequences of certain actions taken by either the householders or the business firms. For example, if the householders do not spend on goods all the income that they receive by the sale of their factor services, it will reduce the effective demand for goods and therefore the goods prices will fall. The business firms will fail to recover their costs causing business losses. This will compel them to reduce production and consequently employment will decrease and the householders' income, will also decrease. The new equilibrium will take place at a lower level of income and employment.

From the above description of the basic nature of a model we learn that an economic model like any scientific model, has two essential elements, namely, a descriptive element and an explanatory element from which follows its predictive power. The degree of predictive power of a model shows how realistic it is, in spite of the methodological abstractions it incorporates.

Self Check Exercise-1

Q.1 What is an Economic Model?

2.4 MODEL BUILDING

Having explained the basic nature and meaning of a model, we may now proceed on to study a few more details, particularly regarding how economic models are formulated.

The first step in model building, of course, is to select the economic phenomenon or the aspect of it which is to be studied. The next step is to give very precise meanings to the terms to be used in the formulation of the model, for a scientific model has to link with a scientific language. It is here that the mathematical language is the most helpful and the terms may be expressed in the form of definitional equations or identities. The next. task is to introduce the necessary and appropriate assumptions. Some of these assumptions will be simplifying assumptions which implies that the economic scientist has to select the relevant variables related to the phenomenon under study whose interrelationships are to be studied and established on the basis of which the final hypothesis of the model has to emerge. All other variables which are not relevant are either just assumed away or may be assumed to remain constant. A very common example of this methodological device is

found in the demand models where the relevant variables in the context of proposing a demand- hypothesis are the price of a good (p) and quantity demanded of it (q). All other variables such as income, prices of other goods and tastes and preferences of the consumers are either assumed away or assumed to be constant under the familiar ceteris paribus clause.

Model building also requires the making of appropriate behavioural assumptions. Economic models deal with the study of economic behaviour of living human being and therefore it is necessary to stipulate how they are likely to behave in the context of the situation being studied. Such assumptions are behavioural assumptions. The assumption" of rational behaviour in the neo-classical economic models is a famous example of it. Such assumptions sometimes take the form of axioms. An axiom is a statement Which has at least the appearance of self-evident truth. Adam Smith's repeated postulate that occurs passim in the Wealth of Nations, namely, human beings are motivated in their activities by their self-interest is an example of this type of axioms postulated in economic models. Similarly, the postulate that consumers seek to maximize their total satisfaction from a given money expenditure and the business firms seek to maximize their profits are the famous postulates or assumptions underlying indifference curves in the Hicks-Allen model of demand are other examples of such axioms.

After having made simplifying assumptions and behavioural assumptions and also after taking note of constants which may be technical such as a given production function or institutional, the model builder will apply systematic logic, verbal or mathematical or both depending on their usefulness for the purpose in hand, and arrive at certain conclusion or hypothesis.

The hypothesis so arrived at in a - model must be stated in a form which stands the chance, at least in principle, of being refuted. A hypothesis which is stated in a form in which it can never be refuted is something is true by definition and therefore is tautology rather than a scientific hypothesis.

Self Check Exercise-2

Q.1 What do you understand by Model building?

2.5 EMPIRICAL TESTING OF ECONOMIC MODEL

The process of model building is not complete unless it is made to go through empirical testing. It is empirical testing which confirms or refutes the internal consistency of the model as well as its consistency with real facts. It should be noted that the hypothesis of a model has predictive power. For example, let us suppose that the demand model of a particular good concludes with the hypothesis that its demand equation is as follows :-

Q = 50 - 2PWhere Q = quantity demanded of the good and P = Price of the good

This is a very simple, yet very precise economic model which can precisely predict the effect of any change in price of the good on its demand. If its predictions correspond with actual facts, the model is regarded as consistent with reality and therefore scientifically valid and operationally reliable. The greater is the predictive power of a model, the more reliable is it.

But the question is how economic models are tested empirically. The models in the physical sciences can be tested in a laboratory by controlled experiments. But economics is a social science dealing with the actions of living human beings and their consequences. Controlled experiments on them cannot be normally made in a laboratory as they can be made in the case of natural sciences like physics and chemistry. What is the way out of this difficulty then? The way that leads the economic model builders out of this difficulty is the use of statistical laboratory.

The use of statistical laboratory implies the collection of relevant statistical data in the form appropriate for the model to be tested. The data collected should be adequately representative of the universe of the model. After the collection of data, these data are analyzed with the help of appropriate statistical techniques. This is the technique of empirical testing of economic models. If the empirical tests (i.e. the statistical tests) of an economic model correspond with its theoretical predictions, the model becomes realistic, scientifically valid and operationally useful and reliable.

Self Check Exercise-3

Q.1 What do you understand by Empirical testing of an economic model?

2.6 ASSUMPTIONS IN ECONOMIC THEORY (Their Role and Significance)

You might have already got some feel regarding the role and significance of assumptions in economic theory from what we have said about them in the context of economic models in the preceding section of this lesson. However, we shall have to give a relatively detailed treatment to this topic.

Assumptions or premises are very important in the formulation of economic models and economic theories. There are two distinct roles that are played by assumptions. in economic theory. One of these role is to make the phenomenon to be studied and hypothesized about simple for the convenience of analysis. We know that

the real-world phenomena whether they are natural phenomena or economic phenomena or for that matter any other social phenomenon, are very complicated. It is very difficult to understand and analyze such complicated phenomena in one go. Moreover, there may be in the phenomenon to he studied many elements which are not relevant to the objective of study. Therefore, they cause unnecessary complication. On account of this, economic scientist like any other scientist, has to simplify the phenomenon to be studied in order to make it easier to handle for the purpose of analysis. You will remember that we had observed while explaining the nature of economic models and the process of model building in the preceding sections that a model is an abstraction from reality. A model is an abstraction from reality in the sense that it chooses only the relevant elements of reality making the assumption that the other elements either do not exist or remain constant You might have also come across in the statement of certain economic laws like the Law of Demand and the Law of Supply the phrase "all other things remaining, the same" or its latin equivalent "ceteris paribus," This qualifying phrase occurs, because while hypothesizing about the relationships between change in the price of a good and the quantity demanded or supplied of it, the economist as a scientist makes the simplifying assumption that all other things except price and quantity demanded or supplied of the good remain unchanged. As a matter of fact, while hypothesizing about the relationship between the price of a good and quantity demanded of it, even the supply of the good may be assumed to be given and constant. As a matter of fact a very important assumption in micro-economic theory which is sometimes made explicit and sometimes allowed to remain implicit is that demand and supply functions (or curves) are independent of each other. This is done in order to simplify analysis. Similarly, in the theory of demand, the first approximation contains the simplifying assumption that a consumer spends his money only on the given commodity, which assumption is, though, relaxed once the essential relationship in the context of the simplified onecommodity model is grasped.

Thus we find that there is a particular set of assumptions which play the role of simplifying the analysis. These assumptions help the economic scientist in abstracting from complicating elements of reality and to separate the relevant elements from the irrelevant. Thus they help him to place the relevant elements in a form which is convenient to handle for the purposes of analysis. Such assumptions are known as simplifying assumptions.

Although the role that simplifying assumptions play has its own importance, yet there is the other set of assumptions known as the behavioural assumptions which are relatively more crucial. It is because the science of economics is the science of human -behaviour, though it confines itself to a particular aspect or kind of human behaviour which we described as economic behaviour. These assumptions involve postulates about the motives of various types of economic behaviour of people. A very common example, as we have already explained in the context of model building, is the postulate of 'self- interest' that we come across in Adam Smith's economic theories. A similar postulate in the form of the postulate of rational behaviour we come across in the neo-classical economic theories where rational behaviour is defined as the maximizing behaviour. These postulate end up in the assumptions that consumers seek to maximize their satisfaction and producers seek to maximize their profits.

Why is the role that behavioural assumptions play said to be more crucial? It is because it is the application of logic to these assumptions which enables the scientist to put forth a hypothesis regarding the functional relationship that exists between the variables or elements of the phenomenon under study and analysis. Without behavioural assumptions, scientific economic analysis is not possible at all. It is in th is sense that they are regarded as crucial. Adam Smith derived the theory of Laissezfaire or the theory of free- market economy or the theory of optimizing character of free competition from the behavioural assumption that human beings are guided in their economic behaviour by their individual self-interest. Similarly, the various marginalist theories of neo-classical economics have been derived from the behavioural assumption of rational or maximizing economic behaviour.

The role of behavioural assumptions is net confined to providing a basis for deriving testable hypotheses. Another role of them, which has been particularly emphasized by Milton Friedman in his "Methodology of Positive Economics" is to provide a means of confirming or refuting a hypothesis through their implications. If the implications of a set of behavioural assumptions are borne out by actual events, that is, if they correspond to the actually observed events, then the hypothesis is valid and reliable. If the implications of the assumptions do not correspond to the actually observed events, then the hypothesis is not scientifically valid because the actual facts contradict these implications or at least do not confirm them.

After the publication of Friedman's Essay, "The Methodology of Positive Economics" there was a lot of controversy over whether the behavioural assumptions (postulates, premises, axioms) should have realism about them or whether the question of their realism was irrelevant. Before we elaborate on this particular point, let us first observe that the behavioural assumptions that are generally made in economics and, for that matter, in any science may have been derived empirically or borrowed from some other scientific discipline or they may be even derived by the scientist intuitively or they might have been imposed by the logical necessity of the system itself. Friedman's view is that the question of realism of assumption underlying a theory is irrelevant. They may or may not be realistic. According to him, the realism of assumptions is no test of the scientific validity of a hypothesis. Assumptions have certain. implications. Friedman's stress is on this characteristic of assumptions which gives the hypothesis based on such assumptions power of prediction. If the implications of the assumptions and predictions of the hypothesis derived from those

assumptions are borne out by the observed facts, it does not matter whether the assumptions are realistic or unrealistic. He illustrates his argument with the case of plants which grow in profusion on the side of a hill that faces the south direction. If some one seeking to propound a theory of growth of plants makes the assumption that the plants behave in a manner so as to maximize the intake of sunlight and from this derives the hypothesis that plants on hill will grow in profusion and luxuriance on that side of the hill which faces the south direction, it is irrelevant to contend that the plants do not consciously try to maximize the intake of sunlight and therefore the assumption is unrealistic. Realistic or not realistic, it is sufficient that its implication conforms with the observed behaviour of the plants on a hill.

Without going too deep into this controversy we can say that Friedman takes a rather too extreme position. He rules out by implication, the possibility of the refutation of a hypothesis by observed (empirical) facts due to the unrealism of the behavioural assumptions. It is one thing to state that the realism or unrealism of a particular set of behavioural assumptions does not matter at all so long as their implications and predictions, thereof, are confirmed by the observed facts. But it is an entirely different thing to state, even by implication, that the non-consistency of the implications and predictions, thereof, of the assumptions can never be due to the unrealism of the assumptions. While the former statement is valid, the latter one is not. If it is so the question of realism of assumptions will not be irrelevant under the circumstances.

Self Check Exercise-4

Q.1 What is the role and significance of assumptions in economic theory?

2.7 THE CONCEPT OF EQUILIBRIUM

"Equilibrium" is an analytical concept which the science of economics has borrowed from the science of mechanics. It has been very widely used in economics as a tool of analysis. Therefore, it is necessary to understand its full meaning.

Bent Hansen, a famous Swedish economist, has observed that the concept of economic equilibrium which has been taken from classical mechanics "is loosely defined as a state wherein the forces that operate on a point (or body) cancel each other out." Thus, "if we have an economic model that explains certain variables and if there is no tendency for these variables to change, given the data of the model, then the system of variables is in an equilibrium."

However, Bent Hansen's definition of economic equilibrium as given above refers to one particular form of it which can be described as "equilibrium as a position of rest". There is at least another meaning of the term, economic equilibrium. This meaning refers to a situation in which the Individual units which are being studied are in their chosen position. J.R. Hicks, in his Capital and Growth, adopts this meaning of equilibrium when he observes therein "The static economy......is in a state of

equilibrium when all the individuals in it are choosing those quantities which, out of the alternatives available to they prefer to produce and to consume."



In the neo-classical economics (the micro-economics which you are going to study in the present course is essentially neo-classical economics) no distinction between equilibrium as a position of rest and equilibrium as a state of chosen position is made. It is because in practically all the neo-classical equilibrium models, one implies the other. We can explain it with the help of the simple neo-classical demandsupply model of price determination. The following diagram with which you may well be quite familiar depicts this model.

In Fig. 2.1 above the demand curve DD represents the price-demand function of the given good, while the supply curve SS represents the price-supply function of it. In this simple model, equilibrium price OP is determined by the interaction of the forces of demand and supply as reflected in the curves D and SS respectively. E is the point where the opposing forces of demand and supply cancel each other and the system is, consequently, in a state of rest or equilibrium. The equilibrium price is OP. The equilibrium demand is OQ... which is also the equilibrium supply in this position, E, there is no tendency for the variables of the system (that is demand, supply and price) to change. This is what Bent Hansen means by economic equilibrium.

However, we hope that you already know from your previous knowledge of price theory that at any given price, each consumer adjusts his demand for the given good in such a way that he gets the maximum satisfaction from his money expenditure on it. This means that at the equilibrium price OP each consumer or buyer would also be in equilibrium as he will be in his chosen or most preferred position under the given circumstances or constraints. Similarly, all producers of the given good would also be in their chosen or most preferred positions as each one would adjust his supply to this

equilibrium price in such a way that it gives him the maximum profits or, if he is producing at a loss in the short period, makes his loss the minimum possible. It is due to this that the quantity demanded equals the quantity supplied. All those who prefer to buy or not to buy the good at the equilibrium price would be in their chosen positions, for all of them would be able to buy as much as they choose. Similarly, all those who prefer to supply or not to supply the good at the equilibrium price would be in their chosen to including zero quantity. Thus we see that in this neo-classical model, equilibrium as *rest position* tallies with equilibrium as chosen positions. One implies the other.

But this may not always be the case unless we are always in the neo-classical world. In the Keynesian model, for example, the economic system may be in a state of less-than- full employment equilibrium so that the levels of income and employment do not tend to change. But, all the workers who are willing to work at the current wage rate are not able to get employment which causes involuntary unemployment. The existence of involuntary unemployment means that all the suppliers of labour are not in their preferred or chosen positions. Hence, in this case equilibrium as a position of rest does not tally with equilibrium as a state of chosen positions.

Self Check Exercise-5

Q.1 Discuss the concept of equilibrium.

2.8 STABLE EQUILIBRIUM

Closely related to the concept of equilibrium is the distinction between "stable equilibrium and unstable equilibrium." Stable equilibrium is a state or position which, when disturbed, tends to restore itself. For example, if we again take up the neoclassical model depicted in Fig. 2.1 we shall see that if the equilibrium at E is disturbed, say, by artificially or exogenously raising the price above the equilibrium price OP or lowering it below the equilibrium price, the system will automatically tend to come back into the original equilibrium position E. Suppose price is raised exogenously to OP₁. This will tend to make supply more than what the buyers would choose to buy at this price. The sellers will choose to sell P₁b quantity. Buyers would choose to buy only P₁a quantity. Thus there is excess supply equalling a b in the market. The free competition among the sellers would tend to pull down the price back to the equilibrium price OP. Similarly, if the price is exogenously fixed at OP₂, it will cause a situation of excess demand; The buyers would choose to buy more than what the producers choose to produce and sell. The buyers would choose to buy P2d quantity, while the sellers would want to supply only P,C quantity so that there would be excess demand equaling cd. The free competition among the buyers would push up the price back to the equilibrium level OP. Thus the equilibrium model of Fig. 2.1 represents stable equilibrium.

Self Check Exercise-6

Q.1 What do you know about stable equilibrium?

2.9 UNSTABLE EQUILIBRIUM

On the other hand, is a position of equilibrium which, when disturbed, will not tend to be restored. Suppose we have a model which unlike in the model of Fig. 2.1, has downward sloping supply curve and upward sloping-demand curve as shown in Fig. 2.2 below. E is the position of equilibrium where the buyers are able to buy as much as they choose and the producers are able to sell as much as they choose. So the equilibrium price is OP and at this price the quantity demanded equals the quantity supplied (which is OQ in the diagram) But if this equilibrium disturbed, let us say, buy exogenously raising the price to OP_1 , there will be *excess demand* and therefore the competition among the buyers would tend to push up the price higher and higher and the system will never tend to come back to the equilibrium positions E. Similarly, if the price is lowered exogenously, there will be excess supply as a result of which competition among the sellers will increase which will pull the price further down. The system, it can be seen, will never tend to come back to the equilibrium position 'E'



Thus the model of Fig. 2.2 represents unstable equilibrium.

Having explained the distinction between stable and unstable equilibrium, we may now also familiarize you with another distinction, namely, the distinction between the Marshallian view of equilibrium and the Walrasian view of equilibrium as regards the neoclassical demand-supply model. This distinction essentially lies in the difference between the approaches of Marshall and Walras with regard to the mechanism of adjustment postulated in their respective models. In Marshall's model adjustment takes place through changes in quantities supplied while in Walras's model

adjustment comes through changes in price. We can explain it with reference to our Fig. 2.1. Look at the diagram in Fig. 2.1. To the left of equilibrium quantity OQ the demand price is greater than the supply price. Therefore more is supplied. As the supply increases, the price tends to fall and comes back to the equilibrium position E. To the right of the equilibrium quantity, the demand price is less than the supply price, therefore the supply decreases. Consequently the price tends to rise back to the equilibrium level OP. This is the Marshallian mechanism of adjustment. looks at the vertical gap between the demand curve and the supply curve to the left and right of the equilibrium position to which supply reacts.

Walras focuses attention on the reverse process. At positions above the equilibrium position E, he looks at and emphasizes the phenomenon of *excess supply* on account of which price tends to fall and it goes on falling till the excess supply is zero. At positions below the equilibrium position he focuses on the fact of excess demand which reacts on the price making it to rise and go on rising till the excess demand is zero. Walras looks at the horizontal gap between the demand curve and the supply curve above and below the equilibrium position. Above it, there is excess supply price reacts to it by falling. Below it, there is excess demand and price -reacts by rising.

Marshall starts with the fact of disequilibrium price to which quantities supplied and demanded are made to react. Walras, on the other hand, starts with the fact of excess supply or excess demand to which the price reacts. Thus the Marhshallian stability condition is sometimes stated in symbols as follows:-

For a given Q, Δ Q has the same sign as (P_d - P_s) where Q is quantity supplied and P_d and P_s are respectively the demand price and supply price.

On the other hand, the Walrasian stability condition is sometimes expressed in symbols as follows:-

For a given P, ΔP has the same sign (Q_d - Q_s). where P is price and Q_d and Q_s are respectively quantity demanded and quantity supplied.

But these conditions are valid only when the demand curve is negatively sloping and supply curve is positively sloping. When their slopes are reversed, that is, when demand curve has a positive slope and supply curve has a negative slope, these very conditions will produce unstable equilibrium. However, the model of Fig. 2.1 represents both the Marshallian and the Walrasian stable equilibrium. And the model of Fig, 2.2, represents both the Marshallian and the Walrasian unstable equilibrium. In Fig. 2.2 to the left of E, the demand price for any given quantity of the good is less than its supply price. Therefore the supply goes on decreasing. As the supply decreases, the demand price goes on falling further and further down and consequently the supply, instead of returning to the equilibrium level goes further and

further away from it. To the right of equilibrium position E, demand price is greater than the supply price. Therefore, the supply increases. But with every increase in quantity supplied demand price rises further and consequently supply also increases further. It never returns to the equilibrium supply. Thus Fig. 2.2 represents Marshallian unstable equilibrium.

But it is an unstable equilibrium in the Walrasian sense also. Above E, there is excess demand which pushes up the price. But with every increase in price the excess demand goes on increasing further and further and consequently the price too goes on rising. It never returns to the equilibrium level OP. Similarly below E, there is excess supply which pulls down the price. But every decrease in price increase excess supply further and further, on account of which price also goes on falling further and further down, never tending to return to the equilibrium level.

In view of the above, it is better to look upon the above-said so-called stability conditions as the result of the respective assumptions of the two models.



Fig 2.3

However, when the demand curve as well as the supply curve is negatively sloping but the slope of the supply curve is greater than that of the demand curve as shown in Fig. 2.3, it will present a model of equilibrium which is unstable according to the Marshallian assumption but stable according to the Walrasian assumption.

In the model depicted in Fig. 2.3 both the demand curve and supply curve are negatively sloped (falling downwards to the right). But the supply curve SS is steeper than the demand curve DD and therefore the former intersects the latter from above. Equilibrium takes place at E with OQ as the equilibrium quantity demanded and supplied and OP as the equilibrium price. Now if this equilibrium is displaced and the actual quantity demanded is less than OQ, that is, to the left of the equilibrium quantity OQ, the demand price becomes then the supply price. Since, according to the

Marshallian assumption, at any given quantity Q, Δ Q, takes the same sign as (P_d-P_s) the quantity supplied will decrease which, instead of closing the gap between the demand price and supply price (which equals the vertical distance between the demand curve and the supply curve), will further widen it leading to further rounds of decrease in supply. The system moves further away from the initial equilibrium position.

But the model of Fig. 2.3 represents stable equilibrium according to the Walrasian assumptions. At price above the equilibrium level OP, there is excess supply as the producers will choose to sell more than what the buyers choose to buy. This will cause the price to come down. It will go on falling till the initial equilibrium at E is regained by the system. If the actual price is below the equilibrium price, there will be excess demand leading to a rising tendency of the price till the initial equilibrium at E is regained. Thus, the model depicts Walrasian stable equilibrium but Marshallian unstable equilibrium.



If on the other hand, the demand and supply curves are negatively sloping but the supply curve has a smaller slope than the demand curve intersecting the latter from below as depicted in. Fig. 2.4, then it will be a model of Marshallian stable equilibrium and Walrasian unstable equilibrium. We leave the explanation of it to yourselves along the lines of the above explanation of the model of the Fig. 2.3.

Self Check Exercise-7

Q.1 What is unstable equilibrium?

2.10 PARTIAL EQUILIBRIUM AND GENERAL EQUILIBRIUM

Partial equilibrium refers to a particular position or state of a part of an economic system but it also refers to particular technique or method of economic analysis. In the former sense it usually refers to the equilibrium of a particular firm or at the most a particular market or industry. When, for example, we are focusing our attention on sugar market or industry and find it to be in an equilibrium position regardless of what the position of other industries is, then we observe that the sugar industry is in equilibrium. It is not necessary that whenever a particular industry is in equilibrium, all other industries must also be in equilibrium refers to a situation in which, the forces of demand for and the supply of the product of a particular industry are in equilibrium with each other. In this sense partial equilibrium may be defined as a position in which there is no tendency towards a change in the output of a particular industry and consequently factors of production do not tend to move into or out of this particular industry.

But in the sense, and this sense is much more important, of an analytical method. It refers to that method of analysis in economics which seeks to analyze the conditions of equilibrium in a particular industry assuming that the conditions in the other industries remain constant. The assumption, in fact, implies that all industries are independent of one another. What happens in one particular industry has no repercussions on other industries or if they do have some repercussions, they are so insignificant that they can be ignored. The micro-economic theory that you are going to study in the present course is predominantly based on partial equilibrium analysis. This is the technique which was mainly used by Marshall.

The advantage of the method of partial equilibrium analysis is that it simplifies the task of economic analysis. Once we isolate a particular industry from the rest of the economy, we are able to remove most of the needless complications which makes analysis of the equilibrium conditions in a particular industry very easy. But the danger of relying solely on this method is that our model may become an abstraction and unrealistic policies formulated on the basis of this type of analysis may prove to be ineffective in practice, because in the real world economy not all the industries be "independent". Therefore partial equilibrium analysis is reliable only as a first approximation. Its conclusions should be appropriately modified after taking into consideration the mutual inter-dependence of at least the related industries, that is, the industries which are producing substitute goods and complementary goods. Like partial equilibrium the term general equilibrium is also used in two different senses. In one sense, it refers to a position of an economic system in which all the markets (industries) are in a position of equilibrium. In this state, all the firms in each and every industry are satisfied with the outputs they are producing inclusive of zero outputs and by implication all the consumers of each and every product (including the products which are not being produced) are satisfied with the quantities (inclusive of zero

quantities) they are purchasing for consumption. In consequence of it, general equilibrium of an economic system implies a *position and a structure of the system in which the factors of production do not tend to move out of one industry into another industry.*

In the other sense, which is more important, it refers to that method of analysis employed in economics which treats an economic system as a web of interrelated industries and markets such that anything that happens in any one particular industry or market has its repercussion on all the other industry and markets.

Self Check Exercise-8

Q.1 Discuss Partial equilibrium and General equilibrium?

2.11 SUMMARY

This method of economic analysis seeks to study and analyze the conditions of equilibrium of the economic system as a whole, because it assumes that no particular industry or market can be in equilibrium, unless at the same time all the other industries and market are also in equilibrium. This is the method which was adopted by Walras.

The advantage of this method is that it is more realistic and less abstract. But the disadvantage is that this method of analysis is highly complicated and can be handled with the help of mathematics only. And, even when we use mathematics, we cannot discover the determinate solution of the equilibrium problem unless we have as many equations as there are the unknowns in the system. Moreover, since the realworld economies produce thousands of final goods as well as intermediate goods, the effective use of this method, will require the solution of quite a maze of simultaneous equations. The liking for this method in its extreme form betrays a faddish fastidiousness. We should remember that even in the real world there would be some industries which are closely inter-related while there would be many others which would be only remotely and peripherally related. Therefore taking into account each and every industry and market for determining equilibrium in individual industries is a fundamentalist approach which may not be practical wisdom.

However, it is to be acknowledge that partial equilibrium analysis has to be reinforced with an appropriate degree of general equilibrium analysis, if economic analysis is to be made effective without making it unnecessarily too complicated.

2.12 GCOSSARY

• **MODEL BUIKDINGS :-** For Model Building the first step is to select the economic Phenomenon or the aspect of it which is to be studied. Model building also requires the making of appropriate behavioural

assumptions. Economic Models deal with the study of economic behaviour of Living human being.

- **EQUILIBRIUM :-** is a state of balance, especially between forces or influences that are working in opposite ways. Equilibrium is described as a position of Rest.
- **PARTIAL EQUILIBRIUM :-** Partial Equilibrium is a condition of economic equilibrium which analyzes only a single market.
- **GENERAL EQUILIBRIUM :-** General Equilibrium only analyzes the economy as a whole, rather than analyzing single markets like with Partial equilibrium analysis. General Equilibrium shows how supply and deviant interact and tend toward a balance in an economy of multiple markets working at once.

2.13 ANSWERS TO SELF CHECK EXERCISES

Self Check exercise -1 Ans.1. Refer to Section 2.3 Self Check exercise -2 Ans.1. Refer to Section 2.4 Self Check exercise -3 Ans.1. Refer to Section 2.5 Self Check exercise -4 Ans.1. Refer to Section 2.6 Self Check exercise -5 Ans.1. Refer to Section 2.7 Self Check exercise -6 Ans.1. Refer to Section 2.8 Self Check exercise -7 Ans.1. Refer to Section 2.9 Self Check exercise -8 Ans.1. Refer to Section 2.10

2.14 REFERENCES/ SUGGESTED READINGS

- 1. Lipsey: *Positive Economic* Part I.
- 2. Milton Friedman "The Methodology of Positive *Economics*" in his Essays in Positive Economics. Also available in Reading in *Microeconomics* edited by Breit and Hochman.
- 3. E. Nagel: "Assumptions in Economic. Theory" reprinted in Readings in *Micro-economics* edited by Breit and Hochman.
- 4. J.R. Hicks: Value and Capital Part I.
- 5. A. Marshall: *Principles of. Economics* Ch. III and V.
- 6. Eric Schneider: *Pricing and Equilibrium*, Ch. 111.

2.15 TERMINAL QUESTIONS

- Q.1 What do you know about economic Model. Describe in detail the Process of Model Building?
- Q. 2. Describe the concept of Equilibrium? Also Discuss Partial and General Equilibrium.

Unit- 3

SLUTSKY THEOREM AND COMPENSATED DEMAND CURVE

STRUCTURE

- 3.1 Introduction
- 3.2 Learning Objectives
- 3.3 Slutsky's Theorem
 - 3.3.1 Slutsky's Substitution Effect for a fall in Price
 - 3.3.2 Slutsky's Substitution Effect for a rise in Price
 - 3.3.3 Price Effect Broken Up into Income and Substitution Effects
 - 3.3.4 Main Differences between Hicks and Slutsky

Self Check Exercise-1

- 3.4 Compensated Demand Curve
 - 3.4.1 The Marshallian Uncompensated Demand Curve
 - 3.4.2 The Hicksian Compensated Demand Curve
 - 3.4.3 The Slutsky Compensated Demand Curve

Self Check Exercise-2

- 3.5 Summary
- 3.6 Glossary
- 3.7 Answers to Self-Check Exercises
- 3.8 References/ Suggested Readings
- 3.9 Terminal Questions

3.1 Introduction

The concept of substitution effect put forward by J.R. Hicks. There is another important version of substitution effect put forward by E. Slutsky. The treatment of the substitution effect in these two versions has a significant difference. Since Slutsky substitution effect has an important empirical and practical use, we explain below Slutsky's version of substitution effect in some detail.

3.2 LEARNING OBJECTIVES

After studying this lesson, you will be able to:

- Know the Slutsky Theorem of Substitution Effect
- Understand the differences between Hicksian's and Slutsky's approach of substitution effect.
- Know the concept of Compensated Demand Curve

3.3 SLUTSKY'S THEOREM

In Slutsky's version of substitution effect when the price of good changes and consumer's real income or purchasing power increases, the income of the consumer is changed by the amount equal to the change in its purchasing power which occurs as a result of the price change. His purchasing power changes by the amount equal to the change in the price multiplied by the number of units of the good which the individual used to buy at the old price.

In other words, in Slutsky's approach, income is reduced or increased (as the case may be), by the amount which leaves the consumer to be just able to purchase the same combination of goods, if he so desires, which he was having at the old price. That is, the income is changed by the difference between the cost of the amount of good X purchased at the old price and the cost of purchasing the same quantity if X at the new price. Income is then said to be changed by the cost difference. Thus, in Slutsky substitution effect, income is reduced or increased not by compensating variation as in case of the Hicksian substitution effect but by the cost difference.

3.3.1 Slutsky's Substitution Effect for a fall in Price

Slutsky substitution effect is illustrated in Figure 3.1 With a given money income and the given prices of two goods as represented by the price line PL, the consumer is in equilibrium at Q on the indifference curve IC₁ buying OM of X and ON of Y. Now suppose that price of X falls, price of Y and money income of the consumer remaining unchanged. As a result of this fall in price of X, the price line will shift to PL' and the real income or the purchasing power of the consumer will increase. Now, in order to find out the Slutsky substitution effect, consumer's money income must be reduced by the costdifference or, in other words, by the amount which will leave him to be just able to purchase the old combination Q, if he so desires. For this, a price line GH parallel to PL' has been drawn which passes through the point Q. It means that income equal to PG in terms of Y or L'H in terms of X has been taken away from the consumer and as a result he can buy the combination Q, if he so desires, since Q also lies on the price line GH. Actually, he will not now buy the combination Q since X has now become relatively cheaper and Y has become relatively dearer than before. The change in relative prices will induce the consumer to rearrange his purchases of X and Y. He will substitute X for Y. But in this Slutsky substitution effect, he will not move along the same indifference curve IC_1 , since the price line GH, on which the consumer has to remain due to the new price-income circumstances is nowhere tangent to the indifference curve IC_1 .



Figure 3.1 Slutsky Substitution Effect (for a fall in price)

The price line GH is tangent to the indifference curve IC_2 at point S. Therefore, the consumer will now be in equilibrium at a point S on a higher indifference curve IC_2 . This movement from Q to S represents Slutsky substitution effect according to which the consumer moves not on the same indifference curve, but from one indifference curve to another. A noteworthy point is that movement from Q to S as a result of Slutsky substitution effect is due to the change in relative prices alone, since the effect due to the gain in the purchasing power has been eliminated by making a reduction in money income equal to the cost-difference. At S, the consumer is buying OK of X and O W of Y; MK of X has been substituted for AW of Y. Therefore, Slutsky substitution effect on X is the increase in its quantity purchased by MK and Slutsky substitution effect on Y is the decrease in its quantity purchased by NW.

3.3.2 Slutsky's Substitution Effect for a Rise in Price

We have graphically explained above Slutsky substitution effect for a fall in price of good X. It will be instructive to explain it also for a rise in price of X. This is demonstrated in Figure 3.2. Initially, the consumer is in equilibrium at point Q on the indifference curve IC_1 , prices of the two goods and his money income being given. Now suppose that price of good X rises, price of Y remaining unchanged. As a result of the
rise in price of X, budget line will shift downward to PL|| and consumer's real income or purchasing power of his given money income will fall. Further, with this price change, good X has become relatively dearer and good Y relatively cheaper than before. In order to find out Slutsky substitution effect in this present case, consumer's money income must be increased by the _cost-difference' created by the price change to compensate him for the rise in price of X. In other words, his money income must be increased to the extent which is just large enough to permit him to purchase the old combination Q, if he so desires, which he was buying before. For this, a budget line GH has been drawn which passes through point Q. It will be evident from the figure that, PG (in terms of Y) or L|| H (in terms of X) represents _cost difference' in this case. With budget line GH he can buy if he so desires the combination Q, which he was buying at the previous price of X.



Figure 3.2 Slutsky Substitution Effect (for a rise in price)

But actually he will not buy combination Q, since on budget line GH, X is relatively dearer than before, he will therefore replace some X by Y (i.e., he will substitute of Y for X). As is shown Figure3.2, with budget line GH he is in equilibrium position at S on a higher indifference curve of IC_2 and is buying OK of X and OW of Y.MK of X has been replaced by AW of Y. Movement from point Q to S is the result of Slutsky substitution effect; the effect due to the fall in purchasing power has been cancelled by giving him money equal to PG of Y or L|| H of X. In this present case of stipulated rise in price of X, Slutsky substitution effect on X is the fall in its quantity bi

ought by MK and Slutsky substitution effect an Y is the increase in its quantity brought by NW.

From the above analysis it is clear that whereas Hicks-Allen substitution effect takes place on the same indifference curve, Slutsky substitution effect involves the movement from one indifference curve to another curve, a higher one. The difference between the two versions of the substitution effect arises solely due to the magnitude of money income by which income is reduced or increased to compensate for the change in income. The Hicksian approach just restores to the consumer his initial level of satisfaction, whereas the Slutsky approach over-compensates the consumer by putting him on a higher indifference curve.

3.3.3 Price Effect Broken Up into Income and Substitution Effects

In our discussion of substitution effect we explained that Slutsky presented a slightly different version of the substitution and income effects of a price change from the Hicksian one. In fact it was Slutsky who first of all divided the price effect into income and substitution effects. His way of breaking up the price effect is shown in Figure 3.3. With a certain price- income situation, the consumer is in equilibrium at Q on indifference curve IC_1 .



Figure 3.3 Price Effect is decomposed into Substitution and Income Effects with Slutsky's Cost-Difference Method

With a fall in price of X, other things remaining the same, budget line shifts to PL₂. With budget line PL₂, the consumer would now be in equilibrium at R on the indifference curve IC₃. This movement from Q to R represents the price effect. As a result of this he buys MN quantity of good X more than before. Now, in order to find out the substitution effect his money income be reduced by such an amount that he can buy, if he so desires, the old combination Q. Thus, a line AB, which is parallel to PL₂, has been so drawn that it passes through point Q. Thus PA in terms of good Y represents the cost difference. With budget line AB, the consumer can have combination Q if he so desires, but actually he will not buy combination Q because X is now relatively cheaper than before. It will pay him to substitute X for Y.With budget line AB he is in equilibrium at S on indifference curve IC₂. The movement from Q to S represents Slutsky substitution effect which induces the consumer to buy MH quantity more of good X. If now the money taken away from him is restored to him, he will move from S on indifference curve IC₂ to R on indifference curve IC₃. This movement from S to R represents income effect. Thus, movement from Q to R as a result of price effect can be divided into two steps. First, movement from Q to S as a result of substitution effect and secondly, movement from S to R as a result of income effect. It may be pointed out here again that, unlike the Hicksian method, Slutsky substitution effect causes movement from a lower indifference curve to a higher one. While separately discussing substitution effect above, we pointed out the merits and demerits of the Hicksian and Slutskian methods of breaking up the price effect.

3.3.4 Main Differences between Hicks and Slutsky

- 1. Hicks proposes a demand curve that expresses the demand for consumption bundles whereas Slutsky proposes a demand curve for the change in demand for consumption bundles.
- 2. Hicks demand function was named after John Richard Hicks whereas Slutsky demand function was named after EugenSlutsky.
- 3. Hicks demand function is also called compensated demand function whereas the alternative name for Slutsky demand function is Slutsky Identity.
- 4. Hicks derives a solution to reduce expenditure on commodity bundles whereas Slutsky relates the changes from uncompensated to compensated demand.
- 5. Hicks gives rise to the income and substation effects whereas Slutsky is a result of both the effects.

Self Check Exercise-1

- Q.1 What do you know about Slutsky's theorem?
- Q.2 Discuss main differences between Hicks and Slutsky.

3.4 Compensated Demand Curve

Microeconomics is a vast field of study that includes several theories related to the wants and needs of people. An important aspect involves defining _compensated demand' which further isolates the substitution effect. The compensated demand curve shows the quantity of a good which a consumer would buy if he is incomecompensated for a change in the price of that good. In other words, the compensated demand curve for a good is a curve that shows how much quantity would be purchased at the changed price by the consumer if the income effect is eliminated.

The compensated demand curve can be explained in terms of both the Hicks and Slutsky approaches to the substitution effect. The two-storey Figure 3.4 illustrates the construction of the Hicks and Slutsky compensated demand curves and the uncompensated (or ordinary or Marshallian) demand curve. The upper portion of the figure shows the substitution effects of the Hicks and Slutsky analyses and the combined price effect.



Figure 3.4

The lower portion of the figure shows the derivation of the Hicks and Slutsky compensated demand curves and the ordinary demand curve. First consider the lower diagram (B) where the price of good X is taken on the vertical axis. Point P is an arbitrary point on this axis which shows the price of X when the budget line is PQ in the upper diagram. The fall in the price of X as shown by the budget line PQ_1 is reflected in point P₁ in the lower diagram.

3.4.1 The Marshallian Uncompensated Demand Curve

First we explain the derivation of the Marshallian uncompensated demand curve. Suppose the initial equilibrium of the consumer is at point R where the budget line PQ is tangent to the indifference curve I_1 , and OA of good X is bought by the consumer in the tipper diagram. Let the price of X fall. As a result, the budget line PQ extends to PQ₃ and the consumer is at a higher point of equilibrium T on the indifference curve I_3 . The movement from R to T is the price effect which includes both the substitution effect and the income effect. This is shown by the D₃ curve in the lower portion of the figure. This is the uncompensated (or ordinary or Marshallian) demand curve which shows that when the price of good X falls from P to P₁ its quantity demanded increases from OA to OD.

3.4.2 The Hicksian Compensated Demand Curve:

Since the compensated demand curve is based on the substitution effect of a change in the price of good X, we carry the above analysis further and derive the Hicks substitution effect. Let us take away the increase in the real income of the consumer due to the fall in the price of X equal to PM of good Y and Q₁ N of X good by drawing a compensated budget line MN parallel to the budget line PQ₁. This line MN is tangent to the original indifference curve I₁, at point H. The movement from point R to H on the I₁, curve is the substitution effect which traces out the demand curve D₁, in the lower portion of the figure when the demand for X increases from OA to OB with the fall in its price from P to P₁.

3.4.3 The Slutsky Compensated Demand Curve:

In order to derive the Slutsky substitution effect, let us take away the increase in the apparent real income of the consumer equal to PM_X of Y and Q_1N_1 of X by drawing the Slutsky compensated budget line M_1N_1 , parallel to PQ which passes through the original point R on the I₁, curve where he will buy the same quantity OA of X. But since the price of X has fallen, he will buy more of it so that he moves to point S on the higher indifference curve I₂, which is tangent to the budget line M_1N_1 Thus the movement from R to S traces out the Slutsky compensated demand curve D₂ in the lower part of the figure. This curve shows that with the fall in the price of good X from P to P₁ its demand increases from OA to OC.

In brief, A perusal of the compensated demand curve D₁ of Hicks and D₂ of Slutsky shows that the curve D_2 is more elastic than D_1 . This is because the total expenditure on the purchase of good X is greater in the Slutsky approach than in the Hicks approach. While the conventional demand curves D₃ is more elastic than even the Slutsky demand curve D₂. Another important point to be noted is that the compensated demand curve, whether of Hicks or Slutsky, always slopes downward because it is so drawn that the substitution effect only is in operation and the income effect is altogether eliminated through compensating variation in income. But the ordinary demand curve may or may not slope downward. In the case of the ordinary demand curve like D, both the substitution and income effects are in operation and they explain the downward slope of the curve. In case X is an inferior good, the ordinary demand curve will slope downward but will be elastic than the compensated demand curves D₁ and D₂ because the substitution effect is stronger than the income effect in the case of the ordinary demand curve. But if X happens to be a Giffen good, the ordinary demand curve will slope from left to right upward i.e. it will have a positive slope because the income effect is stronger than the substitution effect. On the other hand, the compensated demand curves will have a negative slope because they are not affected by the income effect.

Self Check Exercise-2

- Q.1 What is Compensated demand curve?
- Q.2 Discuss Hicksian compensated demand curve.
- Q.3 What do you know about Slutsky's compensated demand curve?

3.5 SUMMARY

Hicks and Slutsky are two demand functions that are very commonly used by economists and mathematicians across the globe. Interestingly, both have a subtle relationship. While hicks finds out the compensated demand, Slutsky finds out the change when uncompensated demand is converted to compensated demand. Understanding the Hicks demand function and Slutsky demand function is very important while studying economics. Both the theories are related to income and substitution effects. However, while Hicks gives rise to both the effect, Slutsky is formed because of their separation. Another important difference between Hicks and Slutsky is simply the fact that they were founded by two different but very popular economists who managed to change the course of history in microeconomics.

3.6 GLOSSARY

- **Compensated Demand Curve**: shows the quantity of a good which a consumer would buy if he is income-compensated for a change in the price of that good.
- Indifference Curve: is a graphical representation of all combinations of

two products that gives similar kind of satisfaction to a consumer thereby making them indifferent.

- **Budget Line:** is a graphical representation of all possible combinations of the two commodities that can be bought with provided income.
- **Price Effect**: represents change in consumer's equilibrium on account of change in the price of a good and thereby changes in its quantity purchased.
- **Income Effect**: represents change in consumer's equilibrium on account of change in income of consumer and thereby changes in its quantity purchased.
- **Substitution Effect**: represents change in consumer's equilibrium on account of change in the price of one commodity and thereby changes in quantity purchased of another commodity.

3.7 ANSWERS TO SELF-CHECK EXERCISES

Self Check exercise -1

Ans.1. Refer to Section 3.3

Ans.2. Refer to Section 3.3.4

Self Check exercise -2

Ans.1. Refer to Section 3.4

Ans. 2. Refer to Section 3.4.2

Ans.3. Refer to Section 3.4.3

3.8 References/ SUGGESTED READINGS

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- Koutsoyiannis, A. (1979), Modern Microeconomics, Second edition, London: Macmillian.
- G.S. Maddala and E. Miller (1989), Microeconomics: Theory and Applications, McGrow-Hill, New Delhi.
- Basotiya, S. (2010). Microeconomics: Principles, Applications and Tools, DND Publications.

3.9 TERMINAL QUESTIONS

1. What is Slutsky Theorem of Substitution Effect? What are main differences between Hicksian's and Slutsky's approach of Substitution Effect.

- 2. Explain the Price Effect is a combination of Income Effect and Substitution Effects by Slutsky's methods.
- 3. Explain the Hicksian and Slutsky's Compensated Demand Curve with the help of suitable diagram.

REVEALED PREFERENCE THEORY OF DEMAND

STRUCTURE

- 4.1 Introduction
- 4.2 Learning Objectives
- 4.3 Choice Reveals Preference Self Check Exercise-1
- 4.4 The Law of Demand
 - 4.4.1 Assumptions4.4.2 Fundamental Theorem or Demand TheoremSelf Check exercise-2
- 4.5 Derivation of the Demand Curve from Revealed Preference Self Check Exercise-3
- 4.6 Derivation of Indifference Curve from Revealed Preference Self Check Exercise-4
- 4.7 Superiority of Revealed Preference Theory Self Check Exercise-5
- 4.8 Defects of the Revealed Preference Theory Self Check exercise-6
- 4.9 Summary
- 4.10 Glossary
- 4.11 Answers to Self-Check Exercises
- 4.12 References/Suggested Readings
- 4.13 Terminal Questions

4.1 INTRODUCTION

The Revealed Preference Theory which has been put forward by Prof. Paul A. Samuelson seeks to explain consumer's demand from his actual behaviour in the market in various price-income situations. Thus, in sharp contrast to psychological or introspective explanation Prof. Samuelson's revealed preference theory is behaviouristic explanation of consumer's demand. Besides, revealed preference theory is based upon the concept of ordinal utility. In other words, revealed preference theory regards utilities to be merely comparable and not quantifiable. In short, the theory of

revealed preference states that the consumer reveals his preference for particular combination of goods out of the alternative combinations available to him under a particular budget constraint. The preference of a particular combination is revealed by his actual behaviour.

4.2 LEARNING OBJECTIVES

After studying this Lesson, you will be able to:

- Know the Law of Demand
- Understand the Derivation of the Demand Curve from Revealed Preference
- Know the Superiority of Revealed Preference Theory
- Know the Defects of the Revealed Preference Theory

4.3 CHOICE REVEALS PREFERENCE

The derivation of demand theory of Prof. Samuelson is based on imagination which tells that choice reveals preference. Under this theory, a consumer will buy a combination of two products because either he likes this rather than other combinations or it is cheaper than others. Suppose that a consumer buys combination A rather than B, C or D combination. This is because he reveals preferences towards A. This can be done due to two reasons. First that the combination of A is cheaper than combinations of B, C or D; or the consumer really likes combination A from other combinations even it is costlier than others. In this situation, it can be said that A has revealed preferences than B, C and D or B, C and D are revealed inferior than A.

Figure 4.1 indicates that X and Y both are the price of products and on given income of consumer, LM is the price line of consumer. Triangle OLM is the choice region of consumer which gives the various combinations of X and Y on his given income LM. It means consumer can choose the combinations of A and B or below this line, the combination of C and D on the line LM of triangle OLM. Suppose he chooses combination A than combination B. The combination of C and D is inferior than A because it is below in his price income line but the combination E is more costly for consumer because it is above his price income line LM. So the combination A is revealed preferred.



Figure 4.1

According to Hicks, when a consumer reveals his preference for a valid combination as per market behaviour, then he do this as a strong ordering when this situation is shown on OLM triangle in all preference situations. So when consumer represents his valid preference for combination A on triangle OLM then he refuses all the combinations like B, C and D. So the selection of A is strong ordered.

Self Check Exercise-1

Q.1 What is Choice Reversal Preference?

4.4 THE LAW OF DEMAND

Prof. Samuelson established his law of demand directly from his imagination theory without the use of any curves or barrier of recognition.

4.4.1 Assumptions

The law of demand of Samuelson is based on these assumptions:

- 1. The taste of consumer does not change.
- 2. The selection of a combination reveals the preference of that combination for the consumer.
- 3. The consumer selects a combination on a given price income line means there must be change in price whatever he buys.
- 4. He always gives preference for the combination of more items rather than the combination of fewer items.
- 5. The selection of consumer is based on strong ordering.

- 6. This works on consistency behaviour of consumer. If in a situation he gives preference to A rather than B, then he cannot give preference to A on B in another situation. According to Hicks, this is two-term consistency for which a rule must be followed on a simple line curve- (a) If A is situated on the left side of B then B must be on the right side of A, (b) If A is situated on the right side of B then B must be on the left side of B.
- 7. This law is based on transitivity. The transitivity directs three terms consistency. If he reveals preference for A rather than B and B over C, then consumer must reveal preference for A rather than C. If consumer wants to select on the given possible combinations then it must be workable for the theory of choice of preference.
- 8. The demand of income elasticity is positive means if the income increases then the demand of produce increases and vice versa.

4.4.2 Fundamental Theorem or Demand Theorem

With these assumptions, Samuelson has given the Fundamental Theorem which is also called demand theorem and as per his words, The demand of product (general or combined) is increased when price income increases, the demand will sure low when the price ups for this product. It means that when the demand of income elasticity is positive then the demand of price elasticity would be negative. This can be shown by ups and downs in price of a product.

(a) Rise in Price

First, we would analyze the rise in price of a product X. To prove this theorem we separate this into two stages. In the first stage, we would take a consumer who spends his all income in two products X and Y. In Figure 4.2, LM is his original price income line where he selects the combination of R. Triangle OLM is the region of selection for consumer where he gets various combinations of X and Y on price income line LM. Consumer gives preference by selecting R on or in triangle OLM.



Figure 4.2

Suppose that the price of X increases by keeping the price of Y, constant and then LS would be his new price income line. Now suppose that he selects a new combination A which indicates that due to the price rise of X, the consumer will buy less of product X. The real income of consumer is down by increasing the price of product X, so LP is given to him in the form of product Y. Thus PQ is now his new price income line which is parallel to LS and crosses from point R. Samuelson tells this Overcompensation Effect. Now the selection region for consumer is triangle OPQ. Because R was preferable choice from all the points on original price income line LM, so none of the points will match with the behaviour of consumer on RQ of PQ line below to point R. So he cannot take more quantity of X if the price of X ups. So the consumer will choose R or B on the shaded region LRP on price income line PQ of PR. If he selects the combination R then he would buy the quantity of X and Y before the price hike of X. On other hand, if he selects the combination B then he would buy more quantity of Y than X.

In second stage, if the LP packet is taken away from the consumer then he would be in the left side of R on point A on LS line where he would buy lesser quantity of X, if the income elasticity of demand is positive because the demand is less for X due to price rise (when consumer is on point A) and hence it proves that when income elasticity is positive then price elasticity is negative.

(b) Fall in Price

The theory of demand can be proved when the fall of price happens with product X. This can be described in these words as, Any product (general or combined) whose demand decreases only when income is low, must be high on demand when only its price gets low. This is described in Figure 4.3. LM is the original price income line where consumer gives preferences on point R. His price line goes to LS if the price of product X gets low but price of product Y is stable. Suppose that in this point, consumer

reveals preference for combination A, which indicates that he buys more quantity of product X. The movement from point R to A has price effect due to price fall of product X and X demands high now.



Figure 4.3

Suppose that the quantity LP of Y has been taken off from consumer which is due to increment in his real income and price of X has fallen. Now PQ is his new price line which is parallel to LS and crosses to point R. New triangle OPQ is his selection region. Since consumer was showing his desire on point R of line LM, so all the points on line RP of PQ will not match with his selection. This is because he will get the less quantity of product X on line RP, but it is not possible if price of X declines. So the consumer will reject all the combinations of above R. He would select B or R on line RQ on PQ of shaded region MRP. If he selects the combination R then he would buy the same quantity of X and Y which he was about to buy before price hike of X. And if he selects the combination B then he would buy more quantity of X than Y. There is the movement effect in pricing of X from point R to B. If the LP has return to the consumer then he would be in A on line LS after price fall, where he would buy less quantity of X because of price fall. The movement of consumer to point B to A is income effect. Thus the theory of demand again proved that positive income elasticity means negative price elasticity of demand. This must be underlined that the movement effect of Samuelson is different from indifference curve analysis. In indifference curve analysis, the consumer moves from a point to another on the same curve and his real income is stable. But in reveal preference theory this indifference curve does not happen and the movement effect is the movement of price income line by changing of real price.

Self Check Exercise-2

- Q.1 What is Law of demand?
- Q.2 Discuss Demand Theorem.

4.5 DERIVATION OF THE DEMAND CURVE FROM REVEALED PREFERENCE

The demand curve can be derived by the imagination of revealed preference. It is shown in Figure 4.4. In panel (A), price is in vertical axis while product X is in parallel axis. LM is the original price income line where consumer reveals his preference on point R and buys the quantity OA of product X. Suppose that the price of X falls. As a result, his new price income line is LS. On this line the consumer reveals his preference on point T and buys more OB quantity of product X. The movement from point R to T is Price Effect for price falls of X and so its demand increased from OA to OB.



Figure 4.4

Now that amount has been taken back from consumer which is equal to LP and because of the price fall of X. Thus, PQ is his new price income line which is parallel to line LS and crosses from point R. The new triangle OPQ is his selection region. Since consumer was revealing his preference on point R of original price income line LM, so none of the points are matched with his selection from above the point R on RP of PQ line. Because of this he cannot buy more quantity of X due to price fall. So he will reject all the combinations above R or he will select R or any similar combination from shaded triangle MRQ. If we return the money PL to him, he will again on point T of price line LS where he buys more quantity of X i.e. OB. In panel (B), the movement from point R to T has shown by drawing demand curve. Since we have taken price on vertical axis on panel (A), so to calculate the price of product X, we divide the total price income of

consumer with the brought quantity of X. When the price of X is OL/OM (= OP), then demanded quantity is OA. When the price of X gets low OL/OS (= OP1) then demanded quantity is OB. In Figure 4.4 panel (B), we take price on vertical axis and the units of product X in parallel axis and draw a line of this price quantity combination on E and E1, and by adding this with a simple line, we get DD1 demand curve. This curve indicates that when price falls from OP to OP1, then consumer buys more quantity of X i.e., AB.

Self Check Exercise-3

Q.1 How demand curve is derived from revealed preference theory?

4.6 DERIVATION OF INDIFFERENCE CURVE FROM REVEALED PREFERENCE

The theory of derivation of revealed preference of Prof. Samuelson is used to draw an indifference curve rather than to draw a technical indifference curve. In indifference curve technique we can assume that a indifference curve is drawn by asking consumer to select from all the combinations of product. However, the consumer will not or will not be able to give answer to all his preferences. According to revealed preference theory, we can assume a consumer's preferences and can create the indifference curve for market without directly checking the preferences of consumer. Now indifference curve technique believes that consumer do take the combinations as per his heart and matching. But in revealed preference theory a consumer does not need to give information regarding his tastes or lines to his preferences. But to use the Notes consumer market behaviour and applying revealed preference, an upward indifference curve is drawn.

Its Assumptions

This analysis is based upon following assumptions:

- 1. The taste of consumer does not change.
- 2. He always gives preference to the combination of more products rather than the combinations of fewer products.
- 3. The behaviour of consumer is identical means if preference is given to A than B in a condition then in the other condition; B is not getting more preference than A.
- 4. There is motion in consumer's preferences. It means if A is getting more preferences than B and B is more than C, then consumer will prefer A rather than C.
- 5. X and Y are two products.

If this assumption is given consumer would give preference to the combination of two products rather than other combinations, either the selected combination is more preferable to him or the combination which is not selected is out of his pocket range. Suppose that in Figure 4.5, consumer represents his preference to combination R on original budget line LM. On line LM and all points below point R show the inferior combinations. This is shown by shaded region which is called inferior zone. On the other hand, above R and/or in TRS region, all points are preferred by R, because the quantity of X and/or Y is available more on it. So the shaded region TRS above R is called Preferred Zone. However, in the left and right side of R above the TRS region and above LM line, two combinations are found which are not directed by the consumer. They are called TRL and SRM which are called Ignorance Zone, because there is no idea about consumer preferences on it. This result to cross R is must for below TRS region and above the budget line LM. The slope should must be positive in point R and should upwards to original point, because this ignorance would locate in above and ground region.





Thus the new budget line for consumer is KN. In Figure 4.5 which crosses point B on point R in original line LM. Now consumer will choose the combination B or the other combinations of BN of line KN. All the points would not match with him on the left side of B on this line KB. Since consumer selects combination B, it looks like more inferior to R and all the points above and below of BN look inferior. Thus, triangle BNM has been cut by below ignorance region. To draw these types of budget line in point R and by giving this type of fact, all the portions can be removed from the below ignorance region R. Thus, we can cut the left side of R on above ignorance region in Figure 4.5. Suppose that the price of X increases and the new budget line PQ crosses the original point R, which indicates that real income is on point R. Now consumer selects a new point A on budget line PQ. Thus he reveals preference for A rather than R, because

both the points are on a single budget line. But A gets preference on the right side of A and the above GAH region. Because this region represents those combinations on which a product's quantity is greater than the product combinations of A. This can be understand as because A is preferable to R and GAH region is preferable to A, so GAH is preferable to R. Thus in GAHT region by ranking the combinations and giving preference to R, we remove some of the upper parts or ignorance region. To duplicate this process, we do lessen the ignorance region and established the indifference region, which is shown by I curve in Figure 4.6.



Figure 4.6

Figure 4.6 shows the shape of indifference curve as I curve is convex to its original in point R because it crosses the below and above ignorance region. To give more proof, first we assume LM as simple line indifference curve. Line LM cannot be indifference curve, because the selection of R on all the points indicates all points are inferior than R and consumer cannot indifferent in the same time in between all points of point R and LM. Second, it cannot like I2 curve which cuts LM line on point R because all the points below this level are inferior than R and consumer is indifferent towards it. Third, it cannot concave as indifference curve I1 which crosses R because the above and below regions are inferior region and all points are revealed inferior than R. So the indifference curve can only convex to its original as shown IC curve in Figure 4.6.

Self Check Exercise-4

Q.1 How Indifference curve is derived from revealed preference theory?

4.7 SUPERIORITY OF REVEALED PREFERENCE THEORY

The revealed preference theory is more superior than the analytical numerological theory of Hicks which is more related to the theory of consumer

- 1. This does not study any psychological internal information of consumer behaviour. But it gives the Notes analysis by analyzing the consumer behavior in market. According to Samuelson, this theory has removed the demand theory from the last leftovers of psychological analysis. So the revealed preference theory is more scientific and real than earlier demand theorems.
- 2. This theory is left to get in touch from the continuity of both used and indifference curve. An indifference curve is a curve, on which consumer can select any combinations of the products. But Samuelson believes that this is a discontinuity because consumer can only get single combination. By applying Samuelson's theory, Hicks has applied strong and weak ordering in spite of continuity and assumption in his Revision of Demand Theory.
- 3. The Revision of Demand Theory of Hicks is based on this theory that the consumer is prudent to fulfill his satisfaction by his given income. The Demand Theorem of Samuelson is good because it does not assume that the consumer always wants to get maximum satisfaction and does not apply the bogus theory like decreased marginal theory of Marshall and decreased marginal relocation theory of Hicks.
- 4. In the first stage of Samuelson's Demand Theorem, as the subbing effect of Slutsky and the over compensation effects of Hicks, it gives more real analysis and data. When the price of product X decreases this theorem relocates the consumer to his up price income status and vice versa. This is revolution of Hicks income compensation change. Then, Hicks has left the income compensation theory and took Samuelson's thought as over compensation effect as _Cost Difference' in his book Revision of Demand Theory. Thus, in the second stage Samuelson's theorem describes the income effect of Hicks in very simple manner. Hicks agrees with this theorem by himself when he said, To present an open option to indifferent method, this theory is a new and very important theorem by Samuelson.
- 5. This theorem gives a base to welfare economics by consistent election of analysis behaviour.

Self Check Exercise-5

Q.1 Discuss the superiority of revealed preference theory?

4.8 DEFECTS OF THE REVEALED PREFERENCE THEORY

There are lots of defects in Samuelson's revealed preference theory:

First, it clearly ignores the indifferent behaviour of consumer. It is quite correct that if a consumer selects a combination of product on point R then he does not represent his indifferent behaviour on price income line or in any single price product. But it is possible there may be some more points on R as Figure 4.7 like A and B which is shown in circle and consumer is always unconcerned about it. If we accept the criticisms of Armstrong then the base theorem of Samuelson can end. Suppose that the price of X increases and the new budget line of consumer is now LS. Now give him some amount that he can buy original combination point R on line PQ. Let's assume in this new price income condition, he selects point B below R. This is because Armstrong thinks that the consumer is unconcerned towards the nearer already selected points. But to select B in PQ price income condition means consumer buys more quantity of X when its price increases. Thus the base theorem of Samuelson ends because if price of X increases, the demand is more rather than short.

Second, according to Hicks since revealed preference theory is based on strong ordering, so it cannot be assumed that all the points present in or out of triangle (OLM in our Figure 4.7) describe the good solutions. The strong ordering of a two dimensional continuum is not possible. So there is no option to assume that the product comes in various units, so Figure 4.7 can only be drawn in squared paper and powerful options can only stable in the corner angles. Point R would also present in square angle.



Figure 4.7

Third, the base theorem of Samuelson is conditional and not simple. This is based on the condition that negative income elasticity is present within positive income elasticity. Since the income effect is created by income and substitution effect, so in analysis point of view, the income effect cannot be separated from substitution effect. If income effect is not positive then demand of price elasticity would be indefinite. On the other hand, if income elasticity of demand is positive, then we cannot establish the substitution effect due to changes in price. So the income effect and substitution effect cannot differentiate in Samuelson's theorem.

Fourth, the reveled preference theory of Samuelson has not given the solution of Giffen's paradox because it only studies on positive income elasticity of demand while Giffen's paradox is related to negative income elasticity. As per the demand theory of Marshall, the theorem of Samuelson is also not differentiating between these two. The positive income effect of substitution effected Giffen's product while on the other hand, powerful substitution effected positive effect. Thus the theorem of Samuelson is inferior and less working than the price effect of Hicks and Allen.

Fifth, the assumption that consumer selects only one combination on given price income condition is wrong. It means consumer selects little from both the products. But it is almost impossible that a person buys some parts of products.

Sixth, this assumption is also criticized that selection reveals preference. The consumer always thinks before buying. But since a consumer not always thinks and buys the product, so buying of product cannot indicate that the consumer reveals preference. So this theorem is not based on the market behaviour of consumer but this is an unreal practice like all other economical theorems.

Seventh, the reveals preference theorem applies only in particular consumer. By this theorem, all other things are constant; the negative sloped demand curve can be drawn for all the consumers. But this technique does not help to draw the market demand schedule. Because if the price of X falls in market, it can affect all other products and which can change the real income factor. However, for this product X, the demand curve is sloped downward for the entire consumer, but in a specific region of price, to redistribute the real income, the demand curve sloped upwards too. The theory of Hicks and Allen is better than reveled preference theory because it can draw both demand curves of consumer and market from price consumption curve.

Eight, according to T. Mazumdaar, the revealed preference theory is impossible for those conditions where individual selector is unable to use diplomacy.

Lastly, the revealed preference theory is unable to analyze the behaviour of consumer in selecting dangerous or indefinite selections. If there are three conditions A, B and C then consumer gives preferences to A rather than B and C rather than A. A is definite from it but possibility of B or C is 50-50. In this situation, to give more preference to C than A is not based on an observed behaviour.

Self Check Exercise-6

Q.1 Discuss the defects of revealed preference theory?

4.9 SUMMARY

In this analysis, it can be concluded that though Samuelson makes improvement over the Hicks-Allen indifference curves theory of demand in respect of methodology adopted (that is, its behaviouristic method is superior to Hicks-Allen introspective method) but in respect of the content of the demand theorem enunciated by it, it is a few steps backward than the Hicks-Allen demand theorem. In the end, we may emphasize the point that superiority of Samuelson's theory lies in his applying scientific or behaviouristic method to the consumer's demand and his enunciation of preference hypothesis.

4.10 GLOSSARY

- **Revealed Preference**: is a way to infer the preferences of individuals given the observed choices.
- **Law of Demand**: states that at a higher price of a good, consumer will demand a lower quantity of that good.
- **The budget line:** is a graphical representation of all possible combinations of the two commodities that can be bought with provided income.
- **Demand Curve**: is a graphical representation of the relationship between the price of a good or service and the quantity demanded for a given period of time.
- Indifference Curve: is a graphical representation of all combinations of two products that gives similar kind of satisfaction to a consumer thereby making them indifferent.

4.11 ANSWERS TO SELF-CHECK EXERCISES

Self Check exercise -1 Ans.1. Refer to Section 4.3 Self Check exercise -2 Ans.1. Refer to Section 4.4 Ans.2. Refer to Section 4.4.2 Self Check exercise -3 Ans.1. Refer to Section 4.5 Self Check exercise -4 Ans.1. Refer to Section 4.6 Self Check exercise -5 Ans.1. Refer to Section 4.7 Self Check exercise -6 Ans.1. Refer to Section 4.8

4.12 REFERENCES/ SUGGESTED READINGS

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4.13 TERMINAL QUESTIONS

- 1. Critically explain the Revealed Preference Theory of Demand. Also explain its superiority.
- 2. Explain the derivation of Demand Curve with the help of Revealed Preference Theory.
- 3. How does Revealed Preference Theory superior than indifference curve analysis.

RECENT DEVELOPMENT IN THE THEORY OF LIMIT PRICING-I

STRUCTURE

- 5.1 Introduction
- 5.2 Learning Objectives
- 5.3 Sylos-Labini's Theory of Limit Pricing
 - 5.3.1 Assumptions

Self Check Exercise-1

5.3.2 Price Determination

Self Check Exercise-2

- 5.3.3 The determinants of the entry-preventing price
- 5.3.4 Criticisms of Sylos-Labini Model

Self Check exercise-3

- 5.4 Summary
- 5.5 Glossary
- 5.6 Answers to Self-Check Exercises
- 5.7 References/ Suggested Readings
- 5.8 Terminal Questions

5.1 INTRODUCTION

Dear students, in graduate level, you have studied the price determination under different market structures i.e. perfect competition, monopoly, monopolistic competition and oligopoly. In the perfect competition and the monopolistically competitive market structure, you have studied the effects of actual entry of new firms on the price and output decisions of the existing firms. But in monopoly and oligopoly market structures, the existing firms do not worry about the potential entry of new firms. The traditional closed oligopoly models, viz. Cournot, Bertrand, Edgeworth and Chamberlin do not provide for entry of new firms. Under oligopoly, the number of firms assumed to be constant. It is only the reaction behavior of the existing firms to the moves of the rival is explained.

But recently it has been argued by several economists that the price and output decisions of the existing firms in oligopolistic markets are affected not only by the potential entry of the firms but by the actual entry as well. The prominent economists of these findings are Bain, Sylos-Labini, Franco Modigliani, and Jagdish Bhagwati. Another issue that has been raised by these economists is that the objective of the firm under oligopoly is not to maximize the short run profits but to maximize the profits over the long run. The oligopolist firm seeks to maximize the profits over the long run after allowing the entry of potential firms that affect the possibilities of profit.

J.S. Bain in his pioneering work _A Note on Pricing in Monopoly and Oligopoly (1949)' followed by his book _Barriers to New Competition (1956)' developed the theory of limit pricing. The theory of limit pricing is also known as entry preventing pricing. The theory of Bain's limit pricing has been further developed by Sylos-Labini, Modigliani and Jagdish Bhagwati. Sylos-Labini further modified the limit pricing theory whose basis was laid by J.S. Bain. According to him, limit pricing laid special emphasis on the economies of scale barriers to entry of potential firms. His analysis of the economies of scale barriers to entry is more thorough than that of Bain. He also propounded a postulate about the behavior pattern of established firms as well as the potential firms and it is known as Sylos-Labini postulate. Let us study the Sylos-Labini theory of limit pricing in detail.

5.2 LEARNING OUTCOMES

After studying this lesson, you shall be able to

- Know the concept of Limit Pricing
- Know the concept of Sylos-Labini Model
- How Sylos-Labini model is different from Bain's model of limit pricing

5.3 SYLOS-LABINI'S THEORY OF LIMIT PRICING

Sylos-Labini developed a model of limit-pricing based on economies-ofscalebarriers to entry of potential firms in his book _oligopoly and Technical Progress (1957). His analysis of the economies-of-scale barrier is more thorough than that of Bain. He highlighted the determinants of the limit price and discussed their implications, thus providing the basis for Modigliani's more general model of entry-preventing pricing. Sylos-Labini concentrated his analysis on the case of a homogeneous oligopoly whose technology is characterised by technical discontinuities and economies of scale.

5.3.1 Assumptions

- 1. The market demand is given and has unitary elasticity.
- 2. The product is homogeneous and will be sold at a unique equilibrium price.
- 3. Firms of different sizes have different types of technology. Sylos assumes thre types of plants with different types of technologies: small, medium and large size plants with scale economies so that the smaller the plant, the higher the LAC, and larger the plant, lower the LAC.
- 4. All firms of a given size have similar costs.
- 5. The limit price is set by the price leader who is the largest firm, with the lowest cost at a level low enough to prevent entry. The smaller firms are price-takers.
- 6. The leader is assumed to know the cost structure of all plant sizes, and the market demand.
- 7. The actual level of output is determined by a minimum rate of normal profit set for the industry.
- 8. The entrant is assumed to come into the industry with the smallest plant size.
- 9. Modigliani refers to the _Sylos's Postulate' which is based on two basic rules. First, the potential entrance firm will not enter the industry if it expects that after its entry the price will fall below its LAC. Second, the potential entrance assumes that the established firms will produce the same output level after its entry and the established firms are aware of it.

Self Check Exercise-1

Q.1 Discuss Sylos-Labini's Theory of Limit Pricing.

5.3.2 Price Determination

In this section we will see how limit price is determined under Sylos model. Sylos assumed that there is a normal rate of profit which must be earned by the firms in order to remain in business in the industry. The minimum acceptable price must be enough to cover average total cost and the normal rate of profits. The minimum acceptable price is set according to full cost pricing rule. Thus, the minimum acceptable price can be written as:

$$Pi=L\Box C(1+r)$$

Where *Pi* is the minimum acceptable price to the firm with ith plant size

LAC is the long-run average cost of ith plant size

ris the normal rate of profits of firm.

Let us explain it with the help of a diagram. In the figure, quantity is measured on X-axis and price on y-axis. DD is the market demand curve. AC1 is the average cost curve of the large size plant, AC₂ is the average cost curve of the medium size plant and AC₃ is the average cost curve of the small size plant. The output OQ₅ is the level of output with the minimum average cost of the small size plant. We have seen above that if a new firm has to enter the industry then it should set up the smallest size plant. So, a new firm enters in the industry with this small size plant with average cost equal to AC₃. The price leader firm is the most efficient firm with lowest average cost of production. The price leader firm sets a price that is acceptable to all the small firms in the industry but the price that is set by the leader firm must be low enough to prevent entry of new firms. Here the most efficient firm has the lowest average cost AC₁. Sylos assumed that the price leader firm does not think it profitable to compete with the smaller firms and when setting price he ensures that the least efficient firm with the smaller plant size continues to make normal profits. So, accordingly the price leader firm will set price above average cost AC₃ which is the average cost of the least efficient firm. The price that is set by the price leader firm must be such that it prevents the entry of new firm in the industry.



The quantity demanded at price OP_3 (which is the average cost of the least efficient firm) is OQ_2 . Given that the new firm can enter the industry with a plant size with productive capacity equal to OQs, then QL=OQ2-OQs provides us the quantity of

output corresponding to which price will be set. The quantity of output OQ_L can be sold at price OP_L . According to Sylos, This OP_L price is the limit price that prevents the entry of new firm in the industry. This is so because at the price P_L a new firm with an economically viable output OQs enters the industry, the total supply of output Q_L+Q_S will just exceed OQ_2 . This excess supply of output will cause the price to fall below the average cost AC_3 of the least efficient firm which is also the average cost of the new potential entrant firm. This requirement of average cost of least efficient firm acts as a scale barrier. At limit price P_L , all firms are making supernormal profits irrespective of plant sizes. The limit price P_L corresponding to output OQ_L is the equilibrium price because this price is acceptable to all firms and it also prevents the entry of new firms in the industry. Thus, P_L acts as an upper limit of the limit price and OP_3 acts as the lower limit. The equilibrium price cannot be higher than OP_L nor lower than OP_3 . In other words, any output smaller than OQ_L will not prevent the entry of new firms whereas output larger than OQ_L will deter entry into the industry.

According to Sylos, the new potential entrant knows that if it enters the market then the resultant increase in supply of output would drive the post entry price to fall below its own average cost of production. As price is less than average cost, the firm would incur losses. Thus, PL is the limit price that is fixed so as to restrict the entry of new firms. To quote Sylos, The price tends to settle at a level immediately above the entry preventing price of the least efficient firms, which it is to the advantage of the largest and most efficient firms to let live.

Self Check Exercise-2

Q.1 Discuss Price determining Process of Sylos-Labini's Theory of Limit Pricing.

5.3.3 The determinants of the entry-preventing price

The major determinants of the entry preventing price under Sylos's model are:

- (i) **The absolute size of the market-**The larger the market size the lower would be the entry-preventing price.
- (ii) The elasticity of market demand The more elastic the demand the lower is the price that the established firms can charge without attracting entry.
- (iii) The technology and technological change- The larger the minimum viable plant size, the higher will be the limit price.
- (iv) The prices of the factors of production- An increase in the factor prices will lead to an increase in the costs and the limit price in the industry.

Let us study them in detail.

(i) The Absolute Size of the Market

The relationship between limit price and the absolute size of the market is negative. The greater the market size, the lower the entry prevention price or lesser the market size, higher is the entry preventing price. If there is an increase in demand then the demand curve would shift to the right, the effect of this increased demand on the price and the structure of the industry depends on the size and the rate of increase. If the increase in demand occurs rapidly and considerable and if at this stage firms wish to prevent the entry of potential entrant then they must lower the price (or set a lower price initially, in anticipation of the developments on the demand side) and build up additional capacity to meet the demand (or have adequate foresight so as to keep a continuous reserve capacity). Suppose if the already established firms cannot build up the required capacity which is fast enough to keep up with the rate of increase in demand, then entry from new firms as well as from already established firms in other industries would take place. This occurs because of abnormal profits earned by existing firms as price is more than average cost. If we suppose relax the restrictive assumption that the potential entrant will enter with the smallest optimal plant size and accept that large firms from other industries somehow manage to enter at a lower average cost then some or all of the small firms will be eliminated, and price would fall down. As a result the entire profit drives down to zero because now price is no longer more than average cost of production.

Thus, increase in the absolute market size will tend to reduce the price and increase the average plant size in the industry, unless the existing firms can keep their shares constant by keeping continuously adequate reserve capacity. This policy may be very costly. Thus in fast-expanding industries entry is almost certain to occur and price will be reduced. On the other hand, if the growth of increase in demand is slow then the established firms would be able to meet the increased demand by appropriate reserve capacity and gradual new investment, and the price will not be reduced unless new techniques with lower costs can be adopted for the larger scales of output to which the established firms are gradually led.

(ii) The Elasticity of Market Demand

The relationship between elasticity of market demand and the limit price is negative. The more elastic the demand is, lower the price that established firms can charge without attracting entry and *vice versa*.

Suppose there is a considerable increase in the elasticity of demand due to any price reductions and if the firms are able to identify this change in the elasticity of demand then the effects of this change in elasticity on price and on market structure are the same as in the case of a shift in the market demand curve.

Practically it is very difficult to detect the changes in the elasticity of market demand and established firms would not plan ahead on such uncertain changes in elasticity of market demand. Thus, if elasticity of market demand change substantially then established firms in other industries would enter into the market, since the existing firms will not be able to cope with such change, and the price would ultimately fall.

(iii) Technology and Technical Change:

The technology determines the minimum viable plant size. The larger the minimum viable plant size, the higher will be the limit price. Thus there is a positive relation between the minimum viable plant and the premium included in the limit price. Technical progress is defined as improvement in technology. Technical progress benefits all plant sizes -small, medium or large. It results in fall in average cost and price would decrease. If technical progress is such that only large firms have access to it then the limit price would not change. The large firms would have larger profits, but under the assumptions of Sylos's model the price need not change. If technical progress is associated with product innovation rather than process innovation then the price in the market would not be affected. One should expect an intensification of non-price competition as all firms in the industry will attempt to imitate the innovation.

(iv) The Prices of Factors of Production:

The prices of factor of production play an important role in determining the limit price. Any change in the factor prices affects all the firms in the industry in the same way. Thus, an increase in factor prices will lead to an increase in the costs and the limit price in the industry. Similarly a reduction in factor prices will lead to a decrease in the limit price. Thus, there exist a positive relationship between price of factors of production and limit price.

5.3.4 Criticisms of Sylos-Labini Model

The Sylos-Labini model has been severely criticized on the account of its unrealistic assumptions:

- 1. Sylos has adopted a methodologically naive approach, based on numerical examples.
- 2. The model assumed a very rigid technology, with strong discontinuities.
- 3. The scale-barriers are not important if the entrant is an alreadyestablished firm in the same or in another industry (within-entry and crossentry). Even for completely new firms economies of scale have not been found to be important barriers in practice.

- 4. The scale economies may in fact enhance entry if the limit price is very high; a firm may decide to enter despite the initial losses, if the current price yields lucrative profits to the large-scale plants.
- 5. The scale-barriers may be offset by the advantages of a new firm, which can adopt the most up-to-date methods of production and choose its location optimally, given the supply and demand conditions in the market.
- 6. The rationale of an entry-preventing policy is not given; neither does Sylos discuss explicitly the assumed preference of firms, existing and potential, for the behavioural pattern implied by the Sylos's Postulate.
- 7. The model is static; it does not examine the long-run implications of the adoption of an entry-preventing policy. As Pashigian has suggested, the rational firm should examine the profitability of all the alternatives open to it. Pashigian argues that in most cases it may be more profitable to charge the monopoly price for a certain (initial) period of time and subsequently charge a limit price or a purely competitive price, depending on the profitability of each alternative strategy. Such an analysis is dynamic, since it involves the examination of the time paths of alternative strategies.
- 8. The model assumes considerable knowledge of the conditions of supply and demand: the price leader is assumed to know the cost structure of all plant sizes, to have estimated accurately the market demand, and to know the minimum (normal) acceptable profit of the industry. The required amount of information is very unlikely to be available in practice.

In general Sylos's contribution lies in the systematic discussion of the most important determinants of the limit price in the case of substantial economies of scale. These factors provided the basic material used by Modigliani and Bhagwati in the development of more general and more rigorous models of limit-pricing.

Self Check Exercise-3

Q.1 What are the shortcomings of Sylos-Labini's Theory of Limit Pricing.

5.4 SUMMARY

J. S. Bain in his pioneering work _A note on pricing in oligopoly and Monopoly (1949) followed by his book _Barriers to New Competition' developed the theory of limit pricing. The theory of limit pricing is also known as entry preventing pricing. The theory of Bain's limit pricing has been further developed by Sylos-Labini, Modigliani and Jagdish Bhagwati. SylosLabini further modified the limit pricing theory whose basis was

laid by J.S. Bain. According to him, limit pricing laid special emphasis on the economies of scale barriers to entry of potential firms. His analysis of the economies of scale barriers to entry is more thorough than that of Bain. He also propounded a postulate about the behavior pattern of established firms as well as the potential firms and it is known as Sylos postulate.

The most important feature of the SylosLabini model is the existence of price leader firm. The price leader firm is the most efficient firm with lowest average cost of production. The price is set by the price leader who is the largest firm. Except price leader firm, all other firms are so small that they cannot affect the price i.e. they are price takers and not price makers. However, collectively small firms may put pressure on the leader by regulating their output. The price leader firm sets a price that is acceptable to all the small firms in the industry but the price that is set by the leader firm must be low enough to prevent entry of new firms. The leader is fully aware about the cost structures of all plant sizes and the market demand for the product. SylosLabini also assumed that the entrant is assumed to come into the industry with the smallest plant size.

According to Sylos, the new potential entrant knows that if it enters the market then the resultant increase in supply of output would drive the post entry price to fall below its own average cost of production. As price is less than average cost, the firm would incur losses. Thus, the limit price is fixed so as to restrict the entry of new firms. To quote Sylos, The price tends to settle at a level immediately above the entry preventing price of the least efficient firms, which it is to the advantage of the largest and most efficient firms to let live

5.5 GLOSSARY

- Efficient Firm: The firm with the lowest cost of production.
- **Limit Price:** The _limit price' is the highest price which the established firms charge without inducing entry.
- **Minimum Acceptable Price:** The price at which the firms break even.

5.6 ANSWERS TO SELF-CHECK EXERCISES

Self Check exercise -1 Ans.1. Refer to Section 5.3 Self Check exercise -2 Ans.1. Refer to Section 5.3.2 Self Check exercise -3 Ans.1. Refer to Section 5.3.4

5.7 REFRENCES/ SUGGESTEDREADINGS

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5.8 TERMINAL QUESTIONS

- 1. Criticaly examine the Sylos-Labini model of limit pricing.
- 2. How is equilibrium price determined under oligopoly when there are scale barriers to entry in the Sylos-Labini model.

Unit - 6

RECENT DEVELOPMENT IN THE THEORY OF LIMIT PRICING-II

STRUCTURE

- 6.1 Introduction
- 6.2 Learning Objectives
- 6.3 Franco Modigliani's Model of Limit-Pricing
 - 6.3.1 Assumptions
 - 6.3.2 Determination of Limit Pricing
 - 6.3.3 Criticism of Modigliani's model Self Check Exercise-1
- 6.4 Bhagwati's Limit Pricing Model Self Check exercise-2
- 6.5 Summary
- 6.6 Glossary
- 6.7 Answers to Self-Check Exercises
- 6.8 References/ Suggested Readings
- 6.9 Terminal Questions

6.1 INTRODUCTION

The several economists such as Bain, Sylos-Labini, Franco Modigliani, and Jagdish Bhagwati argued that the price and output decisions of the existing firms in oligopolistic markets are affected not only by the potential entry of the firms but by the actual entry as well. According to these economists, the oligopolist firm seeks to maximize the profits over the long run after allowing the entry of potential firms that affect the possibilities of profit.

The theory of limit pricing given by Prof. Bain,has been further developed by Sylos-Labini, F. Modigliani and Jagdish Bhagwati. Sylos-Labini modified the limit pricing theory whose basis was laid by J.S. Bain. F. Modigliani further modified the limit pricing theory given by Sylos-Labini by relaxing some restrictive assumptions which underlie Sylos's model. Further, Prof. Bhagwati extended Modigliani's model and also made it dynamic. Let us study these two model of Limit Pricing in detail.

After studying this lesson, you shall be able to

- Know the Limit Pricing Model of Franco Modigliani
- Discuss the views of Bhagwati the Limit-Pricing.

6.3 FRANCO MODIGLIANI'S MODEL OF LIMIT-PRICING

Modigliani relaxed the restrictive assumptions which underlie Sylos's model, but retained the assumption of scale-barriers and the behavioural pattern of Sylos's Postulate.

6.3.1 Assumptions:

 The technology is the same for all firms in the industry. There is a minimum optimal plant size (x) at which the economies of scale are fully reaped. Once the minimum optimal scale is reached the LAC becomes a straight line. Under these conditions the LAC is L-shaped (as shown in figure) and is the same for all firms.



- 2. Entry occurs with the minimum optimal plant size. Entry with suboptimal size is prohibited because in the long run, it would imply irrational behaviour. There is an implicit assumption regarding entry, namely that entry comes from new firms.
- 3. The product is homogeneous and the market demand is known. The point of intersection of the given demand curve with a line drawn at the level of the flat section of the LAC determines the competitive output X_c and the competitive price P_c , that is, the price and quantity that would be sold at that price in the long run if the market were purely competitive, given that in the long run equilibrium LAC = P_c .



- 4. The price is set by the largest firm in the industry, at such a level as to prevent entry.
- 5. The firms behave according to the Sylos's Postulate. That is, the existing firms expect that the entrant cannot enter with a plant smaller than the minimum optimal scale x, and that he will not enter if he believes that the price post-entry will fall below the flat segment of the LAC. The entrant expects that the established firms will keep their output constant at the pre-entry level.

6.3.2 Determination of Limit Pricing

Under the above assumptions, the equilibrium price P_L will be higher than the P_c (= LAC). The established firms will earn abnormal profits due to the scale-barrier which is reflected in the minimum optimal plant size x. The main preoccupation of the firms is the determination of price at a level which will not attract entry. The limit price P_L is determined indirectly by determining the total output which will be sold by all firms in the industry. The established firms decide to sell a quantity X_L such that if the entrant comes and offers an additional quantity x (the minimum he can produce optimally), the total output in the market will just exceed the competitive output X_c , and the price would fall just below the P_c = LAC level (figure 14.5). Symbolically this behaviour may be stated as follows the entry-preventing output is X_L , such that $X_L + X > X_c$, and the postentry price falls to $P < P_c$ (where $P_c = LAC$). Given X_L , the entry-preventing price P_L is simultaneously determined from the given industry-demand curve. Entry will be prevented as long as $X \ge X_L$. If $X < X_L$ entry will occur.


In figure DD' is the industry-demand curve, x is the minimum optimal level of output, $X_L = X_c - \underline{X}$ is the output which the established firms should produce in order to prevent entry, and P_L is the entry-preventing price, defined from the demand curve, given X_L . The scale-barriers cause P_L to be higher than P_c . The difference $P_L - P_c$ is the entry gap or premium and defines the amount by which the price can exceed the LAC without attracting entry.

The determinants of the entry gap and the entry-preventing price are:

- 1. The demand for or absolute market size of the product
- 2. The price elasticity of demand for the product
- 3. The minimum efficient plant size
- 4. The prices of factors and technology. Both of these determine the cost of production.

The above determinants of limit price are the same as in Sylos's model. Further, the limit price varies directly with minimum efficient plant size and the competitive price. The greater the optimal plant size, the smaller will be the output and therefore, the higher will be the limit price. Again the higher the competitive price, the greater will be the limit price. On the other side, the limit price varies inversely with price elasticity of demand and the absolute market size for the product.

A significant contribution of Modiglianilies in combining the above factors in an expression which shows how the various determinants are related to the limit price. The expression is as under:

$$\mathsf{P}_{\mathsf{L}} = \mathsf{P}_{\mathsf{C}} \left(1 + \frac{q}{\mathbf{Q}c. e} \right)$$

Where P_L = the limit price

 P_c = the competitive price

q = the minimum efficient plant size

Qc = the competitive output

The limit price changes with the minimum efficient plant size and price elasticity of demand is graphically shown in the following figures. The following figure shows that when the minimum efficient plant size increases ($q_2 > q_1$), the limit price increases from P_{L1} to P_{L2} .



In the following figure, two demand curves D_1D_1 and D_2D_2 have been drawn. At the competitive price Pc, price elasticity of demand for demand curve D_2D_2 is greater than price elasticity of demand for demand curve D_1D_1 . It will be observed that limit price PL₂ fixed in case of less elastic demand, D_2D_2 is higher than PL₁ fixed in case of more elastic demand D_1D_1 .

6.3.3 Criticism of Modigliani's model

Firstly, the model does not determine the individual shares of the firms. Thus the number of firms in the industry is not defined.

Secondly, it assumes scale-barriers are important. This implies that Modigliani does not take into account the typical form of entry in the modern business world, namely entry by an already-established firm in the same or in another industry.

Thirdly, the rationale of the policy of entry-prevention is not discussed.

Fourthly, dynamic aspects arising from growing markets are not considered.

Fifthly, although at some point Modigliani states that the _large firms typically set the pace in the market' and they set the price by applying _the full-cost rules of thumb,' he does not fully explain how the price is defined, nor does he discuss how the interaction of firms with different costs and different shares leads to a stable market equilibrium.

Sixthly, the assumption that the entrant can enter only with the minimum optimal scale is applicable to new firms only. An already-established firm may enter at scales which are profitable for it, although suboptimal for new firms.

Self Check Exercise-1

- Q.1 Discuss Franco Modigliani's Model of Limit Pricing.
- Q.2 What are the shortcomings of Franco Modigliani's Model of Limit Pricing.

6.4 BHAGWATI'S LIMIT PRICING MODEL

Prof. Bhagwati extended Modigliani's model and also made it dynamic. First, Bhagwati's contribution lies in adding two more factors that determine the limit price. These two additional determinants of limit price are (i) the number of firms in the industry and (ii) the feeling of dissatisfaction of the consumers from the established firm. The feeling of dissatisfaction is measured by a special elasticity which is known as Chagrin elasticity, Secondly, he considered the changes in limit price in the framwork of the growing demand or market for a company.

According to Bhagwati, as new firms enter the industry and price of the product falls and demand for the product increases; some of the new buyers will buy from the established firms who are known in the field and some new buyers will purchase from the new entrant.

To make this analysis simple, Bhagwati assumes that increase in quantity demanded as a result of the fall in price will be shared equally between the established firms and new entrant. Let ΔQ stands for the increment in demand following the entry of new firm and resultant fall in price, N for number of firms before the new one, x is the share of each in the increment in demand, then

$$\frac{\Delta Q}{N+1} = x$$

Or $\Delta Q = x$ (N+1)

The second factor emphasized by Prof. Bhagwati is that as a new firm enters the market and price falls, some of the consumers who were previously buying form the established firms switch to the new entrant as they had developed a feeling of dissatisfaction with the established firms thinking that they were exploiting them by charging higher prices before the entry of the new firm. As a result of the switching of customers, there is a certain decrease in the demand or sales of the established firm. Here a new concept chagrin effect has been introduced. Chagrin effect measures the proportionate decrease in quantity demanded (i.e. sales) of the established firms as the dissatisfied consumers switch to the new entrant and we denote it by β which has a positive sign.

Thus writing expression for the elasticity of demand of the established firms at competitive output Qc and competitive price Pc we have

$$\mathbf{e} = \frac{\Delta Q}{Q} \div \frac{\Delta P}{P}$$

by putting the value of ΔQ , we have

$$\mathbf{e} = \frac{x(N+1)}{Q} \div \frac{\Delta P}{P}$$

Here,

$$\frac{\Delta P}{P} = \frac{PL - Pc}{Pc}$$

Substituting and solving for P_L, we have

$$P_{L} = P_{c} \left\{ 1 + \frac{X(N+1)}{Qc \left[(e+\beta(N+1)) \right]} \right\}....(i)$$

It therefore follows that the two additional determinants of limit price P_L are the numbers of firms in the industry (N + 1) and Chagrin effect which is denoted by β . To quote Prof. Bhagwati, "The premium obtainable in an industry will vary directly with (1) the minimum size of scale of most efficient production (x) and the number of existing firms (N); and inversely with (1) the size of the total market (Qc) the price elasticity of industry demand and (3) the extent to which existing buyers will transfer custom to the entrant consequent upon entry."

The expression (i) above represents determinants of limit price for a given market demand of a good. This has been extended further by Bhagwati to cover cases when dynamic changes in the market demand are occurring. If there is increment in demand by λ and proportion of this increase goes to the new entrant, then the limit price is given by

$$\mathsf{P}_{\mathsf{L}} = \{ 1 + \frac{X - k\lambda}{Qc \left[\frac{\beta B}{N+1} + \beta\right]} \} \dots (ii)$$

where Qc represents the total quantity demanded at the competitive price after growth in demand has taken place. It will be seen that fraction k is inversely related to the limit price P_L . That is, if a higher proportion (k) of increase in demand accrues to the new entrant, the limit price (P_L) will be set at a lower level. This implies that entry is relatively easy in case of growth in demand for the product. The greater the growth in demand for the product is, the less the premium by which the limit price will be higher than the competitive price.

From the above formulation (ii) of the limit price an important result follows. This is that if $(k\lambda)>x$, that is, if the increase in demand for the product accruing to the entrant exceeds the minimum efficient plant size, then entry in the industry cannot be prevented. This is because $(k\lambda)>x$ means that on the entry of a firm and consequent increase in output would not cause the price to fall below the competitive price (=LAC) which is essential if entry of new firms is to be prevented. This implies profits to the new firm and this would induce its entry in the industry. Thus, in the case of faster growth in demand, the price strategy to forestall the entry of new firms becomes ineffective. Therefore, Prof. Bhagwati argues that in case of faster growth in demand, the entry prevention price policy becomes an ineffective instrument. Under these circumstances,

according to him, entry-prevention strategy has to adopt other measures such as maintaining enough spare productive capacity continuously so that rate of production by the existing firms can be increased at the same pace as the growth in demand for the product. This however may be very expensive and unprofitable proposition. Moreover, this requires making of accurate forecast of the increasing demand. Such forecasting ability or the part of entrepreneurs is lacking.

Prof. Bhagwati reaches a conclusion that if market demand for a product is increasing very rapidly (i.e. $(k\lambda > x)$, entry-prevention strategy cannot be based on adoption of price policy alone. The established firms have to adopt other ways and means to prevent entry of new firms. These ways and means adopted must ensure that the established firms themselves rather than potential entrants get the largest share of the growth in demand. According to Bhagwati, in growing markets, if the firms seek to forestall entry they should devise ways to increase their market share and adopt those policy instruments which are under their control. To quote him, "The theoretical problem thus shifts from devising an entry-preventing price to a formal analysis of the non-price factors which determine the share of the existing firm in the growing market and the ways in which these are within the range of influence of these firms."

Self Check Exercise-2

Q.1 Discuss Bhagwati's Limit Pricing Model.

6.5 SUMMARY

The Sylos-Bain-Modigliani-Bhagwati model suggests that the limit price will be higher than the LAC due to the scale-barriers to entry. Thus the firms will be earning abnormal profits without attracting entry. Prof. Bhagwati mentions that firms under certain conditions may adopt a mixed strategy, namely charge the monopoly price ($P_M > P_L$) over a certain period of time and subsequently reduce their price to the level that will prevent entry (P_L).The adoption of this strategy depends on the length of two time periods: the period over which entry will not occur due to various barriers, and the period that is required for the established firms to adjust their pre-entry plant to the postentry optimum size. If the latter period is longer, then the firms maximise their profits by charging to begin with the limit price, while if the former period is longer, the existing firms will attain higher profits by adopting the above mixed strategy.

6.6 GLOSSARY

- **Efficient Firm:** The firm with the lowest cost of production.
- **Limit Price:** The _limit price' is the highest price which the established firms charge without inducing entry.
- **Price Elasticity of Demand**: the percentage change in the quantity demanded of a good or service divided by the percentage change in the price.

- **Competitive Price**: A price is equal to the lowest point of long run average cost curve.
- **Minimum Acceptable Price**: The price at which the firms break even.

6.7 ANSWERS TO SELF-CHECK EXERCISES

Self Check exercise -1

Ans.1 Refer to Section 6.3, 6.3.1 and 6.3.2

Ans.2 Refer to Section 6.3.3

Self Check exercise -2

Ans.1. Refer to Section 6.4

6.8 REFERENCES/SUGGESTEDREADINGS

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6.9 TERMINAL QUESTIONS

- 3. Examine the Modigliani's Model of Limit Pricing. Also explain its criticism.
- 4. Critical examine the Bhagwati's Model of Limit Pricing.

BAUMOL'S CONTESTABLE MARKET THEORY

STRUCTURE

- 7.1 Introduction
- 7.2 Learning Objectives
- 7.3 Baumol's Contestable Market Theory
 - 7.3.1 Characteristics of Contestable Markets
 - 7.3.2 Important conditions for contestable markets to prevail
 - 7.3.3 Price and Output Determination
 - 7.3.4 Criticism of the Theory of Contestable Markets

Self Check Exercise-1

- 7.4 Significance and Impact of Contestable Market Theory
- 7.5 Implications of Contestable Market Theory Self Check Exercise-2
- 7.6 Summary
- 7.7 Glossary
- 7.8 Answers to Self-Check Exercises
- 7.9 References/ Suggested Readings
- 7.10 Terminal Questions

7.1 INTRODUCTION

The term 'contestability' has nothing to do with the number of firms currently in the industry, but refers instead to the ease with which firms are able to enter or leave a market; a perfectly contestable market is one in which there are no barriers or costs to entry or exit: the greater these are, the less contestable is the market, and thus the greater is the monopoly power of existing firms; so for a market to be contestable, a barrier to entry, such as a patent protecting technical knowledge, must be absent. One feature of markets which are contestable, that is where entry and exit costs are low, is that it may encourage hit-and-run competition - because entry to the industry is easy, firms may enter that industry to share in the fruits of temporarily high profits, and then withdraw as soon as the abnormal profits have been whittled away. However, the threat of such competition may be sufficient to force firms to price as competitively as possible.

7.2 LEARNING OBJECTIVES

After reading this lesson, you shall be able to

- Understand the concept of Contestable Market
- Discuss the views of Baumol's Contestable Market Theory
- Discuss the significance and impact of Contestable Market Theory

7.3 BAUMOL'S CONTESTABLE MARKET THEORY

The Theory of Contestable Market was first developed by the American economist W.J. Baumol in the early 1980s. The theory argues that what really matters in determining an industry's price and output is not, in reality, whether the industry is perfectly competitive or a monopoly, but the potential of new firms to enter or leave the market. The theory is based on the idea that a firm may enjoy a monopoly position within a market, but if there existed the real threat of competition from other firms, this would force the firm to behave as if it actually faced competition; that is, the firm would not pursue a policy of charging exorbitant prices to make excessive profits. This is because a firm thinks that if it sets a price higher than competitive market, other firms will enter the market and compete for the customers and thereby push down the price. Hence, the threat of new entrants in the markets forces the existing firm or firms to charge no more than the competitive price and therefore make only normal profits.

In essence, a contestable market is one with firms facing zero entry and exit costs. This means there are no barriers to entry and no barriers to exit, such as sunk costs and contractual agreements. For a market to be perfectly contestable, relevant industry technology would be readily available to potential entrants.

The existence, or absence, of sunk costs and economies of scale are two significant determinants of contestability. On the basis of these two criteria, natural monopolies are the least contestable markets. Asymmetric information is a key barrier to entry, with incumbents likely to know much more about their industry than potential entrants, and are likely to be unwilling to share their knowledge or technology. Potential entrants can operate a hit and run strategy, which means that they can _hit' the market,

given there are no or low barriers to entry, make profits, and then _run', given there are no or low barriers to exit.

7.3.1 Characteristics of Contestable Markets

On the basis of above discussion, the contestable markets have the following characteristics:

- 1) A contestable market occurs when there is freedom of entry and exit into the market.
- 2) In a contestable market, there will be low sunk costs. (Costs which can't be recovered when leaving the market)
- 3) Due to freedom of entry and exit existing firms always face the threat **o**f new firms entering the market.
- 4) This threat of entry is sufficient to keep prices close to a competitive equilibrium and profits low otherwise, new firms enter.
- 5) In a contestable market, it is not the number of firms that is important, but the ease by which new firms can enter the market.

7.3.2 Important conditions for contestable markets to prevail

The following are the important conditions for contestable markets to prevail:-

- 1. The new firms can enter the market with the same cost conditions as the existing firm or firms. If the existing firm enjoys some cost advantage as compared to the potential entrants in the market, then the new firms that enter the market cannot succeed in competing with the existing one which can afford to lower the price and inflict losses on the new entrants.
- 2. The second condition for the contestable markets is that firms should be able to leave or exit the market (i.e. industry) without incurring any capital loss
- 3. The third condition for contestable markets to exist is that the potential entrants must be at no disadvantage as compared to the existing firms with regard to the production technology or product quality as perceived by the consumers. Any lack of access to the same production technology as used by the existing firms prevents the new entrants from competing the existing firms on the basis of cost or product quality. This would work to reduce the threat by potential entrants and enable the existing firms to charge higher than competitive price and earn supernormal profits.
- 4. The last condition for the contestable markets to exist is that the new entrants must be able to engage in _hit and run' tactics. That is, entry should be free and costless so that the new entrants enter the market or

industry and make profits and exit the industry before the existing firms adjust their prices downward. Hit and run tactics can succeed when the existing firms can adjust their prices with some time – lags whereas the consumers immediately respond to buy from new entrants who offer same or similar products at slightly lower prices.

It follows from above that fewer the barriers to the entry in a market, the more contestable the market is. So to the extent monopolistic and oligopolistic markets are contestable depends on the barriers to the entry of new firms into a market or industry.

7.3.3 Price and Output Determination

When there are absolutely no barriers to the entry of new firms, the perfectly contestable markets would exist even though the existing firms may be working in monopolistic or oligopolistic market structures. In perfectly contestable markets, the existing firms are forced to keep their prices equal to average cost and therefore make only normal profits, and move towards sale maximization rather than profit maximization.

Price setting in a contestable market is illustrated in Figure. Suppose there are two firms in an industry, that is, there is duopoly in the product market. AR is the demand curve for the industry's product. The average and marginal cost curves of each firm are shown. The threat of entry of new firms leads each duopolist to charge a price Pc (which is equal to their minimum average cost) and produces output equal to Qc. Each firm earns zero economic profits.



By producing at the lowest minimum average cost, they are able to enjoy all the economies of scale. Thus, in producing the level of output at the minimum average cost and charging a price equal to it, the two firms behave like a perfectly competitive firm.

7.3.4 Criticism of the Theory of Contestable Markets

The extent to which the theory of contestable markets may be applied in practice is limited. Two pre-requisites may not be met:

- 1. Firstly, firms' sunk costs must be low so that they can easily leave the market. However, in reality sunk costs may be extremely high, even when capital is transferable. For example, if the Ford Motor Company decided to switch its operations from Dagenham (UK) to Delhi (India), it could not do so without substantial costs, despite the possibility of taking much fixed capital to India with it.
- 2. Secondly, the specific technical knowledge necessary to operate in the industry must be freely available. However, sole possession of technical knowledge, often protected by patent, is a common and powerful barrier to entry to monopolistic markets where production is of a highly sophisticated

nature, and is underpinned by extensive R&D - for example, the case of the drugs industry.

The theory ignores the possible aggressive actions of existing firms to potential entrants. In a market where cost barriers to entry and exit are low, existing firms may behave like monopolists by charging high prices and making supernormal profits, but might frighten off potential entrants by making it quite clear that any firm attempting to enter their 'patch' would face 'big trouble' in the form of all-out, to-the-death competition.

Those on the political right view the theory in terms of a justification of free markets and non-government intervention as both consumers and producers appear to benefit. However, this standpoint may be criticised on the grounds that even if perfect contestability exists, which is in itself by no means common in practice, government intervention in the free market may be warranted for a whole variety of other reasons.

Self Check Exercise-1

- Q.1 Discuss Baumol's Contestable Market theory.
- Q.2 Discuss the process of price and output Baumol's Contestable Market theory.

7.4 SIGNIFICANCE AND IMPACT OF CONTESTABLE MARKET THEORY

Contestable market theory has certain theoretical and policy significance, especially for deregulation. According to contestable theory, if the market is contestable or can make market contestable, the potential competitive threat will need government intervention in the market, the reason is that it can eliminate any generic market power. Elimination of barriers to entry and opening markets can contribute to the formation of a contestable market. Meanwhile they can make the focus of the government market policy changed, from market behavior of intervention and regulation towards relaxing the competitive market environment. Generation of contestable market theory has a direct relationship with intrinsic defects of traditional microeconomic theory and problems in the application of it. This theory had a significant impact on Western national control policies and regulatory practices, while it presents a set of concepts and methods to analyze multi-product industry.

7.5 IMPLICATIONS OF CONTESTABLE MARKET THEORY

- 1. The number of firms in an industry is irrelevant in terms of economic efficiency.
- 2. Abnormal profits attract new entrants driving down prices and ensuring economic efficiency.

- 3. All markets (excluding natural monopoly) can be efficient so long as they are contestable.
- 4. Shift the emphasis of government competition policy away from the number of firms towards reducing barriers to entry in an industry.
- 5. Potential competition may be more important for economic efficiency than actual competition.

Self Check Exercise-2

- Q.1 Criticise theory of contestable Markets.
- Q.2 Discuss significance and Impact of contestable market theory.

7.6 SUMMARY

To conclude, the threat of new entrants can lead to the existing monopolists and oligopolists to behave like a competitive firm in some situations but when there exist substantial sunk investment costs, the existing firms have an edge over the new entrants and charge higher than competitive price and make large supernormal profits. We thus see that contestable market theory does not apply to all monopolistic and oligopolistic market situations.

7.7 GLOSSARY

- **Contestable Market:** A *contestable market* occurs when there is freedom of entry and exit into the market. In a *contestable market*, there will be low sunk costs.
- **Sunk Cost:** it refers to a cost that has already occurred and has no potential for recovery in the future. For example, rent, marketing campaign expenses or money spent on new equipment etc.
- **Hit and Run strategy:** is a strategy used by firms to enter a particular market to avail of the high profits during the time the profitability is high, and then leave the market when the profitability reduces
- **Oligopolistic market structure**: A structure in which a market or industry is dominated by a small number of large sellers or producers. Oligopolies often result from the desire to maximize profits, leading to collusion among them.
- **Competitive Price:** A price is equal to the lowest point of long run average cost curve.

7.8 ANSWERS TO SELF-CHECK EXERCISES

Self Check exercise -1

Ans.1 Refer to Section 7.3, 7.3.1 and 7.3.2 Ans.2 Refer to Section 7.3.3 Self Check exercise -2 Ans.1. Refer to Section 7.3.4 Ans.2. Refer to Section 7.4

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7.9 TERMINAL QUESTIONS

- 1. Critical examine the Baumol' Theory of Contestable Market.
- 2. Explain the significances and implications of Contestable Market Theory

PUBLIC UTILITY PRICING

Structure

- 8.1 Introduction
- 8.2 Learning Objectives
- 8.3 Characteristics of Public Utilities Self Check Exercise-1
- 8.4 Theories of Public Utility Pricing
 - 8.4.1 Marginal cost of Production Theory
 - Self Check Exercise-2
 - 8.4.2 No profit, No Loss Theory
 - Self Check Exercise-3
 - 8.4.3 Average Cost of Production Theory
 - Self Check Exercise-4
 - 8.4.4 Theory of Making Profits
 - Self Check Exercise-5
 - 8.4.5 public enterprises and profit
 - Self Check Exercise-6
- 8.5 Control and Regulation of Public Enterprises and Public Utilities Self Check exercise-7
- 8.6.1 Recommendations of the Administrative Reforms Commissions Self Check exercise-8
- 8.7 Summary
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- 8.11 Terminal Questions

8.1 INTRODUCTION

As a general rule, the Government supplies goods which cannot be provided efficiently by the private firms because production is subject to decreasing costs. This is the case with public utilities such as water and electricity supplies, public transport system and postal services, etc. These are _situations', which are referred as, _natural monopolies∥ where competitive market cannot function because larger firms can produce at a lower cost and, therefore, a single firm tends to supply the entire market. The existence of decreasing costs implies that the firm would suffer losses, if forced to operate where price equals marginal costs. Thus, the Governments may prefer to render the service itself and a public enterprise is substituted for the private firm. Besides, a private monopolist produces too little output at too high a price. Hence, public enterprises are favoured which intend to maximise welfare rather than profits.

When a public enterprise operates under competitive conditions, few special problems of Pricing arise. The major problem in such a situation is that of maintaining fair competition between public and private units. But most of the problems arise where public enter prises enjoy a monopoly. It should, however, be noted that the public utilities are generally monopoly or semi-monopoly. In fact this is the position in most cases. The degree of monopoly, of course, varies in different cases. The monopolistic element has two implications. First, on the supply side, in the absences of competing units, it is difficult, if not impossible, to make cost comparison. Secondly, on the demand side, there is scope for discrimination and exploitation.

The monopolistic element in Indian public enterprises is different for different industries. There are industries where public enterprises enjoy total monopoly, e.g., airways, electricity, aircraft production, telephone production, state trading in some commodities. In the second category, there are industries where public enterprise enjoy partial or regional monopolies e.g., road transport, electronics, heavy electrical. In the third category, there are industries where public enterprise face very nominal competition, either among themselves or with private enterprises, e.g., fertilizers, steel, machine tools, antibiotics. Lastly, there are industries in which public enterprises operate under competitive conditions such as soap making, salt production, ship building, sugar hotels. This category or industries is owned mostly by the State Governments. It should, however, be noted that the degree of monopoly is generally higher in enter prises owned by Central Government than in those owned by the State Governments.

Broadly speaking, public utilities enjoy the highest degree of monopoly power because private units are barred from entering these industries and their products are regionally non-transferable. The examples of such industries are provided by railways to a great extent, the internal airways, the electricity boards, the multi-purpose projects, the road transport undertaking, etc.

8.2 Learning Objectives

After reading this chapter, you will be able to explain

• The meaning of Public Utilities.

- Different theories of Public Utility Pricing
- Control and Regulation of Public Enterprises and Public Utilities

8.3 CHARACTERISTICS OF PUBLIC UTILITIES

- (a) Public Utilities operate at the highest level of efficiency and are given exclusive rights to operate in certain locality so as to avoid duplication of the same facilities in that area, reduce cost and improve the quality of their services.
- (b) They are given monopoly rights by the State and are regulated so as to protect the consumers interests.
- (c) They are characterised by heavy initial investment in plants and equipment as also by some unused plant capacities, which can be used in emergencies or at peak periods. Therefore, as output increases, the average cost tends to fall so long as the plant capacities are not fully used.
- (d) Public utilities must meet all the reasonable demands for their services from the consumers.
- (e) Public utilities deal in services rather than goods. Transport and communications are services; gas, water and electricity are goods but the supply of such goods is regarded as a services to the community.
- (f) The demand for the public utility service by each individual consumer is also said to be income inelastic.
- (g) Public utility services are necessities of the community and are demanded continuously almost round the clock.
- (h) Lastly, the service supplied by a public utility is non-transferable. It is difficult for the buyer to transfer his demand from one seller to another. Suppose, if the consumer is not satisfied with the service supplied by the railway between two points, he cannot be it from another company. Similarly, if the electric supply in a town in unsatisfactory, the consumers cannot call on another undertaking to do the job.

It is because of these characteristics of public utility products that their supply is best done by a monopoly. Because of the large fixed capital investment and extensive equipment required, public utilities must enjoy monopolies so as to enable them to operate at the maximum economy in the localities served by them.

Self Check Exercise-1

Q.1 What do you mean by Public Utility Pricing. Discuss its characteristics.

8.4 THEORIES OF PUBLIC UTILITY PRICING

A number of theories of pricing in public enterprises have been put forward. Some of them have been discussed here:

8.4.1 Marginal Cost of Production Theory

- 8.4.2 No profit, No Loss Theory
- 8.4.3 Average Cost of Production Theory
- 8.4.4 Theory of Making Profits

8.4.1 Marginal Cost of Production Theory

Some economists, however have tried to apply the general principles of economic theory to pricing in public enterprises. Thus, marginal cost pricing has been advocated as a general price policy for all public enterprises. In a situation of perfect competition, where prices are autonomously determined, all entrepreneurs are expected to extend their output to the point where their marginal costs equal this price. Marginal cost pricing is supposed to enable them to maximise their profits and enable the consumers to reap the benefits of innovation and better technique in the form of low prices, and also ensure an optimum allocation of resources in conformity with consumers' choices. But, although the marginalists do not always assume perfect competition, nevertheless they claim that only marginal cost pricing can lead to ideal output. Even for public utilities working as semi-monopolies and often under conditions of decreasing costs, the suggested solution is marginal cost pricing. As far back as 1938, Hotelling pleaded that the prices of public utility products be fixed at their marginal costs and that the fixed costs be treated as bygones.

Marginal cost pricing by leading to equi-marginal value of the product of each factor in every use, was expected to result in an optimum allocation resources. Later on, marginal cost pricing was advocated for all enterprises (whether public utilities orotherwise) in a socialist set-up by A.P. Lerner. Professor Meade and Mr.Fleming also argue for marginal cost pricing for all public enterprises.

As already stated, the marginal cost pricing in public utilities in a mixed economy was first suggested by Prof. Hotelling in his article, The General Welfare in relation to problems of Taxation and of Railway Utility Rates. The marginal cost pricing in a socialist economy was advocated earlier, primarily by A.P. Lerner. These contributions led to a heated discussion of the problem which continued for about a decade. The theory holds that price should be fixed on the basis of the marginal cost of production which would ensure an optimum output and maximum utilisation of all factors of production. According to this principle, the prices of the public utility services should be fixed at a level at which they are equal to their marginal cost of production. Under this approach, a public utility would expend its output until the marginal cost of last unit offered is equal to the demand price. It means that:

P(Price) = MC (Marginal Cost)

Prof. Hotelling argues that the prices fixed for the public utility services should not attempt to cover the interest charges on fixed capital, depreciation allowance and the return on capital invested. It means that public utilities should not try to cover average cost. The prices should be fixed at the level at which the marginal cost alone is covered so as to ensure maximum social welfare.



Fig 8.1

Explanation of the theory

In case of industries which are subject to the law of decreasing costs, and consequently where average costs are greater than the marginal costs, the total sale proceeds from charging aprice equal to marginal cost would be less than the total costs. Thus, the rule P= MC will cause a deficit in the budgets of the public utility concern because its marginal cost curve will be below theaverage cost curve, as shown in the diagram given below (Figure 8.1). This deficit should becovered from general revenue of the Government.



Figure 8.2

Again if marginal cost pricing principle is followed, the price is fixed at RM or PO, rather then DM, which is the average cost of producing OM amount of output. This will result into a deficit or DR per unit of the service or the commodity. (See Figure 8.2). This deficit (DR) should be covered from the general revenues. This is the case with public utilities such as water and electricity supplies, public transport systems, and postal services.

Again in Figure 8.3, if the price is fixed at P_1N which is equal to the average cost but higher than the marginal cost, the output produced will be less, i.e, ON units instead of OM units and, therefore, the welfare of the society will be reduced. Hence, Prof. Hotelling concluded that the price should be equated to the marginal cost even it means a deficit in the budget of public utility concern. (See Figure 8.3).A private firm would fix its output at the point where marginal cost and marginal revenue are equal, i.e., MC =MR, since it earns maximum profits at this point. This is known as equilibrium output or efficient output. It means OE is efficient output. Thus, a private firm will produce OE output and charge EP₂ price. But the welfare of the society is maximum at OM output, where MC = AR and the price of the product is charged equal to marginal cost of the product, i.e., MC. (See Figure 8.3)Whenever there are deficits due to the adoption of the marginal cost pricing principles, they should be covered by subsidies by imposing certain type of taxes such as death duties, property taxes, etc., which will not reduce demand for the public utility services and, therefore, there will not be much reduction in the total welfare of the community as the benefit to the society from a large output would exceed the cost of subsidy.

If, the prices is equal to average cost, (i.e., equal to P_1N) principle is followed, the demand for public utility service may fall because of increased price, causing thereby a considerable reduction in the welfare of the community. Therefore, the Price must be equal to the marginal cost of enterprise producing the public utility services. Such as the views of the economists like Hotelling. (See Figure 8.3)



Figure 8.3

If, on the other hand, the service or goods is being produced under the increasing cost conditions, rule P= MC will yield surpluses, because the MC will be higher than AC. Hence, according to this principle, price will be higher than the average cost. Therefore, the demand for public utility services will be less. But if the price is equal to AC, the demand for the public utility services will be higher than that when it was equal to MC. Here, it was argued that to reduce the over utilisation of the existing plants, the price must exceed the average cost which will happen only when the price is equated to the marginal cost. This theory explains how prices are determined in case of public utilities as well as in public enterprise. The theory, however, suffers from a number of drawbacks.

Criticism of the Theory

In the first place, it has been said that where there are multiple products or services, the determination of detailed costs of each item may be a very costly and complicated affair. This is reason why the post office charges the same price for carrying letters from one street to another or from one corner of the country to another.

Secondly, It is said that fixation of price at a level insufficient to cover costs may lead to inefficiency in management.

Thirdly, marginal cannot be accurately assessed because the factors are indivisible and the various charges on a new factor in-takes are not the charges of one factor in use needed for additional increments of output.

Fourthly, the adoption of the marginal cost pricing principle may involve a considerable discrimination. For instance, the marginal cost of running extra trains during peak hours may be much higher than at other times so that railways fares will have to be higher during peak hours and lower at other times. Such fluctuations in the marginal cost create serious difficulties for rate fixing. Precise determination of the marginal cost may be impossible.

The adoption of marginal cost pricing will make difficult the determination of the investment policy of the Government. How far should any other State enterprise be expanded and, because the demand for the products will increase at low price, from where the resources for expansion of enterprises are to obtained? If the limited factors are used too much to expand output in accordance with marginal cost pricing, there will be mal-allocation of resources because the factors which are retained in such enterprises would have earned more in alternative enterprises.

There would be hardly any marginal cost of an additional traveler on a road bridge. Similarly, the unused capacity would be vast in case of museums, parks and broadcasting services and, therefore, there will not be any significant marginal cost if more persons avail of these services. Thus, the absence of marginal cost should not mean that those, who use products or service do not pay.

Self Check Exercise-2

Q.1 Critically Discuss Marginal Cost of Production Theory

8.4.2 No Profit, No Loss Theory

The principle of no profit no loss' was evolved by the Fabians in connection with the municipal trading and even now it has its supporters. It is argued that the Government should not make profits and follow a policy of no profit, no loss. This sort of price policy that a public corporation ought to follow can be stated simply in two rules:

- (1) It should make neither a loss nor a profit after meeting all capital charges; and
- (2) The prices it charges for different services should correspond to relative cost.

The traditional view is that the public enterprises are meant to serve the people rather than to make profit. The public enterprises should distinguish themselves from private enterprise by promoting the public purpose rather than making profits. It is further held that earning of profits is inconsistent with public purposes. Prof. Lewis states, If the corporation makes a profit or loss, it should be required to adjust its prices as to eliminate the profit or loss. He supports the principle on the ground that it prevents over or under-expansion of the industries concerned and avoids the inflationary or deflationary tendencies. He is of the opinion that if in some circumstances, it is considered desirable to supply product or service at a price below or above the cost of production, it is better to use the method of subsidies and taxes rather than tocover losses in some parts of undertakings by profits in other parts.

Many advocates of public enterprises have, in fact, argued that a great advantage of public ownership would be the freeing of the industries from the tyranny of the profits and loss account.' The profit motive should be replaced by a spirit of the public welfare. The National Coal Board, for instance is required to make supplies of coal available, of such qualities and sizes, in such quantities and at such prices, as may seem to them best calculated to further the public interest in all respects. Similarly, the Gas Boards are required to develop and maintain and efficient coordinated and economical system of gas supply for their area and to satisfy, so far it is economical to do so, all reasonable demands for gas within their area.

An Estimate of the Principle

In the past, when State participation in economic activities was considered a necessary evil, the State undertook the provision of only such services as were considered absolutely essential for the public and were not attractive to the private enterprise, the principle of no profit, no loss was not very unsatisfactory. But now the entire concept of State participation in economic life is changed. It has been widely accepted that the State has to play an important role in accelerating the rate of development in underdeveloped countries. The Government is increasingly entering the highly profitable industries and trade to mop up profits for financing the country's development plan, which were previously enriching a few capitalists.

If the Government operates on no profit, no loss principle in such industries, the possible investable surplus will be fittered away in consumption and the rate of capital formation would be slowed down because even the private capitalists invests a major portion of their profit. The principle cannot work where public enterprises work in collaboration with local or foreign private capitalists because they cannot agree to invest their funds or permit to use to patent rights without adequate reward for the same. It is now widely accepted that public enterprises must make profits and no profits, no loss principle is inconsistent with a socialist economy. If this principle is followed during the transitional stage of a mixed economy like India, it is likely to hamper the evolution of the mixed economy into a socialist state.

A public enterprise operating on loss may well be contributing to the welfare of the community through cheap gas, cheap electricity, cheap transport or cheap postage far in excess of its loss. It is on this basis that Phillip E. Taylor justified the operation of some public industries at less than cost. But the principle that public enterprises should not be run at loss is based on a number of considerations.

In the first place, a policy of losses would contribute towards inflation because in this case public enterprise will put more money into circulation by paying for services, materials, etc., and take less money out of circulation by charging for its products and services. Thus, any loss by public enterprises would be inflationary unless it is deliberately offset in some other manner.

Secondly, if a public corporation has to consistently operate at a loss, additional taxation would be necessary to recover this loss, the adverse effects of which may far outweigh the benefits likely to flow from operation at a loss.**

Thirdly, if costs are not covered and the product is sold at a loss, there might be an over-expansion of the industry concerned. This would particularly be the case if the product concerned is fairly elastic.

Fourthly, there is no justification to subsidizes consumers as a class.

Hence, it is obvious, that the principle of no profit, no loss∥ is inconsistent with the planned economy or a socialistic pattern of society like ours.

Self Check Exercise-3

Q.1 Discuss No Profit, No Loss Theory

8.4.3 Average Cost of Production Theory

In actual practice, average cost pricing is widely adopted as a method of pricing in public enterprises. The post office, both in the U.K. and in India, provides typical example of average cost pricing: letters are carried to small or large distances at the same rate in spite of differences in cost. The main advantage of an average of cost pricing is that it is simple to administer. While it is impossible to calculate the marginal costs of various services provided by railways, post office, multi-purpose projects, etc., average cost can be determined easily. Secondly, average cost pricing enables the enterprises to cover their full costs and spares the community the burden of the additional taxation that would have been necessary to make up any losses incurred by charging marginal cost prices in decreasing cost industries. Moreover, this method avoids monopoly exploitation of consumer in increasing cost industries which are charging marginal cost prices.

The main dangers of average cost pricing are that it may hide the inefficiency of an enterprise and force the consumers to pay the full cost of an obsolete high costs plan, by removing any incentive for innovation. These dangers can be overcome by enlightened management, through efforts to reduce cost and to encourage research and experimentation in new techniques. Secondly, average cost pricing is said to fail to achieve the optimum allocation of resources. It has been argued that under the conditions of imperfect competition prevailing in the present day world, the achievement of ideal output conditions, through the price mechanism is a myth created by welfare economists, and is not itself an argument for the choice or abandonment of pricing policy.

Philip E. Taylor, is of the view that the average cost is fair and just because of the following reasons:

- 1. The public undertakings are expected primarily to meet the needs, that is, to provide an optimum volume of supplies cheaply without seeking any profit.
- 2. Every purchaser pays the entire cost of the unit or units consumed by him instead of paying only the additional cost of producing these units.
- 3. Since nobody is required to pay more for the goods he purchases than the amount it actually costs to produce those goods, there is no exploitation.
- 4. The average cost price is a reliable criterion for investment in many cases.
- 5. The average cost principle ensures that the entire expenditure of the undertaking is covered and thereby secures the viability and the autonomy of the undertaking.

The theory, however, suffers from a number of defects. From the macroeconomic point of view, the determination of average cost is not as easy as it appears from the purely accounting point of view. Besides, the average cost pricing may result in holding excess capacity because of the un-restriction of investment where potentialities exist. It is not sufficiently flexible to accommodate price adjustment. If does not provide incentives for the managers of public enterprises.

Self Check Exercise-4

Q.1 Discuss Average Cost of Production Theory.

8.4.4 Theory of Making Profits

Public sector would be meaningless if it failed the profitability test and could claim no virtue unless it functioned effectively as an instrument of production and development and as creator of new wealth. It is now realised that with the public sector taking up significant proportion of total investment in the economy, an important source of capital formation will be dried up if public enterprises do not make profits. Capital is one of the scarcest resources in India, hence a proper return must come up wherever it is. In centrally planned economies, a predominant part of the revenues is derived from the profits of the public enterprise or from the taxes on the products of public enterprise. Normally only about 10 per cent of public revenues in USSR was derived from general taxation and loans and the remainder from the profits of the national enterprises and the turnover tax on the products of public enterprises which is also a commodity price determining factor. It is, thus, obvious that 90% of the revenue is derived from the profits of the public enterprises in the USSR.

The fundamental guiding principle in private enterprises is to maximise profits. This principle is not very relevant to the pricing in public enterprises in underdeveloped countries, But in view of the increasing requirements of funds of executing development plans, the public enterprises are expected to yield surpluses which can be used either for their expansion or financing other public enterprises.

Self Check Exercise-5

Q.1 Discuss Theory of Making Profits

8.4.5 Public Enterprises and Profits.

Why Public Enterprises should make profits?

(1) Development of Resources

Dr. V.K.R.V. Rao, while discussing the pricing policy of public enterprises, states, that the pricing policy should be such as to promote the growth of national income and the rate of this growth..... public enterprises must make profits and larger the share of public enterprises in all enterprises, the greater is the need for their making profits. Profits constitute the surplus available for savings and investment on the one hand and contribution on national social welfare programmes on the other.

Public enterprises must earn profits for re-investment purposes just as private enterprises do. The place of corporate sector in the accumulation of saving in the country is prominent today; and it ought not to be far different in the case of the enterprises brought within the public sector. Thus, S.S. Khera is of the view that Public enterprises have to play a more positive role in the economic development of the country like India, which is suffering from an acute shortage of capital for investment.

The Taxation Enquiry Commission observes, in certain cases where State has made substantial investment, a policy of regulating prices so as to secure an adequate return on capital invested is not only unobjectionable but may, indeed be desirable. This is particularly so in the conditions of economically underdeveloped countries, where public enterprise itself, fostered at State expense may, in turn, play a role in financing the country's development.

Besides, the Menon Committee on Parliamentary Supervision over State Undertakings also holds the view that Government companies should not only pay their way but make legitimate profits. To achieve a rapid rate of economic development, it is very essential to ensure that the capital is accumulated at every convenient point of activity and there is no leakage of investible funds into current consumption.

(2) Pattern of Government Revenue

Unless the Public enterprises follow deliberate policy of making profits, it is feared that they may disturb the pattern of Government Revenues. In the first place, nationalisation by the State Government reduces the income-tax receipts of the Central Government e.g., departmental organisation of nationalised transport. Secondly, in case of some public enterprise there may by pressure from the State or Centre Legislators for subsidies or non-profits prices. For them, this may be the very purpose of State's replacing private enterprise. This would lead to decline in receipts of the Government from taxation. Thirdly, many public enterprises have suffered losses which eat into Government resources collected from other sources. Fourthly, if it is assumed that private enterprises are more effectively inspired than public enterprises towards profit maximisation, the tax receipts based on profits, probably also those based on sales, would be lower under public enterprises. Thus, if the decline in Government revenues is to be avoided, it is necessary cither to diverse an appropriate system of taxes on public enterprises or to direct them to earn profits.

(3) For Financing Increased Expenditure on Welfare Activities

Because of the increasing participation of State in economic activities and the adoption of Welfare State principles in many developing countries, there has been a steep increase 1n Government expenditure. This has necessitated a substantial increase in Government revenues. All this increased revenue cannot come from direct taxes and an increasing proportion has to come from taxes on the products of or profits from public enterprises. While advocating a policy of making profits, care should, however, be taken that public enterprises do not indulge in profiteering or use their power to follow a price based on a narrow criterion of maximisation of profits on the model of private enterprise.

Most of the States have before them the goal of building a socialist society. Socialism basically implies equal opportunity for all. The responsibility for prouiding equal opportunity for advancement of the children of the poor classes, who cannot meet the cost of bringing up and educating their children at a level enjoyed by the children of the richer classes, will have to be taken by the State which requires huge funds. There is, however, a strict limit to which funds can be collected by levying taxes without adversely affecting incentives to work and to save and invest. The profits of public enterprises will have to be an important source of funds required for building a socialist society. Thus, Prof. V.K.R.V. Rao said that the theory of _No profit, No loss' in public hamper the evolution of the mixed economy into a socialist society. The sooner, therefore, this theory of _No profit No loss' in public enterprises such as will make the State increasingly reliant on its own resources, (as distinguished from taxing the personal incomes of its citizens) the quicker will be the evolution of socialist society.

(4) Organisational Grounds

The last argument for a policy of profits rests on organisational grounds. If public enterprises are required to show profits, the manages are under a psychological stress to work towards good results; the policy in itself has a favourable effect on efficiency. The managers will then be keen on organising the industry entrusted to them on lines optimal sub-division, ensuring that no unit of the industry exceeds the optimum limit and that healthy inter-unit competition in outlook and efficiency prevails. Thus, there is greater hope of managerial efficiency in the public sector under the policy of making profits then under a no profit, no loss; policy or a loss policy. The policy of profits holds before the managers a goal to be realised through positive effort and initiative.

Determination of Price

It is thus obvious from the above discussion that public undertaking should make profits, but the interests of the public should not be sacrificed. We also hold this view. This can be achieved by increasing the efficiency of public undertakings and making maximum possible economy in the cost. This, however, also depends upon the capacity or the size of the plant. This public undertaking should operate with the highest possible efficiency and maximum possible economy in the cost with present capacity of the plant. It is essential under a policy of self-financing undertakings or on be part of the public enterprises. This may be illustrated by the adjacent diagram (Figure 8.4)



Figure 8.4

Given the demand conditions as represented by curve, D, the more the consumer's interest is affected the higher the price is fixed above the cost curve AC. Since the requirement of self-financing make this necessary, i.e., to earn profit, it is of vital important insist that the restriction on output, which the price implies, is minimum. It means that the interest of the consumers should be protected by increasing the supply and without sacrificing the objective of self-financing or earning profit. In other words,

within given capacity of the plant, the output should be adjusted in the interest of the consumers without sacrificing the objective of self-financing, i.e., earning profit.

For instance, in the above diagram, the surplus of PORS, involves an output restriction to the extent of MM₁. It means that the output can be increased upto the point M₁to earn profit equivalent to PQRS. Under the present situation, the surplus is undoubtedly equal to PQRS but the consumer's interest is affected most i.e., the price PM is the highest. Now, the only method of achieving the same surplus while simultaneously making more output possible, given the demand curve D, is to lower the cost curve, i.e., effect cost economies. If the range of output we are concerned with i.e., the output that we want to meet the demand, is to be produced the cost curve can be lowered to AC₁. Then the output can be larger than the earlier one of OM and the price lower than the earlier one of MP, while the same surplus, as planned continues to be realised. In Figure 8.4, at the point P₁, price is the lowest, output is maximum, surplus P₁Q₂R₂S₂ is same as PQRS. This is the efficient output, or the maximum output without sacrificing surplus. The output OM. is higher than OM. The priceM₂P₂, is lower than MP. The profit P₂Q₂R₂S₂ is equal to the earlier profit PQRS, output is lower than OM₁i.e, OM₂<OM₁. Interest of the consumers is sacrificed.

Thus, the consumer's interest has maximum protection under the policy of sizeable surplus when the policy is accompanied by the maximum of cost efficiency. Where it is not, the price interest of the consumer too severely clashes with the profit interest of the enterprise. However, there are some who do not accept this policy. Public enterprises should not as a rule be expected to assist Government finances. To tax the consumer of a particular product in order to have the revenue and help the general taxpayer is in most circumstances wrong.

Self Check Exercise-6

Q.1 Why Public Enterprises should make profits?

8.5 CONTROL AND REGULATION OF PUBLIC ENTERPRISES AND PUBLIC UTILITIES

The need for price control over public sector is no less than that over private sector. There often prevails a misconceptions that the elimination of the private capitalist whose objective is to maximise profits, removes the need for price control over public sector and that the public enterprises work in the interest of the consumer. In fact, the statutes of public enterprises hardly give any consideration to the interests of the consumers, nor is there any provision for statutory public enterprise. Since many public enterprises such as public utilities, operate under monopolistic conditions, there is greater need for price control to ensure that they do not exploit the consumer by their attitude of take it or leave it when the consumer has no alternative sources of supply.

In private enterprises economy, in contrast, competition, where it is effective, safeguards the interests of the consumers. Although the primary aim (of private enterprise) is to maximise profits and service is rendered to the consumers only as an incidental consequence, the forces of competition help to bring prices to the level of actual costs.

All public enterprises, that is, whether they are public utilities or commercial enterprises should be brought under a well-conceived overall structure of price control. There should be a Price Tribunal for every major public enterprise, particularly where it operates under monopolistic conditions. Public utilities generally operate under monopolistic conditions. It has been often suggested that a Public Enterprises Commission should be set up under the Ministry of Finance, enjoying the status of an expert semi-independent tribunal. Such a Commission would provide a converging point for the price tribunal activities. The Commission should play an important role in deciding the profit targets and the price policies of the public enterprises. The Public Enterprises Commission, the apex of the price control mechanism, would ensure uniform approach to pricing in public enterprises, whether owned by the Central or other State Governments.

These tribunals or commissions are given the powers to fix fair price schedules for the services provided by the public utility monopolies or, more broadly speaking, public enterprises. These organisations may face a number of difficulties in calculating fair prices of public utilizes or public enterprises which they are expected to charge from the consumer. For instance, there may be a problem of determining average cost of the service or commodity, i.e., which element should be included in the joint cost or which should be excluded. How much margin of profit should be allowed to these enterprises, whether the margin of profit should be original investment or the present book value of the investment? Finally, what allowance should be made for good or bad year. Assuming that the Regulation Commission of these enterprises (or public utility monopolies) knows the cost and price structure of the monopoly, the Commission will decide a price which is in the interest of the consumer and which may as well accelerate the development and welfare activities. Figures 8.5 below will help in understanding the problem.



Figure 8.5

If there is no control and regulation of price, the public enterprise may fix its price at Q_1P_1 and the amount of quantity to be produced at OQ_1 at this output profits are maximum. It isQ₁P₁, also known as monopoly price, i.e., where MR= MC. Suppose there is competition, the price may be fixed at QP, and the amount of commodity produced at OQ_2 where the enterprise earns only normal profit. It is the point where AR= AC. Suppose, the Government appointed Regulatory Commission fixed the competitive prices as the price to be charged by the public enterprise (Public utility). Now the regulated price will be a horizontal line indicating that the public enterprise (public utility) can produce and sell the quantity but can sell only at this price. Hence, this price OR =(Q₂P₂) will also be or the MR for the public enterprise. Following the principle of profit maximisation, the enterprise will decide to produce OQ_4 amount of quantity, where MC = MR. But the price charged would be Q₄F which is higher than the average cost. Again, the amount of commodity produced is OQ_4 and the price charged is Q₄F. These, two points should be noted here.

It is thus obvious that under this situation public enterprise will earn profit even though it is selling at regulated price. It should also be noted that the regulated price is higher than the average cost. Secondly, the public enterprise is not producing competitive output (OQ_2) but something smaller, that is, OQ_4 . Hence, the regulating authority should fix, not only the competitive price, but insist upon competitive output also. Generally, in case of public utilities and services, greater stress is laid on output than on return on investment.

Self Check Exercise-7

Q.1 Discuss about control and regulation of public enterprises and public utilities.

8.6 RECOMMENDATIONS OF THE ADMINISTRATIVE REFORMS COMMISSIONS

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The Administrative Reforms Commissions has recommended that the following principles should be kept in view in formulating the pricing policies of public enterprises.

- 1. Public enterprises in industrial and manufacturing fields should aim at earning surpluses to make substantial contribution to capital development out of their earning besides making a contribution to the Exchequer.
- 2. Public enterprises should in any event pay their way and should not run into losses except in pursuance of expressed directives issued by Government in public interest.
- 3. In the case of the public utilities extended upto a level at which marginal cost is equal to price.
- 4. While determining the price structure commensurate with surpluses extended from them, public enterprise should keep the level of output as near the rated capacity as possible subject, of course, to the volume of demand for the product.

Self Check Exercise-8

Q.1 Discuss recommendations of the administrative reforms commissions.

8.7 SUMMARY

It is general opinion that the public utilities like education, sewage, roads, etc. which may be supplied free to the public and their costs should be covered through general taxation. There are a number of theories which govern the pricing of public utilities services like Marginal Cost of Production Theory; No profit, No Loss Theory, Average Cost of Production Theory, and Theory of Making Profits. Which theory should be adopted to determine the pricing of public utilities, depends on the nature of public utilities and the targeted group of the population in the country.

8.8 GLOSSARY

- **Public Utility:** is the common term for a firm that provides an important (what some deem as essential) good or service often through the use of an extensive distribution network.
- **Natural Monopoly:** The firm with very high capacity emerges as a very large entity with average cost pricing. The largest capacity firm emerges as the sole player in the market.
- **Marginal Cost:** The change in total production cost that comes from making or producing one additional unit.
- Average Cost: is the per unit cost of production obtained by dividing the total cost (TC) by the total output (Q).
- *Monopoly market:* where a firm is the sole seller of a product without any

close substitutes.

8.9 ANSWERS TO SELF-CHECK EXERCISES

Self Check exercise -1

Ans.1 Refer to Section 8.1. and 8.3

Self Check exercise -2 Ans.1. Refer to Section 8.4.1 Self Check exercise -3

Ans.1 Refer to Section 8.4.2

Self Check exercise -4

Ans.1 Refer to Section 8.4.3

Self Check exercise -5

Ans.1 Refer to Section 8.4.4

Self Check exercise -6

Ans.1 Refer to Section 8.4.5

Self Check exercise -7

Ans.1 Refer to Section 8.5

Self Check exercise -8

Ans.1 Refer to Section 8.6

8.10 REFERENCES/ SUGGESTED READINGS

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8.11 TERMINAL QUESTION

- 1. Explain public utility services. Give its classification and features.
- 2. Discuss the price determination of public enterprises and public utilities.

MARKETS WITH ASYMMETRIC INFORMATION

STRUCTURE

9.1 Introduction

9.2 Learning Objectives

- 9.3 Asymmetric Information Self Check Exercise-1
- 9.4 Adverse Selection

Self Check exercise-2

- 9.4.1 Market for _lemons'
- 9.4.2 Market for Labour
- 9.4.3 Market for Insurance
- 9.4.4 Market for Credit

Self check Exercise-3

- 9.5 Solution to Asymmetric Information- Signalling and Screening
 - 9.5.1 Signalling
 - 9.5.2 Screening

Self Check Exercise-4

- 9.6 Moral Hazard
 - 9.6.1 Principal-agent Problem

Self Check Exercise-5

- 9.7 Summary
- 9.8 Glossary
- 9.9 Answers to Self-Check Exercises
- 9.10 References/ Suggested Readings
- 9.11 Terminal Questions

9.1 INTRODUCTION

In a perfect competitive market structure, one of the key assumptions defining

the market is that of complete and symmetric information among the parties involved in the transaction. That is, we assumed no seller knows more about a product's characteristics than a buyer, and no buyer knows more about the product's costs than a seller. Such an assumption is unrealistic due to the fact that in real life, one party to a transaction often has more information than another about the characteristics of the good or service to be traded. This condition is referred to as that of a symmetric information.

For instance, the seller of a product usually knows more about the quality of the good than the buyer; workers usually know more about their abilities than the potential employers; in the market for second-hand cars, sellers have more information regarding the true status of the car than the buyer; in the financial market, the creditor has relatively lesser information about the default risk of the debtor than the debtor himself; and in the health insurance market, the insurance company has lesser information about the individual than the individual himself. These are some of the common examples of the presence of asymmetrical information.

As per the first welfare theorem of Economics, perfect competition leads to a Pareto efficient allocation of resources. A key assumption for the theorem to hold is that all the information related to the trade in the market should be equally observed by all the agents involved. When such assumption fails to hold, that is, when information is asymmetric with one agent possessing more information related to the trade than other agent(s), prices are distorted and we do not get a Pareto efficient allocation of resources. This is referred to as the situation of market failure. The present unit will discuss the concept of asymmetric information; how does it lead to market failure and how equilibrium is attained in the presence of asymmetric information.

9.2 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- explain the concept of a symmetrical information;
- discuss how a symmetrical information leads to market failure;
- describe market solutions to the problem of a symmetric information;
- define the problem of moral hazard resulting in the presence of a symmetric information; and
- understand principal agent problems.

9.3 A SYMMETRIC INFORMATION

The concept of a symmetric information was first analysed by George Akerlof in his 1970 paper titled _The Market for _Lemon': Quality, Uncertainty and the Market
Mechanism. He considered an example of automobile market. Asymmetric information exists, when amongst different parties in the trade, unequal information set persists. That is, if we assume there are buyers and sellers in the market, then under asymmetric information, one agent will have greater (or lesser) information than the other. For example, in the market for second-hand cars, also called the market for lemons, sellers of the second-hand cars have more information about the real value of the car than the buyer. This information asymmetry gives the seller an incentive to sell goods of less than the average market quality. The average quality of goods in the market will then reduce as will the market size. Moreover, buyer possessing lesser information, often is discouraged to go in trade, as he wants to reduce the risk of buying a damaged car, called a _lemon'. Thus the presence of asymmetric information, may result in no trade taking place at all. In another example, in the market for health insurance, buyer of insurance has more information about his/her status of health than the insurance company selling such policies. More such examples exist in the real world. The existence and persistence of asymmetrical information cannot be denied and due to it, many markets fail to trade. This simply means, that due to lack of symmetry in information between the parties, they are unable to construct tradable price in the market and without tradable price, trade cannot take place. This way asymmetrical information leads to market failure.

To correct for the market failure resulting from asymmetrical information, one way out is when such asymmetries in information can be nullified, in other words when more equal distribution of information is possible. For instance, in markets for second-hand cars, some certification or quality accreditation with some years of guarantee from an organisation can help spread information about the true real value of the second-hand car amongst buyers and sellers. In the market for health insurance, a thorough medical check-up can reveal true status of the buyers' health. In the financial market for credit, borrowers borrowing-score can help reveal the actual default rate of the borrower.

Self Check Exercise-1

Q.1 What do you mean by a symmetric Information?

9.4 ADVERSE SELECTION

Asymmetric information exacerbates inefficiencies. One reason behind why presence of asymmetric information leads to market failure is due to adverse selection. Adverse selection refers to a situation when parties gaining from the presence of asymmetric information are more likely to enter into a trade than the parties suffering from information asymmetries. In our examples mentioned in the previous section, if buyers of the secondhand cars cannot distinguish good cars from bad ones, sellers may

be inclined to sell only lemons (bad-quality cars). If insurance companies have difficulty in evaluating applicants' health status, they may end up serving high-health risk policyholders and may not be able to harness the cross subsidies from the low health risk policyholders and thus may not be able to breakeven due to high insurance claims from the high risk clients. If the potential employers have trouble assessing the abilities of workers, they may end up employing poorly qualified workers. In each of these examples, the informed parties, viz. second-hand car sellers, insurance buyers, workers, are more willing to trade when trading is less advantageous to the uninformed parties, viz. second-hand car buyers, insurance companies, and potential employers, respectively. This phenomenon is known as adverse selection. When the affected uninformed parties realise that they face adverse selection, they may become reluctant to even come forward for trade, causing a market failure.

Let us discuss a few of these examples which lead to adverse selection and market failure in detail.

Self Check Exercise-2

Q.1 What do you mean by adverse selection?

9.4.1 Market for 'lemons'

Let us consider a market where buyers and sellers have different information regarding the quality of the product offered for sale. Consider a market where there are 100 sellers and 100 buyers for used cars. Everyone knows that all the used cars are not of same quality and there is 50 percent chance of getting a car in good condition (_Plums')and 50 per cent chance of getting a car in bad condition (_lemons'). However, the owner of the cars know the actual quality of the car, but the buyers have no clue about which one is plum and which one is lemon. Moreover it is not easy to verify the quality of car from the market.

Let the owners of the lemon want to sell it at Rs.1,00,000 and the owners of the plums want to sell at Rs. 2,00,000. Let the buyer of the car is ready to pay Rs. 2,40,000 if the car is a plum but Rs. 1,20,000 if the car is a lemon. If there is no problem in verifying the quality of car from the market, then the lemons will be sold at some price between Rs. 1,00,000 to Rs. 1,20,000 and the plums will be sold at some price in between Rs.2,00,000 to Rs. 2,40,000. Since buyers cannot observe the quality of car to be purchased, they will have to guess about the quality of an average car. Given that there is only 50 per cent chance of getting a plum (i.e., a car is equally likely to be a plum or a lemon), the expected value of the car for a typical buyer is:

 $E(B) = \frac{1}{2} \times 2,40,000 \text{ (Rs.)} + \frac{1}{2} \times 1,20,000 \text{ (Rs.)} = 180,000 \text{ (Rs)}.$

However, at that price the owner of the lemons will be only willing to sell the car) because E(B)= Rs. 1,80,000 > $E(S_{Lemon})$ = Rs. 1,00,000) but not the owner of the plums

(because E(B)= Rs. 1,80,000 < $E(S_{Plum})$ = Rs. 2,00,000). The price that the buyers are willing to pay for an average car is less than the price that the sellers of plum expect from the transaction. So at a price of Rs. 180000, only lemons would be offered for sale. Even though the price at which buyers are willing to buy plums exceeds the price at which sellers are willing to sell them, no such transaction for plums will take place. This is the problem of **market failure**. In an extreme case, if the buyer was certain that he would get a lemon, he would not be willing to pay Rs.1,80,000 for it. The equilibrium price then would have settled somewhere between Rs. 1,00,000 to Rs. 1,20,000. For this price range market would have been segregated, for sellers of plums would not offer their cars for sale.

There is an externality problem between the sellers of plums and lemons, which result in the market failure. When an individual is trying to sell lemons he affects the buyers' perception on the quality of average car in the market. This lowers the price that the buyers are willing to pay for an average car in the market. This further discourages the sellers of plums. This is an externality problem. Thus in the presence of information asymmetry, if too many low quality items are offered for sale, it changes the buyers' perception (and dampens the willingness to pay) on the average product, and thus making difficult for the sellers of high quality items to offer their products in the market.

9.4.2 Market for Labour

Now consider market for labour in Figure 9.1. Let us represent the number of workers on the horizontal axis and monthly wages on the vertical axis. The figure shows demand curves for high- and low-ability workers when workers' abilities are observable to the potential employers, labelled as DH and DL respectively. The figure also shows the supply curves for high- and low-ability workers labelled as SH and SL respectively. The higher the monthly wage, more the high-ability workers are willing to accept employment.





Using this figure, we show how asymmetries exist in the labour market. Usually workers have greater knowledge about their abilities than their potential employer. We assume here that workers are paid according to their abilities. Initially we assume the ideal market situation where the potential employer can easily differentiate between a high-ability and a low-ability worker. Accordingly, a high-ability worker will be paid where curve D_H intersects S_H . The number of high-ability worker employed will be 500 and they will be paid a monthly wage of Rs. 12,000. The equilibrium for low-ability worker is where curve SL intersects DL, that is, at 400 low-ability workers paid a monthly wage of Rs. 6000 per month. Low-ability workers are paid lower than the high-ability workers when the labour market is in equilibrium. In this case, we do not face a situation of asymmetric information, as the abilities of the workers to be hired are common knowledge. Thus, the employer can easily differentiate between a high-ability and a low-ability worker.

Now consider the case when we have a situation of asymmetric information in the labour market. That is, the abilities of the workers to be hired are not the common knowledge anymore. For this refer Figure 9.2.



Figure 9.2: Deadweight loss under Market for Labour

Given that there is information asymmetry, the potential employer is not able to distinguish between the high- and low-ability workers. So for the employer the demand for labour is depicted by the demand for an average worker. Thus following Fig. 8.2, D represents the demand for an average worker which is given by the average of lowability and high-ability workers. DH represents demand for high-ability workers and DL is the demand for low-ability workers. Let curve S represents the total supply of highand low-ability workers together. Curve SH and SL are the supply of high-ability and low-ability workers, respectively. Thus in the presence of information asymmetry, the labour market equilibrium is defined by the intersection of the S and D curve, depicting the total employment of labour in the equilibrium as 900 workers. Out of 900, the existing 400 low-ability workers should be paid a monthly wage of Rs. 4000, while the existing 500 high-ability workers should be paid a monthly wage of Rs. 12,000. This would be the feasible outcome when the quality of labour was observable. But since in this case ability of labour cannot be distinguished, 900 workers in the market are paid a uniform monthly wage of Rs. 6000. This is due to the presence of asymmetric information to the potential employer about the abilities of the workers. As a result of this, a high-ability worker is underpaid and a low-ability worker is overpaid. This will discourage a high-ability worker from participating in the labour market. At Rs. 6000 per month, only 300 high-ability workers will participate (as shown by the intersection of SH

with D curve). As low-ability workers are overpaid, they will be encouraged to participate more in the market. So insteadof400, 600 low-ability workers participate in the labour market in the equilibrium at the monthly wage of Rs. 6000 (as shown by the intersection of SL with D curve).

In the market, ideally if no asymmetry in information is present, there were total 900 workers employed, out of which 400 were low-ability and 500high-abilityworkers. In the presence of a symmetric information, there 300 high-ability and 600 low-ability workers. This shows that quality of the labour in the market dropped due to the presence of the asymmetric information. This is known as the situation of adverse selection. Potential employers would have hired 500 high-ability and 400 low-ability workers when there was no asymmetric information, but they ended up hiring 600 low-ability and 300 high-ability workers. Hence, the market has become adverse due to the presence of asymmetric information.

Dead weight loss due to a symmetric information:

In Figure 9.2, area ABC represents the deadweight loss due to lower hiring of high-ability workers and area DEF represents the deadweight loss resulting from hiring too many of low-ability workers. In the above case we saw that in the labour market equilibrium, with the presence of asymmetric information, fraction of high-ability workers will be smaller than it would have been in the first best scenario (without any information asymmetry) where the potential employers would able to identify abilities of the workers before hiring. Because of asymmetric information, low-ability workers drive high-ability workers out of market. This phenomenon is an important source of market failure.

9.4.3 Market for Insurance

Huge asymmetric information exists in the market for insurance. For instance, in the case of health insurance, the maximum and true information about one's own health is known only to the person himself or herself. The insurance company often suffers from the lack of information about the person's real health status. People facing high health or disability risk (and old in age) would prefer buying a fat medical insurance, so that their medical bills can be taken care of. While healthier (and younger) people facing a lower health risk, generally do not need much insurance and hence they would prefer to buy insurance which are attractive to them in terms of premium and insurance cover. If the insurance company sells insurance to proportionately more sick or old people, then it may not be sustainable for them to run business because it won't be able to draw the benefit of cross subsidies from the healthy (and young) clients. The insurance company will incur huge costs of frequent claims and may find it difficult to breakeven. In such cases the profit maximising company may withdraw from the market. In the presence of asymmetric information, it is difficult for the insurance company to segregate individuals facing high health risk from the ones facing a lower risk. This leads to the problem of adverse selection in the market for health insurance. If the pricing or the insurance contract (defined by the amount of yearly/monthly premiums and amount of insurance benefit in case of sickness) is uniform for both the healthy and sick individual, then it may induce a relatively stricter clause (over priced) for the healthy individual and relatively easier clause (under priced) for the sick individual. This situation is similar to _market for lemons'. In such a scenario, the healthy individuals may have disincentive to buy insurance while sick individuals may have high incentive to buy insurance. Adverse selection will prevail as individuals applying for insurance work to buy insurance of the sick people than healthy people, leading to insurance company losing out profits. This will lead to market failure in insurance market.

9.4.4 Market for Credit

Similar problem of asymmetric information exists in the market for credit. In market for credit, the borrower has more information about his true credit worthiness as compared to the lender. In other words, it is often difficult for the lender to judge the true credit worthiness of the client. Choosing a wrong client would mean greater risk of default and hence larger losses to the lender. As in the case for market for _lemons', low quality or risky borrowers are more likely to enter the credit market for credit than high quality or safe borrowers. This forces the lending interest rates based on the average default risk to go up further, which in turn may induce the safe borrowers to withdraw from the market and may increase the client profile of lenders by more risky borrowers. This leads to the problem of adverse selection in the credit market.

Self Check Exercise-3

- Q.1 Discuss the term Market for 'lemons'.
- Q.2 Discuss the term Market for Labour.
- Q.3 Discuss the term Market for Insurance.
- Q.4 Discuss the term Market for Credit.

9.5 SOLUTION TO A SYMMETRIC INFORMATION-SIGNALING AND SCREENING

9.5.1 Signalling

The existence of asymmetric information often leads to the problem of adverse selection and this leads to market failure. Now what to do when asymmetric information is prevalent? One way in which the buyer and seller can deal with this problem is

through market signalling. The concept of market signalling is where the buyer or the seller signals the other uninformed party, to increase their information about the product in trade.

To see how market signalling works, let us consider the case of asymmetric information in the labour market. In the labour market where high- and low-ability workers are present and are not easy distinguishable, employing somebody can be very costly to the potential employer. If an employer hires a low-ability worker for a job requiring high-ability, he will be in severe loss. In such a case market signaling works great. The high-ability worker can signal the employer about his abilities, which stand out amongst all the other low-ability candidates. Signals could be in the form of better resume, being highly qualified, education level, showing good etiquettes, speaking in decent language, etc. These mechanisms are often used by the high-ability worker to signal the potential employer about his (her) potential and makes sure the employer credit him (her) with a high quality tag.

9.5.2 Screening

Presence of asymmetric information provides incentives to the parties concerned to communicate with each other. In the previous sub-section we came across how informed parties (workers) provide information to the uninformed parties (the potential employer) to make up for the a symmetries in the information. There, the informed parties initiate communication by signalling about their hidden type to the uninformed parties. There is another way to take care of the information asymmetries, which is when uninformed parties initiate communication by conducting a test either for the informed parties or the goods those parties seek to trade. For instance, in the market for second-hand cars, the potential buyer of a second-hand car can learn about its quality by getting it checked from a mechanic or learn about the accident record of the car. Similarly, a life insurance company can gain information regarding the health of an insurance policy applicant by obtaining the applicant's medical records, contacting his current physician, or subjecting him to a physical examination. Another common way of implementing screening is by designing and offering different contracts for the different types of agents with hidden information, instead of offering one homogenous contract. In this way each agent's type gets revealed.

There is one significant difference between signalling and screening. In signalling it is the more informed party that initiate the communication, whereas in screening the communication intended to make up for the information asymmetries is initiated by the less informed.

Self Check Exercise-4

Q.1 Give solution to a symmetric information.

9.6 MORAL HAZARD

Moral hazard is also a result of asymmetric information where asymmetry arises due to hidden action by agents such that the action of one party is not observed by the other party in trade, which in turn affects the benefits of the latter. For example, in the case of the insurance market, an insured individual's risk of death or disability may increase in the post insured stage because of his unhealthy lifestyle including smoking, excessive drinking, or a lack of exercise. However, the insurance company is likely to have difficulty in monitoring his behaviour and adjusting its premiums accordingly.

Moral hazard often arises in the labour market since employers cannot monitor the behaviour and efforts of their employees completely. This causes inefficiency with employees exerting less effort than the employer would consider required. Moral hazard is also prevalent in big corporations, where individual managers may take actions that further their own interests at the expense of the company, which we discuss in the next section. In general, moral hazard occurs when a party to a transaction takes hidden actions that remain unobserved by its trading partner and that affect the benefits or payoff of the latter.

A simple illustration explaining moral hazard associated with asymmetric information problem and how it leads to increase in the costs is as follows. Consider a case of night security guard in a company. Since the duty is for the night, nobody observes the actions of the security guard. This in turn is incentive enough for the guard to shirk, that is, not guarding properly. Suppose he frequently sleeps during his duty hours as he knows his actions are not observed. As a result of this, one night the company suffers a break in, leading to huge costs to the company. This is due to the presence of moral hazard in the guard's hidden behaviour which the firm is unable to observe. Thus the presence of asymmetric information leads to market failure.

9.6.1 Principal-agent Problem

We often study a simplified model with only one agent on either side of the market to understand asymmetric information problems. The agent who proposes the contract is called the principal and the agent who either accepts or rejects the contract is called the agent. The existence of moral hazard too occurs because of the principal and agent. Agents are the individuals employed by the principal to achieve principal's objective. In the presence of information a symmetries, often preferences of the principal and agents are not aligned and agents tend to pursue their own goals rather than the goals of the principals. For instance, the employee (or the agent)on duty has incentive to shirk effort, which his employer (or the principal) fails to observe.

Common examples of a principal-agent relationship include corporate management (agent) and shareholders (principal), politicians (agent) and voters (principal), or brokers (agent) and markets— buyers and sellers (principals). Consider a legal client (the principal) wondering whether their lawyer (the agent) is recommending protracted legal proceedings because it is truly necessary for the client's well-being, or

because it will generate income for the lawyer. Similarly a surgeon advising a patient for an expensive knee replacement surgery may be because of genuine requirement of the patient or because it is profitable for the surgeon. In fact the problem can arise in almost any context where one party is being paid by another to do something with the agent having a small or non-existent share in the outcome.

Moral hazard problem arises where parties have different interests and there exists information a symmetries with agent having more information than the principal. In such a case, principal cannot directly ensure that agent is acting in their (the principal's) best interest, particularly when activities that are useful to the principal are costly to the agent, and where elements of what the agent does are costly for the principal to observe. Often, the principal may be sufficiently concerned at the possibility of being exploited by the agent that they choose not to enter into the transaction at all, when it would have been mutually beneficial: a suboptimal outcome that can lower welfare overall. The deviation from the principal's interest by the agent is called agency costs. Principal-agent problem can be found both in private enterprises and public enterprises. One way to correct for the principal-agent problem is by making an effective incentive mechanism, wherein the agent can be tied with some share in the profits so that the agents and the principal's objectives are aligned together. For example, giving managers (agents) some share in the company's equity so that they do not shirk on their full potential in their duty.

Self Check Exercise-5

Q.1 What do you mean by Moral Hazard?

9.7 SUMMARY

The present Unit discussed the market condition when one of the key assumptions of perfect competition given by full and symmetric information among the agents involved in trade does not hold. Asymmetric information exists when in a twoparty trade one party has greater information than the other party. It leads to market failure with one reaching an inefficient allocation of resources. Such an inefficient solution results due to adverse selection that arises when there exist asymmetric information. In adverse selection the high quality goods or worker leave the market and market essentially consists of low quality goods or workers. Examples of markets suffering from asymmetric information are- market for used cars, health insurance market, market for credit, market for labour, etc. There is deadweight loss to the society in the presence of asymmetric information, as efficient allocation of resources is not happening. One solution to achieve equilibrium in the presence of asymmetrical information is through market signalling or screening. The Unit proceeded with describing the problem of moral hazard that exists when one agent tries to shirk as the other agent is not able to observe former's actions. In such a case the agent pursue his/her own goals rather than the goals of the principal.

9.8 GLOSSARY

- **Asymmetric Information**: Occurs when one party to an economic transaction possesses greater material knowledge than the other party.
- **Market for Lemons :** In America, _lemon' is used as a slang denoting a bad quality car. In the presence of asymmetric information, bad cars tend to drive out good cars from the market, leaving behind a Market for lemons (bad cars).
- **Moral Hazard :** A situation arising as a result of a symmetric information in which one party gets involved or consider entering in a risky event after it has struck a deal involving covering of the risky situation by the other party.
- Adverse Selection: Originally defined in the insurance theory, to describe a situation where the information asymmetry between policy-holders and insurers leads to a situation with policy holders claiming losses that are higher than the average rate of loss considered to set premiums.
- **Principal-agent Problem** : Arises when one party (principal) delegates an action to another party (the agent), and there exists information asymmetries between them.
- **Market Failure** : An economic situation defined by an inefficient allocation of goods and services in the free market.
- **Deadweight Loss**: The loss of social welfare measured in terms of the sum of producer and consumer surplus when the equilibrium outcome is not achievable or not achieved. Both monopoly and monopolistic competition create deadweight loss by producing lower output and charging a higher price than what a competitive market would produce and charge.
- Welfare Economics : It is a branch of economics which is concerned with the overall social welfare of the economy. It aims at developing economic policies and target different welfare problems and issues.

9.9 ANSWERS TO SELF-CHECK EXERCISE

Self Check exercise -1

Ans.1 Refer to Section 9.3 Self Check exercise -2 Ans.1. Refer to Section 9.4 Self Check exercise -3

Ans.1 Refer to Section 9.4.1

Ans.2 Refer to Section 9.4.2 Ans.3 Refer to Section 9.4.3 Ans.4 Refer to Section 9.4.4 Self Check exercise -4 Ans.1 Refer to Section 9.5 Self Check exercise -5 Ans.1 Refer to Section 9.6

9.10 REFERENCES/SUGGESTED READINGS

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9.11 TERMINAL QUESTIONS

- 1. Define asymmetrical information? How does asymmetrical information lead to market failure?
- 2. How does market for lemons turn into adverse selection?
- 3. What is solution to the problem of adverse selection?
- 4. Define Moral hazard. What does it lead to?
- 5. What is meant by the principal-agent problem? What leads to principal-agent problem? How can that be corrected?

Unit-10

EQUILIBRIUM UNDER OLIGOPOLY

STRUCTURE

- 10.1 Introduction
- 10.2 Learning Objectives
- 10.3 Oligopoly Self Check Exercise-1
- 10.4 Cournot's Model Self Check exercise-2
- 10.5 Bert round' Model Self Check Exercise-3
- 10.6 Edge Worth's Model Self Check Exercise-4
- 10.7 Chamberlin's Model Self Check exercise-5
- 10.8 Kinked Demand Curve Model Self Check Exercise-6
- 10.9 Summary
- 10.10 Glossary
- 10.11 Answers to Self Check Exercises
- 10.12 References/ Suggested Readings
- 10.13 Terminal Questions

10.1 INTRODUCTION

We have seen how price and output are determined under the two limiting types of markets, pure competition and monopoly, as well as under an intermediary market that goes by the name of monopolistic competition. The latter is a market form which is closer to pure competition despite the monopolistic elements present in it. Now we shall analyze the determination of price and output under a market form which is nearer to monopoly than to pure competition despite the element of competition found in it. This is the market form that is described as oligopoly.

10.2 LEARNING OBJECTIVES :

After reading this Chapter you will be able to explain as 10 :

- What do you understand by an Oligopoly Market.
- What is Cournot's Models.
- What is Best rand's Model
- What is Edge Worth's Model.
- What is Chamberlin's Model.
- What is Kinked Demand Curve Model.

10.3 OLIGOPOLY

Oligopoly is a market form in which there are few firms producing a homogeneous or a differentiated product and freely competing among themselves. The number of firms is so small that a change in the output and price of one is bound to influence the total conditions of the 'industry' and therefore to provoke a of the price-output policies of the rival firms which, in turn, may provoke a further change in the policy of the first firm and such a chain reaction goes on till a new equilibrium is attained. Thus, we find that there is a great degree of inter-dependence of firm's policies which are likely to be determined through a series of moves and countermoves.

In view of what has been said above, the problem of price output determination under oligopoly becomes too intricate to admit of a simple solution. It is generally believed that output and price are indeterminate under oligopoly, that is to say, there is no unique solution to the equilibrium problem under oligopoly. While under pure competition and monopoly, even under monopolistic competition, the individual firm can disregard the behavioural reaction of the rival firms to its own price-output policy, it cannot do so under oligopoly. The individual firm, under pure competition, can sell as much or as little as it likes at the going price over which it has no control so it need not bother about the behavioural reaction of rival firms to its own policy for it will be zero. The monopolist too need not bother about such a reaction because, be definition, there is no direct rival to him.. Under monopolistic competition too, the individual firm may not bother about the behavioural reaction of rival firms, for any adverse effect of a policy move made by it will be widely distributed, as there is a very large number of rival firms and therefore, the impact of the adverse effects on any one rival will be so small that most of them may not react at all to a policy move made by another. Under oligopoly, the number of firms being small any move made by one of the firms is bound to provoke a counter-move by the rival firms. Therefore, an oligopolistic firm has to make some assumption with regard to the possible behaviour reaction of the rival firms to any move adopted by it in order to arrive at the decision how much to produce and what price to charge. The solution of the equilibrium problem under oligopoly, therefore, rests on the behavioural assumptions that one makes. A change in the behavioural assumptions changes the solution. It is due to this that output and price are said to be indeterminate under oligopoly. This fact is conspicuously reflected in the bewilderingly large number of models of oligopoly. We shall discuss them here in brief.

Since practically all the modern models of oligopoly have developed from the classical models of Cournot, Bertrand and Edgeworth we shall firstly, have a look at them.

Self Check Exercise-1

Q.1 What do you mean by Oligopoly?

10.4 COURNOT'S MODEL

Augustin Cournot was perhaps, the first economist to analyze the problem of equilibrium under duopoly which is only a special case of oligopoly. His model is based upon the following explicit or implicit assumptions; (1) There are only two producers (whom we may call A and B producing a homogeneous commodity; (2) They have identical constant costs which are assumed to be zero (Cournot's example is the mineral water having no costs); (3) Both the producers perfectly know the total demand curve for their commodity; (4) The demand curve is a straight line; (5) There is free competition between the producers; (6) Both the producers seek to maximize their profits (7) and the crucial assumption with regard to behaviour reaction is that each of them assumes that whatever he might do to his own output of the next plan period his rival will stick to the output he is currently producing.

Let us suppose that the total demand curve for the commodity is AB in Fig. 13.1 Since it is assumed that whatever be the level of output of either of the two producers the cost remains constant at zero, the AC = MC curve will coincide with X-axis for either of them.

Now let the producer A enter the market first.



He will act as a monopolist, the whole market is open to him alone. So he looks upon the total demand curve AB as his own demand curve (AR-curve). To maximize his profit, he will produce and sell OM quantity at which his marginal revenue is zero therefore, equals his marginal cost. This is one half of the free competition output OB.

Now enters B. He assumes that A will- stick to his output OM which being sold at the price OP. So only the half of the market is open to B it is that half which is not being supplied by A. Therefore, the demand curve facing B is CB. He acts as a monopolist in this part of the market. To maximize his profit he produces that output at which his marginal revenue curve. CM₁ meets the X-axis so that his MR equals his MC. His output is MM₁-1/4 of the competitive output OB.

The total output is now OM₁ and the price is OP₁. There is now a counter-move by A on the assumption that B will stick to his output MM₁ 1/4 OB. So he believes that now 3/4 OB is open to be supplied by him and under the demand and supply conditions assumed and depicted in Fig. 13.1 he will produce 1/2, 3/4, i.e. 3/8 of the competitive output OB. This implies a reduction in his output by 1/8th of the competitive output OB. This move by A will provoke a new move by his rival B who will now see that 5/8 of the market is open to him. So his profits will be maximized if he produces 1/2. 5/8 i.e. 5/16 of the competitive output OB. This implies an increase in B's output by 1/16 of the competitive output OB. The moves and counter-moves will go on infinitely till the equilibrium is attained:

In equilibrium, which will come about through an infinite series of moves and counter moves the total output of the industry will be $1 - 2^+ 4^- 8^+ 16^{-----\infty}$ OB

which will sum up to OB = 2/3 (OB). So we can say that the equilibrium output of the industry will be 2/3 of the competitive output.

The output of A will be
$$\begin{pmatrix} 1 - \frac{1}{2} - \frac{1}{8} - \frac{1}{32} - \dots - \infty \end{pmatrix}$$
 OB which works out to be $\begin{cases} 1 - \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 2 + \frac{1}{8} + \frac{1}{32} - \dots - \infty \end{pmatrix} \end{cases}$ OB $\begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ - \frac{1}{4} & 0 & 0 \end{pmatrix}$ $= 1 - \frac{2}{1 - \frac{1}{4}} (OB) = \frac{1}{3} (OB)$
The output of B will be $\begin{pmatrix} 1 & 1 & 1 & 1 & 1 & -\dots - \infty \\ 4 + \frac{16}{16} + \frac{1}{64} & 0 \end{pmatrix}$ OB which too works out to be $\frac{1}{4} - \frac{1}{4} (OB) = \frac{1}{3} (OB)$

Thus, we see that in Cournot's model, equilibrium output of the industry under duopoly is 2/3 of the competitive output and this is equally divided between the two producers. The output under duopoly is greater than under monopoly and consequently price under duopoly is less than under monopoly.

Cournot's of duopoly can be easily extended to cover number of firms, through the formula that the equilibrium output will be $\frac{n}{n+1}$ of the competitive output which will be equally shared by all firms, where *n* in the formula represents the number of the firms. For example, if there are three firms, the equilibrium output will be $\frac{3}{3+1}$ of competitive output and each *of* the three firms will produce 1/4 of the competitive output.

Self Check Exercise-2

Q.1 Discuss Cournot's Model.

10.5 BERTRAND'S MODEL :

Cournot presented his model of duopoly in 1838. About half century later, another French economist, Joseph Bertrand presented a different model in which it was sought to be demonstrated that the equilibrium output and price under oligopoly are the same as under pure competition. As it was explained in the beginning, the difference between the conclusions of Cournot's model and Bertrand's model is due to the difference in the underlying assumption with regard to the behavioural reaction of the duopolistic producers in the two models.

In Bertrand's model we have all the assumptions of Cournot's model except the last (No 7) of them. In place of it the assumption in model is that producer assumes that whatever he might do to his price, the other will stick to his own price.

Let A enter the market first. Since he is all alone in the market as a seller he will charge the monopoly price and supply the monopoly output to maximize his profit. In terms of Fig. 13.1 he will sell OM quantity and charge OP price. Now B enters the market and assuming that A will stick to his price OP in spite of what he may do fix the price lower than OP. All the buyers will switch over to B because the commodity is homogenous. Now comes the reaction from A who, assuming that B will stick to his price, will lower his own price below that of B, which will provoke B to make a further cut. The logical result of this type of behaviour reactions is a price war between the two. Ultimately, equilibrium will be attained when price is reduced to zero under our assumption of zero constant costs. In terms of our Fig. 13.1 the total output will be equal to the competitive output OB and the price will equal the competitive price that equals average cost (which is zero in our example). This total output is likely to be equally divided between the two firms or for that matter among all the firms making up the oligopolistic industry.

Self Check Exercise-3

Q.1 Discuss Bertrand's Model.

10.6 EDGEWORTH'S MODEL:

The third classical model is Edgeworth's model. It is a model in which there is no stable equilibrium but, instead there are perpetual oscillations of prices.

Edgeworth's assumptions are the same as those of Bertrand inclusive of the behaviour reaction assumption. The results of his model are different from those of Bertrand's because he introduced an additional assumption, namely, that the combined output capacity of the two producers is less than the competitive output.

In Fig. 13.2 OX and OX' represent the constant zero costs of A and B respectively with the constraint that A's maximum output capacity is OA and B's maximum capacity is OB, DD_1 is demand curve facing A and DD_2 is the demand curve facing B.



A is the first to enter the market and fixes his price at the monopoly level P and supplies Pa quantity. B joins in and assuming that A will stick to the price P regardless of the price that he himself charges, fixes the price at a relatively lower level at which he is able to sell his capacity output OB $=p_1b$, and thus encroaches upon the market of A. But A retaliates, assuming that B will stick to his price P₁, by reducing the price below P_1 to P_2 such that he is able to sell the whole of his capacity output, $OA=P_2a_1$. Thus in this model too there is a price war, but unlike in Bertrand's model there is no end to price war in Edgeworth's model. Sooner or later, one of the producers will lower the price to a level at which the demand in his own market will equal his capacity output. For example, this may come about when B's price is lowered to the level P_3 at which B is able to sell his capacity output OB in his own individual market. But this is not a position of stable equilibrium. A, seeing that B has done his worst to the price and that his own individual market is unencoached by B, may again fix the price at P₁ which will provoke B to raise his own price to a level like P1. Thus, the whole process of price-cutting starts again dragging the price down to P₃ and then pulling it back up to P again. There are perpetual oscillations in price. The three models explained above clearly show that there is no unique equilibrium under oligopoly.

One basic weakness of all the three models discussed above is the implicit assumption that the oligopolistic firms in these models do not learn from their experience. In spite of the fact that their behaviour reaction assumptions are repeatedly falsified, they never bother to revise them in the light of their experience. They are assumed to be so shortsighted that they never recognize their mutual dependence.

Self Check Exercise-4

Q.1 Discuss Edgeworth's Model.

10.7 CHAMBERLIN'S MODEL

Chamberlain has provided us with another model of oligopoly in which the producers are assumed to recognize their mutual dependence. When the number of firms is small as in the case under oligopoly, each firm can easily see that any price cut made by it will be immediately followed by the rival firms for the adverse effect of a price cut by it will not be widely distributed and, hence, its impact on the rival will not be negligible. Therefore, it is reasonable to assume that the oligopolists belonging to a given group or 'industry' will recognize their mutual dependence and will, therefore, be able to perceive that any price cut made by any one of them will push his sales not along the more elastic sales curve dd' but along the less elastic DD' in Fig. 13.3. This may prevent them from engaging themselves in a price war. On the other hand, they may very well fix the price at the monopoly level, on the assumption that their cost curves are identical and such that they when added together, will become identical with the cost curves of the single monopolist. The total output, then will equal the 'monopoly' output which under the above assumption, will be equally shared by all the firms. It is to be noted that the monopoly arrangement in this case is not the result of any collusion among the firms. It comes about as a result of the oligopolist's intuition or experience gained through an earlier price war.



Taking into account this fourth model too, we can conclude *that under oligopoly* equilibrium is indeterminate; it can lie anywhere between the monopoly price and monopoly output and the competitive price and competitive output.

As already pointed out the three. classical models referred to above have an implicit assumption that the oligopolists do not learn from their experience.

Chamberlin's model does not make this assumption. But it shares, with the classical models and a number of modern models, another common weakness: all these models are based on the assumption of perfect knowledge and they rule out uncertainty. As soon as we introduce uncertainty into a model of oligopoly, the

analysis of equilibrium becomes still more complicated. This has led some mathematical economists, particularly Von Neumann and Morgenstern to suggest that the laws governing oligopolistic behaviour resemble not the laws of physics, from which the technique of equilibrium analysis has been borrowed but the laws governing the outcome of games and wars which implies a number of strategies and counter strategies.

Some other economists have suggested that since fighting out oligopolistic wars in real life, is full of uncertainty, it is very likely to prove a futile struggle. The realization of this truth may induce the oligopolist to abandon the quest for maximum profit. We had earlier seen, in Lesson 11, that there is not very sound reason why a monopolist should always seek to maximize his profit. But it is mainly the analysis of oligopoly that has led economists to doubt the realism and relevance of the profit maximizing assumption. It is suggested that, under oligopoly at least, the firms are likely to prefer a relatively leisured life to the strains of oligopolistic wars, provided an oligopolist is earning 'satisfying' profits, which may be any level of profits that is able to satisfy him. This suggests that prices and output, particularly prices, under oligopoly would tend to be rigid: they tend to be sticky at the ruling levels. Their rigidity or stickiness may be accounted for probably by the fact that the oligopolist might be earning at these levels of prices what they regard to be 'satisfying' profits. Due to the uncertainty with regard to the behaviour reaction of the rival firms, they are afraid to experiment with price-output changes.

Self Check Exercise-5

Q.1 Discuss Chamberlin's Model.

10.8 "KINKY" MODELS/KINKED DEMAND CURVE MODEL

The rigidity or stickiness of oligopoly prices have been explained with reference to what have come to be known as 'Kinky' models of oligopoly. In these models the sales curve or average-revenue curve of an oligopolist is a 'kinked' one like the curve dAD' in Fig. 13.4 the kink developing at the ruling price OP. Such a curve shows that the demand for the oligopolist's product is highly elastic at prices above the ruling price OP (dA portion of dAD'. curves is relatively flat) and it is rather inelastic at prices lower than the ruling price (AD' portion of dAD' is relatively steep). This type of kinked' sales curve implies the behavioural assumption that an oligopolist expects any price cut by him to be immediately retaliated with a similar price cut by his rivals so that he cannot expect his sales to increase sufficiently in response to a cut in his price to make it worth while. He expects that any price increase made by him will not be imitated by the rival producers so that he expects his sales to fall proportionately more than the rise in price. Thus he feels it very risky to experiment with a change in his price. It is due to this reason that prices tend to be rigid under oligopoly.



However, the above model tells us why prices tend to be rigid at the ruling level. But it does not tell us how the ruling level itself is determined. There are various hypotheses about it. The level of the ruling price might be determined by the level of 'satisfying' profits. Or, it might be fixed by the 'leader' firm and will not change until the 'leader' firm decides to change it. Still another explanation is that prices under oligopoly are set according to the principle which is referred to by the alternative names of 'Full-Cost' Principle, 'Normal Cost' Principle, "Average-Cost" Principle and the 'mark up' Principle. This principle is claimed to have been founded on empirical investigation. According to the authors of this principle (Hall and Hitch, P. W.S. Andrews Barback) a typical real-world firm fixes its price not as a result of fine calculations of its marginal costs and marginal revenue, as the conventional theory implies, but through a rule of thumb involving the following considerations: The average d direct cost of output, which is the cost of the variable factors employed, is found out. To this is added a "costing margin" which covers (i) indirect costs or the costs of the "fixed" factors and (ii) the normal profit that is calculated with reference to the industry as a whole. The average direct costs in this hypothesis are believed to be constant, for the empirical investigations are believed to show that over ranges of output actually worked by firms, these costs do not change. The "costing margin" or "market-up" once it is calculated on some basis, also remains constant despite variation in the demand for its product, provided the prices of direct and indirect factors do not change.

However, the 'Kinky' model does not necessarily imply that profits are not maximized. Look at Fig. 13.4. The MR curve therein is the marginal revenue curve when dAD' is the average revenue curve. The MR curve has a discontinuity gap ab which is due to the sudden change in the elasticity of demand from just above the 'kink' to just below it. If the cost conditions of the firm are such that its MC curve- cuts the MR curve through the discontinuity gap ab, the profit maximizing price for it, also must be OR. The 'Kink' sales curve drawn in Fig. 13.4 is obtuse-angled. Paul Sweezy

has suggested that such a curve is relevant to periods of depression when aggregate demand is too inadequate to make it possible for firms to sell their outputs easily. The firms face difficulties in selling their outputs as there develop "buyer's markets." Within such an environment it is a. reasonable assumption to make that any price. cut by one firm will be almost immediately retaliated with similar price cut by the rival firms, while any price increase made by one will not be followed by the others. It is this assumption which gives us an obtuse angled 'Kinky' sales curve like the dAD' curve in Fig. 13.4 above. According to Sweezy, during periods of boom and prosperity, the 'kinky' sales curve is likely to be reflex-angled with its portion above the 'kink being less elastic than that below the 'kink'. The assumption underlying the reflex-angled 'kinky' sales curve is that any price increase by one firm will be imitated by the rival firms, while a price cut by one will not be imitated by others. This may happen in booms, when aggregate demand is usually ahead of the aggregate supply, in consequence of which 'sellers' markets" develop. Since there is no difficulty for a firm' in selling its output, a price cut by any one will not be followed by others, hence for prices lower than the going price, the demand will be elastic. But a rise in the price of one will tempt others to follow suit, hence for prices higher than the going price the demand will be inelastic. This implies a reflex-angled 'kinky' sales curve of a firm.

Self Check Exercise-6

Q.1 Discuss Kinked demand curve Model.

10.9 SUMMARY

- The term duopoly derives from two Greek Words Digo (Which Means Few) and pollen (When Mean 10 sell). In Oligopoly there are few sellers of a product and product may be howogenores or helerogenour.
- Oligopoly is also known as limited competition, incomplete nomopoly, Multiple monopoly and theory of games.
- Under Oligopoly, Prices are rigid or there is price rigidity i.e. It price is once determined, it tends to stabilize.
- Augurlin cournot, a French economist was the first economist who propunded the oligopoly Model in 1838.
- In coir not Model each seller assumes that his rival's output remains constant while in Bert rends Model each seller assumes that his rival's Price remains constant.
- The theory of kinked Demand curve was advanced independently and almost simultaneously by R.L. Hall and C.J. Hich in England and Paul M. Sweegy in America around 1939.

10.10 GLOSSARY

The Cournot Model shows that firms in Oligopoly Markets make simultaneous and independent output decisions. The relationship between on oligopoly firm's Profit-Maximizing out-put level and oligopoly competitor out-put is called the oligopoly output firms react to competitor production decisions.

The Bertrand Model focuses upon price reactions, rather than the output reactions of oligopoly firms. Bertrand Equilibrium is reached when no firm can achieve higher profits by charging a different price. In the Bertrand Model, the relationship between the profit Maximizing price level and competitor price is called the oligopoly price reaction curve because it shows how the oligopoly firm reacts to competitor pricing decisions.

The Sweezy Model hypothesizes that when making price decisions' oligopoly firms have a tendency to follow rival price decreases but ignore rival price increases. Sweezy theory explains why an established price level tends to remain fixed for extended periods of time in some monopoly markets. Such rigid prices are explain as reflecting a kinked demand curve.

A kinked demand curve is a demand curve of a firm that has different slopes for price increases as compared with price decreases.

10.11 ANSWERS TO SELF CHECK EXERCISES

Self Check exercise -1 Ans.1 Refer to Section 10.3 Self Check exercise -2 Ans.1. Refer to Section 10.4 Self Check exercise -3 Ans.1 Refer to Section 10.5 Self Check exercise -4 Ans.1 Refer to Section 10.6 Self Check exercise -5 Ans.1 Refer to Section 10.7 Self Check exercise -6 Ans.1 Refer to Section 10.8

10.12 REFERENCES/ SUGGESTED READINGS

- 1. W.J.L. Ryan: *Price Theory*, Ch: II.
- 2. Chamberlin *Theory of Monopolistic competition*, Ch. 3.
- 3. Fellner: Competition Among the Few, Ch'. 17,
- 4. Machlup: *The Economics of Sellers Competition*. Chs. 13 and 15.
- 5. Leftwich: *The Price System and Resource Allocation*. Ch. 11 (For some other models of oligopoly.
- 6. Baumol: Business Behaviour, Value and Growth, Chs. 4-8.

10.13 TERMINAL QUESTIONS

- Q.1. Why are price and out-put said to be indeterminate Under oligopoly?
- Q.2 Critically examine Sweegy's kinded demand curve model.

MORE OLIGOPOLY MODELS

STRUCTURE

- 11.1 Introduction-Price Leadership
- 11.2 Learning Objectives
- 11.3 Price Leadership by a Low-case firm
- 11.4 Price Leadership by a dominant firm
- 11.5 Barometric price Leadership Self Check Exercise-1
- 11.6 Barometric sales Maximization Hypothesis Self Check Exercise-2
- 11.7 The Barometric Model Self Check Exercise-3
- 11.8 Williamson's Managerial Model Self Check Exercise-4
- 11.9 Sision's Satisfying Model Self Check Exercise-5
- 11.10 R. Morris Model Self Check Exercise-6
- 11.11 Summary
- 11.12 Glossary
- 11.13 Collusive Pricing
 - 11.14 Price Leadership
 - 11.15 Answers to Self Check Exercises
- 11.16 References/ Suggested Readings
- 11.17 Terminal Question

11.1 INTRODUCTION-PRICE LEADERSHIP:

Price Leadership: Price Leadership refers to a particular form of oligopoly in which one of the firms is informally accepted as the leader by all the other firms

belonging to a given industry or "group". The leader firm sets the price and the other firms who behave as "followers" accept that price as a datum and then adjust their individual outputs in a manner so as to maximize their individual profits.

But the question is which firm it is that will act as the leader and will be accepted as such by the other firms which will act like the followers. Depending on the answer to this question, different models of price leadership have been formulated a couple of which we shall describe here below.

11.2 LEARNING OBJECTIVES :

After reading this Chapter, You will be able to explain :

- What is price Leadership.
- Price Leadership by a Low-cost firm and by a Dominant firm
- What is Barometric Price Leadership
- Different Models of Oligopoly.

A lot of work has been done in the area ' of determination of equilibrium under oligopoly. Consequently there is quite a large number of oligopoly models available in the literature on the theory of oligopoly. In the preceding lesson we discussed a few of the earliest ones. In the lesson we shall explain some of the more important subsequent models.

We had pointed out in the preceding lesson that Chamberlin had presented a model of oligopoly in which the firms were assumed to recognize their mutual dependence, on account of which they did not engage themselves in oligopolistic price wars in that model. On the contrary, learning from either past experience or intuition or commonsense, the firms which recognize their mutual dependence would behave collusively, that is, instead of competing with one another they would reach some sort of open agreement not to compete with one another. Such a state of affairs in the world of oligopoly is referred to as "collusion" and such oligopolies are referred to as "collusive oligopolies." When the collusion or the agreement among the oligopolistic firms belonging to a particular "group" or "industry" not to compete but to collaborate is one and the details of such a agreement are formally specified as in the case of cartels for example the oligopoly is described as organized collusive oligopoly. Where such an agreement is not open and formalized but tacit and informal, the oligopoly is described as unorganized collusive oligopoly. We shall first, examine a couple of models of unorganized collusive oligopoly in the form of Price-Leadership Models. It is because unorganized collusive oligopoly usually takes the form of price-leadership.

11.3 PRICE LEADERSHIP BY A LOW-COST FIRM

One of the possible as well as plausible answer to the above question that the leadership role will be adopted by a firm which has the lowest costs of production. Even when there may be some tacit understanding among the oligopolistic firms regarding the sharing of the market, it is more than probable that if their cost conditions differ, the firm with the lowest costs will tend to act as the price leader. It will set the price which will be accepted by the other firms.

We shall explain this case as is usual with the help of a duopoly model for the sake of simplicity. So we assume two firms. A and B, of which A's cost curves are lower as well as somewhat to the right, compared to the cost curves of B as shown in Fig. 14.1 on next page. We may also assume the commodity to be homogenous. A further simplifying assumption is that the aggregate demand curve for the commodity is a rightward falling straight line like the line DD' in our Fig. 14.1. The curve Dd which lies midway between the aggregate demand curve DD' and Y-axis is the individual demand curve facing each individual duopolist on the assumption that the commodity being homogeneous, each will have one-half share of the total market.



Since A's cost curves indicated in our diagram above by the subscript A are lower, it will behave as a price-leader and B is bound to accept it as the price-leader, it is because if B does not accept it as the price-leader and refuses to behave as a follower, there will take place price-cutting competition. Since A's cost curves are lower than those of B, A's striking power will be greater and it is bound to win the price war, if it breaks out. Therefore it is not in the interest of B to provoke a price-war. So B will in its own self interest, accept to become the follower and let A act as the leader.

A on its part, will fix such a price which brings in to it the maximum profit. This objective, as you know, is attained, when it produces and sells such an output at which its individual marginal cost equals its marginal revenue. In our Fig. 14.1 above the line Dd represents the individual demand curve or sales curve which, as you should be knowing, is also its average revenue curve. The dotted falling straight line

MR is its marginal revenue curve which cuts its marginal cost curves MC_A at E Hence A, the leader, produces the output OQ and fixes the price OP. B who acts as the follower will accept this price and under our simplifying assumptions, will also produce OQ output because the total demand for the commodity will be double of OQ at this price in this simple case. This output and price maximize the profits of A but not of B, if we take into account the cost and demand conditions only. The cost conditions of B are such that its profits will be maximized (where its marginal cost curve MC_B cuts the MR line) at a smaller output and a higher price.

In this simple model, if we relax the assumption of only two firms and make it say three, while continuing to assume that A's costs are the lowest, the situation will remain the same except that the individual demand or sales or average revenue line Dd of our Fig. 14.1 will shift to the left to a position indicating the individual share of each firm to be one third of the total market. Price will be fixed by A, who acts as the leader, at the level which maximizes his individual profits. The other two firms will accept that price, though it does not maximizes their individual profits and share the market equally with the leader.

However, if the commodity is not homogenous but is differentiated, even then it is most probable that A whose costs are the lowest will act as the leader and fix a price which maximizes his own individual profits. If the product of each firm is a very close substitute of those of the others, there is great likelihood that each firm will charge the same price as the one set by the leader. But in this a little complicated model, a single uniform price is not inevitable. The total market in this case will not be equally shared. However, whenever the leader, due to some change in circumstances, changes the price, the other firms will follow suit.

11.4 PRICE LEADERSHIP BY A DOMINANT FIRM

Fritz Machulp; in his book. *The Economic of Setters Competition*, has presented a model of price leadership which is different from the model described and explained above. In this model it is assumed that there is one firm which is relatively very large in size compared to the other firms which are very small sized firms. It is obvious that the large firm has many advantages of large size and moreover, due to its large size and the other firms being very small sized, the large firm would be supplying a very substantial portion of the total supply. The other firms which are small-sized will be supplying individually a more or less insignificant portion of the total market, while the individual market share or the other firms is insignificantly small. Under this assumption it is natural that the large firm will dominate the market. Hence such a firm is said to be the dominant firm.

Due to its dominant share in the total market, it assumes the role of the price leader and the other smaller firms become the followers. The dominant firm fixes the

price which is accepted as a datum by the smaller firms and they try to adjust their outputs according to the price set by the dominant firm which acts as the price-leader. However, in this model the process of determination of price by the leader dominant firm is different from that of the model which we discussed above.

In this model, the demand curve facing the leader firm (which is also its sales and average revenue curve) is derived in a some complicated way. The dominant firm in this model fixes the price and let the other firms produce and sell what they want to and are able to do. Any demand in the market which is left out unsatisfied by the follower firms will be met by the leader dominant firm. The dominant firm will estimate the amount of demand left out unsatisfied by the follower firms at different possible prices of the commodity which can be supplied by the dominant firm. This pricequantity schedule linking different amounts of demand for the commodity left out by the follower firms to be taken over and supplied by the dominant firm at the different prices of the commodity will yield the demand curve of the dominant firm. We can explain this mechanism of the derivation of the leader dominant firm's demand curve with the help of the diagram of Fig. 14.2.



In Fig. 14.2 DD' is the aggregate demand curve. The aggregate supply curve of the follower firms is derived by summing up horizontally the individual marginal cost curves of all the follower firms. Therefore the curve $\sum MC$, in our diagram of Fig. 14.2 represents this aggregate supply curve of the follower firms. Supposing the price is fixed at P₀ the whole market demand at this price will be met by the follower firms, because $\sum MC_1$ intersects the market demand curve DD' at this price. Nothing is left out for the leader dominant firm to take over and supply. So at price P₀, the demand for the dominant firm's output is zero. But at prices, lower than this there is a gap between $\sum MC_1$, and the market demand curve DD'. At price P₁ this gap is AB which equals P₁C This is the left out market demand after the follower firms have produced and supplied their individual profits maximizing outputs. Therefore, the dominant firm

can sell at price P₁ the quantity P₁C. Similarly, the gap between the market demand and the aggregate supply of all the follower firms taken together at price P₂ is A₁B₁ which equals P₂C₁. By joining points like P₀, CC₁ etc, we get the demand curve P₀d which will be the demand curve facing the dominant firm. The dominant firm will fix its own output and price by considering this demand curve P₀d in conjunction with its marginal cost curves which, in our Fig. 14.2, is MC_d. The curve MR in this diagram is the marginal revenue curve of the dominant firm when its demand curve or which is the same thing, its average revenue curve is P₀d. The dominant firm will be maximizing its profits at that price-output combination where its marginal cost curve MC_d and marginal revenue. This takes place at point E where its marginal cost curve MC_d and marginal revenue curve intersect, Thus the leader dominant firm is in equilibrium when it fixes the price OP and produces and sells OQ output. The remaining share of the market will be left to the follower smaller firms, each of which will adjust its output taking the price OP fixed by the dominant firm as a datum like a firm operating in a perfect market.

11.5 BAROMETRIC PRICE LEADERSHIP

There is yet another model of unorganized price leadership. In this model the leader firm is not necessarily either the lowest cost firm or the dominant firm. On the other hand, it is a firm which is described as the barometric firm that is accepted as the leader by all the other firms in a given "industry" as regards determining the price of the commodity. A barometric firm is that firm in a given "industry" which most approximately reflects the conditions governing the "industry" as a whole. It may or may not be the dominant firm and it need not be the lowest-cost firm, because such a firm is likely to be more of an exception than a firm truly representing the cost conditions of the "industry" as a whole. In this model price of the commodity will be fixed by this firm and the other firms follow the lead given by this firm.

Moreover, in this model it is not necessary that one and the same firm will be accepted as the barometric firm. A firm which most approximately reflects like a barometer the overall conditions prevailing in the "industry" at a given time may over a long period or even earlier lose this status in the dynamic world. Its place may be taken by some other firm which represents over all conditions of the "industry" with regard to primarily, costs and demand more accurately due to the changed circumstances.

The price once set by the barometric firm will tend to be sticky unless the conditions in the "industry" change. When the change takes place the barometric firm will reset the price and the other firms will also revise their prices accordingly.

If the oligopoly is *differentiated* oligopoly, the commodity will not be homogeneous. On the contrary, the firm will be producing and selling differentiated products. In that case, there will be a cluster of prices or structure of prices in the industry. When the barometric firm revises its price, the other firms who follow the lead given by the barometric firm will also revise their prices accordingly maintaining the overall price structure. When the barometric firm raises its price, all other firms will also raise their prices by more or less the same percentage thus maintaining the relative prices of the products they are producing and selling. Similarly when the barometric firm lowers its price due to the changed conditions in the industry, the other firms will also lower their prices accordingly maintaining the price differentials as regard the individual products of the firms which are differentiated from one another.

Self Check Exercise-1

- Q.1 Discuss Price Leadership by a low cost firm.
- Q.2 Discuss Price leadership by a Dominant Firm

11.6 BAUMOL'S SALES MAXIMIZATION HYPOTHESIS

We had observed in the preceding lesson just before beginning the exposition of the kinky models of oligopoly that it was mainly the analysis of oligopoly that led economists to doubt the realism and relevance of the assumption of profit maximizing behaviour of firms in the traditional neo-classical economics. Therefore this assumption derived from a particular interpretation of rational behaviour has been sought to be displaced with alternative assumptions with regard to the objective of a firm specially in the context of the oligopolistic environment.

One of these alternative hypotheses has been presented by W.J. Baumol in his book Business Behaviour, Value and Growth. His contention is that an oligopolist firm in real world tends to maximize sales rather than profits. And, the emphasis on sales maximization in his model is not because it may be helpful in attaining its other objectives such as having a high operational efficiency or profits. In his opinion sales maximization is an end in itself for the oligopolists firm..

However, it should be noted that by sales maximization Baumol, does not mean maximizing sales in terms of physical units of the output of the firm. By sales he means the sales revenue that is sales in terms of the revenue (money income) that the firm earns from its Therefore his hypothesis is more unambiguously also termed as the Revenue Maximization Hypothesis.

Moreover, he also stresses that an oligopolist firm does not aim at obtaining the maximum sales revenue in absolute terms. Rather it seeks to maximize its sales revenue under a constraint. This constraint is in the form of a minimum level of profits which it must obtain. A less than absolute maximum of sales revenue is consistent with the objective, provided it brings in at least that minimum level of profits while the absolute maximum sales revenue fails to do that.

In brief Baumol's Sales Maximization Hypothesis may be stated as follows: An oligopolist firm seeks to maximize the money value of its sales (total revenue) under the constraint' that its profits should not fall short of some given minimum level.

The sales maximization hypothesis can be explained vividly with the help of the following diagram.



In Fig. 14.3 above TR is the sales (total revenue) curve of the oligopolist firm. It has a positive slope up to the point RS which is the point of maximum sales revenue. Beyond this point the sales curve TR has negative slope showing decreasing sales revenue with increasing output. TC curve is the firm's total cost curve. OLP curve is the profit curve showing the profit at each level of output. It also increases with increase in output up to a point (point L in our Fig. 14.3) after which it starts decreasing. MM' line is the profit constraint indicating the minimum profit that the firm must earn.

Now, if the objective of the firm had been to maximize its profits as it is assumed in the traditional neo-classical theory, the firm would have produced Q_p output corresponding to the highest point L on the profit curve OLP. On the other hand, if the objective of the firm had been to maximize sales revenue without any constraint, it would have produced Qs output corresponding to the highest point RS on the sales (total revenue) curve TR. But according to Baumol's hypothesis, sales or (revenue) maximizing the objective of an oligopolist firm, is not maximizing sales without any constraint but to maximize sales under a profit constraint. This constraint in our example is shown by the line MM' which means that the firm must not earn less than the minimum level of profits indicated by this profit constraint line MM' (i.e. OM level of profits). Hence, the firm's Equilibrium output cannot be Qs, even though at this output the total sales revenue (Rs) is the maximum. It is because at this output the profit is' less than the minimum desired OM. The constraint is not satisfied at this level of output, Qim output, on the other hand, satisfies the constraint but the sales revenue at this output is only Rm. But at output Qe the sales revenue Re is much greater than

and at the same time, it meets the profit constraint also, because at this output the profit equals OM. Hence the firm's equilibrium output is Qe. And the slope of the straight line joining the equilibrium sales revenue point Re with the origin Q will give us the equilibrium price $\int_{1}^{1} = \frac{\text{Re}}{2}$

Qe

A key part of Baumol's model is the profit constraint flow is its level determined? And more importantly why this constraint? Baumol has answered these very relevant questions by pointing out that the management of an oligopolist firm has to aim at earning some minimum level of profits, because it needs funds for the growth of the firm and their profits provide internal resources to that end. Moreover, they are also necessary in order to attract potential buyers of its stock when new shares are issued to gather funds for expansion. In addition to it, some minimum profits would also be necessary so that the firm's shareholders remain satisfied. These factors explain the existence of the profit constraint. As regards the determination of its level, the strength of these very factors will determine it.

Self Check Exercise-2

Q.1 Discuss Baumol's sales Maximization Hypothesis.

11.7 THE BEHAVIOURAL MODEL

R.M. Cyert and J.C. March, in their work, *A Behavioural Theory of the Firm* (1963), have presented a different approach to the analysis of oligopoly. This approach is based on the empirical investigations into the actual world behavioural of the firm. That is why this approach is described as the behavioural approach and the model presented by them is known as the Behavioural Model.

The first important point made out in this model is that contrary to what is assumed in the conventional theory, the real-world firms do not seek to maximize anything neither profits nor sales nor even utility.

It should be kept in mind that the model of Cyert and March is the model of modern type corporate firms which is the typical form of business organization in the present-day oligopolistic business world. In these types of firms, they point out, decisions are taken not by a single entrepreneur but by a complex group described by them as an organizational coalition which is comprised of managers, shareholders, workers, customers etc., whose interests may conflict with each other. Therefore, the firm does not have a single goal of profit maximization or of sales-maximization or any other such single goal. Rather the corporate firms have multiple goals such as (1) the production goal, (2) the inventory goal, (3) the sales goal, (4) the market- share goal, and (5) the profit goal. Each one of these goals is particularly associated with the

interests of some group or the other comprising the organizational coalition. However, it is the profit goal which is ultimately related with the- firm's output decisions.

Cyert and March point out that all these goals must be satisfied, though there is an implicit system of priorities among these goals. Further these goals are recognized to be not harmonious at all times. On the contrary, conflicts among them often arise, but they are resolved within the firm through a process of persuasion and accommodation and also through, side payments which may be in monetary or, nonmonetary forms. The organizational coalition which is the decision making authority is in fact a coalition of conflicting interests. If there are resources with the firm to meet the demands of all the constituents of this coalition, the coalition is viable, otherwise not. When the firm lacks adequate resources to meet the demands of all constituents, there is according to Cyert and March, an organizational slack in the firm which is the difference between the total resources of the firm and the total necessary payments. The organizational slack consists in payments to the constituents of the coalitions in excess of what is required to maintain the organization. This slack, according to Cyert and March, is a stabilizing factor. The firm is able to acquire excess resources when external environment is favourable as in boom times in order to meet the revised demands of the constituents On the other hand, when the external environment is unfavourable as during depressions, the organizational slack serves as a cushion.

Now, the question is what implications of the model has for the price-output behaviour of the corporate firm. In order to bring out these implications Cyert and March have devised a simplified behavioural model of duopoly. In this model each duopolistic firm is assumed to have only three objectives related to profits, production and sales which in turn, implies three basic decisions related to price, output and sales effort.

According to this model of Cyert and March, each duopolistic firm estimates demand and production costs and then determines its level of output and price. If this price-output decision fails to bring in the aspired level of profits, the firm then searches for ways to reduce costs and it also re-estimates demand. If deemed necessary it will also lower its profit goal.

In the original model as put forth b Cyert and March in their joint work, Behavioural Theory of the Firm, the authors employed the technique of multiple regressing analysis in order to find out the degree sensitivity of the duopolistic firm's behaviour to change its internal parameters. In a later work Theory of the Firm, authored jointly by Cyert and Cohen, another behavioural model employing the technique of simulation process to explain the same general problems was presented.

The model of Cyert and March threw up the following conclusions. Price is highly sensitive to (i) factors which cause variations in the size of the organizational

slack, (ii) the possibility of reducing costs on the sales effort, and (iii) adjustment of the profit goal in the light of the actual profit goal achievement.

The behavioural models of Cyert and March and of Cohen and Cyert underline the close relationship between costs and profits of the oligopolistic firms of the corporate firm type. The price-output level is discovered to be highly sensitive to the factors influencing costs. These models conclude that corporate oligopolistic firms adjust their costs of production and sales effort and consequently prices in response to the changes in the external (market) environments. In this, the behavioural theory of the firm differs from the traditional neo-classical theory in which such an adjustment in costs is not visualized.

Self Check Exercise-3

Q.1 Write a short note on Behavioural Model.

11.8 WILLIAMSON'S MANAGERIAL MODEL

Various managerial models have been presented in recent time. The models of Baumol, Cyert and March, and Cohen and Cyert all belong to this category. The common point of departure in these models is that they abandon the hidden assumption of the traditional theory of the firm, namely, that the price-output and other related decisions are taken by a single entrepreneur or a couple of partners who not only own the firm but also control the firm's business. This model of the firm may fit the old forms of business organization such as single entrepreneur firm or even partnership firms where ownership and control are in one and the same hands. But the traditional model does not fit the modem corporate type of business firms in which ownership and control do not go together but where control is separated from ownership. Ownership of the corporate firms rests with the shareholders who are large in number and also widely dispersed. Control of the business of such firms rests with the managers. Price-output and other related decisions are not taken by the shareholders who own the firm but by the managers who control the activities of the corporate firms.

In the light of the basic transformation of the nature of the firm, the assumption of the profit-maximizing behaviour of the firm in the context of the modern corporate firms is no longer valid. is another common feature of all managerial models of large firms, which generally are oligopolistic, that all of them have done away with the assumption of profit maximizing bahaviour of the firm. The manager's objectives are not the same as the owners. While the latter may be legitimately assumed to have profit maximizing goals, such an assumption would be invalid in the case of the former.
According to Williamson, managers who control the corporate firms are not motivated by the profit-maximizing desire but their policies are motivated by their own self- interest, the fulfillment of which yields them utility. They therefore seek to maximize not profits but their own utility function. However, as in Baumol's model which is also a type of managerial model, there is a similar constraint in Williamson's model also. The managers are assumed to maximize their utility function subject to the constraint that the post tax profits of the firm should be adequate enough to pay satisfying dividends to the shareholders as well as to pay for economically necessary investments (which are different from what Williamson categorizes as the manager's discretionary investment expenditure).

If the managers are assumed to maximize their utility function, it is pertinent to ask what the determinants of this utility function are. Williamson mentions four important factors in this regard. They are as follows:

(i) Manager's Salaries And Other Monetary Perquisites which the managers get from the firm. This is indeed the most important factor as it determines the manager's private expenditure which in turn, determines the level of their standard of living.

But the rewards which the managers get for their work in the corporate firms that they manage are not confined to their salaries and other monetary perquisites only.

(ii) The Size of Staff: Another important factor which determines the utility function of the managers is the number of staff working under them. The status of a manager is generally perceived to be associated with the size of the staff working under his control. The degree of power a manager enjoys is also related directly with the size of the staff that he controls. This gives him added satisfaction or utility. Moreover, his salary and other monetary rewards are also positively linked with the size of the staff he controls. All this makes this factor an important determinant of the manager's utility function.

(iii) Management Slack is another determinant of manager's utility function. The "management slack" refers to those non- essential perquisites such as large expense account, luxurious cars, lavishly furnished offices as well as houses which are not at all necessary for efficiently and effectively discharging the duties of manager but which, nevertheless, the manager receives from his firm. This obviously increases the manager's utility.

(iv) The Magnitude of the Discretionary Investment Expenditure that a manager controls is another important source of utility to him. The magnitude of this discretionary investment expenditure enhances the power and control of the manager

on the firm. It gives him power to direct the flow of new investment by the firm and thus to influence and control the future growth of the firm.

Taking into account all the factors explained above, Williamson has formalized his Utility Maximization Model as follows:

Since there is a very direct relationship between the size of the a manager controls and his salary and other monetary perquisites, therefore Williamson clubs together the first two of the determinants of utility of manager which we mentioned above. Having done that he makes a manager's utility a function of three variables writing his utility function as follows:

 $U=U(S, M, L_D)$

where U is the utility of the manager,

S is the money expenditure on staff

M is the management slack,

and I_D is the discretionary investment that the manager commands.

The above utility function of the manager is his objective function which he seeks to maximize under the constraint of a certain minimum level of profits which are adequate to satisfy the shareholders as well as to provide for economically necessary investment which is not included in the "discretionary investment" mentioned earlier.

As regards the price, it is, in Williamson's model, the function of output, the expenditure on staff and a demand shift parameter. This function, therefore, can be written as follows:

P = P(X,S,e)

where x stands for the level of output in a period

S stands for the expenditure on staff

and e stands for the demand shift parameter

The model, as observed by Cohen and Cyert, indicates that compared to a profit- maximizing firm, the utility maximizing firm of the managerial model of Williamson will have a "higher staff expenditure and more management slack". But "No general statement can be made about the relative output levels for the two firms."

It has also been observed that under the conditions of perfect competition, Williamson's model retains the results of profit maximization model of the firm. But, under conditions of oligopoly or monopoly, Williamson's utility maximizing firm will have greater expenditure on advertising, managerial perquisites (managerial slack) which will increase the cost of the firm which, in turn, will push up the price. On the other hand, when under oligopoly or monopoly conditions, the demand falls. Williamson's utility maximizing firm will tend to reduce its expenditure on staff advertisement and managerial luxuries, thus reducing its costs and pushing down the price. In this it resembles the Cyert and March model.

Self Check Exercise-4

Q.1 Write a short note on Williamson's Managerial Model.

11.9 SIMON'S "SATISFYING" MODEL

Among the behavioural models of the firm that have been presented in recent times, one particular variation of it is the so-called "satisfying" model presented by H.A. Simon, first, in his, 1955 paper, "A Behavioural Model of Rational Choice" and later on elaborated in his subsequent work.

Like all behavioural models this model too discards the assumption of profit maximizing behaviour of a firm. Simon argues that most psychological theories indicate that rational men do not seek to maximize but, instead, seek to "satisfy". From this he deduces that firms, instead of maximizing profits, tend to attain satisfying profits, that is that level of profits which would keep them just

Simon relates satisfying to the firm's "aspiration level" which, according to him, is based on its goal as well as past experience. Moreover, the Firm's view of uncertainties, which are very acute in an oligopolistic environment, also influences its aspiration level. If it can be easily attained, it will revise this level upward. If, on the other hand, if finds it too difficult to achieve its aspiration level, it will revise this level downward. The firm will be in a sort of equilibrium when it is able to determine the satisfying aspiration level through experience.

The process of finding out the satisfying aspiration level runs, according to Simon; more or less as follows. When the actual performance of the firm falls short of the aspiration level, it will not immediately revise down the aspiration level. It will first start what he describes as the firm's search activity. Search activity refers to the firm's efforts to find out and put into action the ways of improving the firm's efficiency performance in order to achieve the given aspiration level. However, he asserts that there is a limit to this search activity of the firm, for this activity is not costless. Since the search activity has a cost; the firm will try to balance this cost with the expected gain from the search activity. When the search activity in this process of evaluation of its costs and benefits proves to be unpractical, further search activity will be abandoned and the aspirations level will be revised downward till the firm is able to discover the satisfying level of its aspirations. Therefore, argues Simon, rational firms do not aim at maximizing their profits, they just aim at satisfying profits or profit rate.

Self Check Exercise-5

Q.1 Discuss about Simom's Satisfying model.

11.10 R. MARRIS'S MODEL

An alternative managerial model has been presented by R.L. Marris in his The Economic Theory of Managerial Capitalism (1964). He starts his work referred to above by highlighting the fact that entrepreneurship in the modern corporation had been taken over by transcendent management whose functions differ in kind from those of the traditional subordinate or "mere manager". Emphasizing the importance of the fact of separation between ownership and control in the modern corporate firm, in which ownership rests with the stockholders while the control is in the hands of professional managers, he argues that it is by no means obvious that action intended to maximize the utility of a company's stock- holders is consistent with maximizing the utility of the action-takers, i.e. of the management. Therefore, as in other managerial models of the firm. Marris also abandons the profit- maximizing behaviour assumption of the neoclassical theory which is relevant to the traditional single-owner firm but is irrelevant in the context of the corporate firm. He advances the hypothesis that the management of the modern corporate firm seeks to maximize the rate of growth of the firm.

However, he holds that the management seeks to maximize the rate of growth of the firm not without a constraint. The constraint visualized in his theory of the firm is in the form of "the threat of takeover" by the "raiders" as well as in the form of the "classical" loyalties to shareholder's welfare. Since shareholders welfare, is ultimatel y related to the dividend rate and appreciation of the shares in the stock market, the profit objective is not eliminated in this model. Only the profit maximizing objective as distinct from the profit objective as such is displaced.

Marris in his model, tries to "determine the connection between desired and/or expected growth rate, on the one hand, and the likely demand-price for the shares, on the other." He achieves this with the help of a 'steady state model in which under certain assumptions the firm's sales, profits, assets and dividends grow at a common, constant annual percentage rate until such time as either the policy changed or the environment changed or both changed. However, it does not mean that there is a unique steady-state' path with a given growth rate. On the contrary, it is possible to choose from alternative steady-state paths, each with a different, though constant, growth rate. If we further assume that it is the expected path of dividends which ultimately determines current stock-market value it then becomes possible to postulate that in choosing a growth rate, the firm in effect, will be influenced by the fact that accelerating the growth rate of the firm will also lead to a higher valuation ratio (that is stock market value expressed as a ratio of total net assets). If it indeed does not a conflict between the growth objective and shareholders' welfare objective wilt arise.

On Marris's own admission, his theory in The Economic Theory of Managerial, Capitalism seems to have been unnecessarily complicated." In a later work. The Corporate Economy (1971), authored jointly with Wood, a simpler model was advanced. The important point to note is that his model visualizes the conflict between the growth objective and the shareholder's welfare. As he observes, given the profitability of the existing activities... the faster the desired growth of the firm, the less the amount of cash available for dividends.

In fact, increase in the desired growth rate of the firm affect the two basic elements in the demand price for a share in opposite ways. Increase in the expected growth rate of the dividend increases the value of a given current dividend, but devoting of more resources to growth decreases the current dividend itself. "It is possible" observes, Marris "that the latter effect may outweigh the former through the whole range of positive growth rates."

This model does not indicate implications for price determinations under oligopoly as such.

Self Check Exercise-6

Q.1 Discuss about R. Marris's model.

11.11 SUMMARY

There is not much of active price competition in digopolistic markets. There are occasionally price wars among firms which are due to the failure of communication channels among firms. Usually, prices are stable in an oligopolistice market. Competition among firms is, therefore, for increased market share of the produce. The olisopolistic firms know that It they try to increase their market share through price cul. Competition among them will lead to an unabated fall in price and all of them would be losers in the process. Thus, instead of competing through price, they resort to non price competition.

Non price competition refers to the efforts on the part of one duopolistic firm to increase its sales by some means other than a price reduction. Some other means are advertising, product differentiation and customer service. These, in turn, include publicity, sales promotion and personal selling, product Quality, brand name and packaging, service agreement, warranty, guarantee, selling on credit, instalment selling etc. Thus non-price competition involves efforts by an oligopolist to differentiate his product from that of his rivals by establishing real or imaginary difference in the minds of consumers through the Quality of the product, its technological level, and through service, marketing and promotional means.

11.12 GLOSSARY

Independent Pricing :-

- (a) If an oligopoly has homogenous product, pricing by Individual firm is not definite. There may arise a price war or price rigidity.
- (b) If an oligopoly has heterogonous product then every firm enjoys monopoly power and attains maximum profits.

11.13 COLLUSIVE PRICING

All Firms in an oligopoly market could benefit. If they formally or informally come together and set prices to maximise in industry profits. A group of competitors operating under a formal over agreement is called cartel. If an informal covert agreement is reached, the firms are said to be operating in collusion.

11.14 PRICE LEADERSHIP

Under price leadership, prices are determi8ned by the leader and other firms follow these prices. Price leadership is of four types.

- (i) **Barometric Price Leadership-** Here prices are fixed by wisest producer who has experience regarding market.
- (ii) **Dominant Price Leadership-** In this form prices are fixed by the largest firms.
- (iii) **Aggressive Price Leadership-** It is also known as exploitative price leadership. In this type of leadership, prices are determined by the dominating firm and It also forces other firms to follow its prices.
- (iv) Effective Price Leadership- In this type of Leadership fixed prices are accepted by these firms which have same cost conditions and less elastic demand.

11.15 ANSWERS TYO SELF CHECK EXERCISES

Self Check exercise -1 Ans.1 Refer to Section 11.3 Ans.2 Refer to Section 11.4

Self Check exercise -2

Ans.1. Refer to Section 11.6 Self Check exercise -3

Ans.1 Refer to Section 11.7

Self Check exercise -4

Ans.1 Refer to Section 11.8

Self Check exercise -5

Ans.1 Refer to Section 11.9

Self Check exercise -6

Ans.1 Refer to Section 11.10

11.16 References/ SUGGESTED READINGS

- 1. W.J.L. Ryan: Price Theory
- 2. Baumol, Business Behaviour. Value and Growth Ch 4-8
- 3. Fellner, Competition Among the Few
- 4. Machlup: The Economics of Seller's Competition.
- 5. Leftwhich,: The Price System and Resources Allocation.
- 6. Cyert and March, : A Behavioural Theory of the Firm.
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- 8. R.L. Marris,: The Economic Theory of "Managerial" Capitalism.
- 9. Marris and Wood,: The Corporate Economy.
- F. Machlup,: "Theories of the Firm : Marginalist, Behavioural, Managerial", American Economic Review, March 1967, also reprinted in D. Needham (ed.) Readings in the Economics of Industrial Organization.

11.17 TERMINAL QUESTIONS

- Q1. Explain and comment on Marris Model of Oligopoly?
- Q2. Explain Baumol's contribution to the theory of oligopoly?

FACTOR PRICING

Structure

- 12.1 Introduction
- 12.2 Learning Objectives
- 12.3 Demand Function Self Check Exercise-1
- 12.4 Marginal Product Self Check Exercise-2
- 12.5 Euler's Theorem And Marginal Productivity Theory Self Check Exercise-3
- 12.6 Supply Function
- 12.7 Supply Function of Land Self Check Exercise-4
- 12.8 Supply Function of Labour Self Check Exercise-5
- 12.9 Factor Price Determination Self Check Exercise-6
- 12.10 Wage Rate Under Perfect Competition Self Check Exercise-7
- 12.11 Wage Rate Under Imperfect Competition Self Check Exercise-8
- 12.12 Summary
- 12.13 Glossary
- 12.14 Answers to Self Check Exercises
- 12.15 References/ Suggested Readings
- 12.16 Terminal Question

12.1 INTRODUCTION

So far we have been analyzing the determination of the relatives prices of consumer's goods on the assumption that factor prices given. Now we shall analyze the determination of factor prices themselves. The theory of factor prices that we shall

be discussing presently in the micro-economic theory of distribution. Whatever is produced in an economy during a given period of time ultimately flows back to the suppliers of services of productive factors such as land, labour, capital and enterprise. The share of each factor in the total product equals its price multiplied by its quantity employed. Therefore, a theory that is able to explain how factor prices and the quantities employed of the factors are determined will also explain distribution. That is why the theory of factor-pricing is also regarded as theory of distribution.

Basically, the theory of factor pricing is not different from the theory of the determination of relative prices of consumer goods that we have already discussed. The basic principle of demand and supply works here too. The price of each factor is determined by the interaction of the forces of demand and supply of that factor. But there are some fundamental differences between consumer goods and factors of production on the side of demand as well as the side of supply, on account of which there is a separate theory of factor pricing. These differences will become evident as we enquire into the nature of the demand and supply functions of the different factors of production.

12.2 OBJECTIVES :

After reading this chapter you will be able to Define :

- What is factor pricing.
- What is Marginal productivity theory.
- What is Euler's Theorm
- How wage rate is calculated under Perfect competition.
- How wage is calculated under imperfect competition.

12.3 DEMAND FUNCTION

Function Factors of production are demanded not for their own sake but for the sake of producing final goods which directly satisfy people's wants. This brings out the essential difference between consumer goods and factors of production on the side of demand. While the demand for consumer goods is direct, the demand for factors of production is indirect or derived demand. Therefore, while the demand for consumer goods can be traced back to their utility, the demand for factors of production basically depends on their capacity to produce goods. This capacity of a factor is referred to as its productivity.

Any individual employer of a factor will employ such a quantity of it that his profit is maximized. If we assume perfect competition in the factor market as well as in the product market, a rational entrepreneur will employ different factors of production in such a combination that the ratio between the price of every pair of them equals the

ratio between their respective marginal physical productivities (MPP) as it was explained in Lesson 9. Assuming for the sake of simplification only two factors, A and

B, a rational entrepreneur will be $\frac{P_a}{P_b} = \frac{MPP_a}{MPP_k}$ in equilibrium when

Where P_a and P_b are respectively the b prices of factors A and B and MPP_a and MPP are their respective marginal physical productivities. Now, let P_a fall P_b remaining the same. The ratio P_a/P_b will become less than MPP_a/MPP_a. Therefore, the entrepreneur's equilibrium is disturbed. The new equilibrium will be attained, when the ratio MPP_a/MPP_B or the MRS_{ab} is also appropriate reduced to equal the new lower ratio P_a/P_b . This can be done only by substituting A in place of B as a result of which MPP_a falls and MPP_b rises. As it was explained in lesson 9, with a fall in the relative price of a factor, its demand rises partly due to the substitution effect and partly due to the 'scale effect. Thus, we see that the demand for a factor is inversely related to its employer for a factor that the marginal factor cost (MFC) becomes equal to the marginal revenue productivity (MRP) of that factor, when the latter is diminishing.

MRP of a factor is the addition made to total revenue of the employer through the sale of the additional output produced when one more unit of that factor is employed with the constant quantities of the other factors. Thus, MRP of the factor depends on (i) the MPP of it and (ii) the price of the final product produced with its help. If the product market is perfect, as we have already assumed it to be, the price of the final product will not change, when an individual employer employs more of a factor to produce more of the final product. In such a case, MRP of a factor equals its MVP (marginal value productivity) which is the product of its MPP and the price of the final product. In Fig. 15.1 MRP is the marginal revenue productivity curve. It rises up to a point due to increasing returns to factor proportions and eventually begins to fall under the influence of diminishing returns to factor proportions. If the price of the factor is OP the horizontal PP line will represent the average factor cost (AFC) as well as the marginal factor cost (MFC). The employer will employ OQ₁ of it, for, at this level (i) MFC = MRP and (ii) to the right of it MFC is greater than MRP which makes it impossible to increase profits by employing more than OQ₁ of it. If the price rises to P_1 , the quantity demanded falls OQ_2 and if the price falls to P_2 the quantity demanded rises to OQ₃. Now you can see that all the points of equilibrium lie on the diminishing portion of the MRP curve of the individual employer. This diminishing portion of the MRP curve of a factor is virtually the individual demand curve for the factor. It is negatively sloped. When we add laterally all the individual demand curves for a factor, we get the total or the aggregate demand curve for the factor which must also be negatively sloped like the individual demand curve.



Another matter to be considered regarding the demand, function of a factor is the magnitude of its slope as well as its position. Its position depends on the one hand, on the position of the MPP curve of the factor and on the other, on the price level of the final product. The position of MPP curve is determined by technology. An improvement in technology will shift it upwards and hence, the factor demand curve will also shift upwards. On the other hand, a rise in the price of the final product will also shift the factor-demand curve upwards and a fall in price will shift it downwards. Another factor that can cause a shift in the demand curve of a factor is a change in the price of some other related factors. A fall in the price of a close substitute will shift it down and a rise in the price of a close substitute will shift it upwards. On the other hand, a fall in the price of a complementary factor will shift it upwards, while a rise in the price of a complementary factor will shift it down.

As regards the magnitude of the slope of the demand function, which is indicative of its elasticity, it depends on (i) whether the MPP of the factor is falling abruptly or gently; (ii) whether the substitution elasticity between it and other factors is small or large; (iii) whether the expenditure on it is a small or a large proportion of the total cost of producing the final good, (iv) whether with a change in its quantity, the other factors have to be changed accordingly or not, and (v) the rate at which the price of the final good falls with an increase in its output, which as you should know, depends on the coefficient of the price elasticity of the demand for the good. If (1) the technical conditions of production are such that the MPP of the factor falls rather abruptly, (2) the elasticity of substitution is small, (3) the expenditure on it is a small fraction of the total cost; (4) the cooperant factors remain constant; (5) the price elasticity of demand for the final product is small, then the demand curve of the factor will be quite steep indicating a relatively low elasticity. If the factors enumerated above work in the opposite direction, it will be relatively flat showing a relatively high elasticity.

Self Check Exercise-1

Q.1 What is demand function?

12.4 MARGINAL PRODUCTIVITY THEORY

The above analysis of demand for a factor shows that each employer of a factor tends to equalize the value of the MPP of the factor with the price of the factor under condition of perfect competition. From this, it was concluded that the price of each factor is determined by its marginal productivity. The conclusion came to be known as the Marginal Productivity Theory of distribution.

It should be noted, that the Marginal Productivity Theory is a theory not of factor prices but of the demand for factors of production. It can be regarded as a theory of factor prices only if we make the unrealistic assumption that factor supplies are fixed and cannot be changed at all. This is a highly unrealistic assumption from the point of view of even the short period. For example, even when the size of population and the proportion of the labour force in it are fixed in the short period, the supply of labour is not fixed, because the workers can always decide to work for longer or shorter hours per day.

The theory, when applied to labour, becomes particularly static in character, for it assumes that wages are the function of the MP of labour, while it rules out the inverse of this function namely that MP of labour may also be the function of wages. The implication of the MP theory is that any independent increase in wage rate will only reduce employment. But the fact is that an independent rise in wages may after some time increase the efficiency of labour as the higher wages enable the workers to afford a more nutritive and balanced diet as well as increase their will to work. The MP curve of labour will, then shift to the right so that there is no fall in the employment despite the rise in wages.

Self Check Exercise-2

Q.1 Discuss Marginal Productivity Theory.

12.5 EULER'S THEORM AND MP THEORY

Apart from the above and other criticism of the MP Theory that has not been touched here for want of space, one fundamental problem that had to be solved, if this theory was to be valid as a theory of distribution, was to show that the total product would just equal the aggregate of the factor shares, if each factor was paid at a rate equaling its respective marginal productivity. This problem in the MP Theory of distribution has come to be known as the "Adding-up Problem."

How did the propunders and the advocates of this theory try to solve this adding up problem?

Wicksteed was the first to make an attempt at it. His solution suggested that the total product would be just exhausted, when each factor was paid according to its respective MP, if the returns to scale were constant. Now this is a solution which could be derived from a theorem in mathematics that is known after the name of its discoverer as Euller's Theorem. According to this theorem if a variable, say P, is a first-degree linear homogeneous function of some other variables, say A and B, then P equals the sum total of the products of the values of the independent variables say A and B, and their respective first differentials. Symbolically, if the function P=f(A, B) is

homogeneous of the first degree, then $P = \left(\frac{dP}{dA} + B\frac{dP}{dB}\right)$

Now let us suppose that P represents total product and A and B are the quantities of two factors of production which we name as A and B. The differential $\frac{dP}{dA}$ is MP, then the MP of factor A and $\frac{dP}{dB}$ is the MP of factor B. The above theorem, therefore, shows that the total product (P) will exactly equal the sum of shares of A and B, when these shares are determined according to the MP theory for then share of A will be A $\frac{dP}{dA}$ and that of B will be B $\frac{dP}{dB}$

So the Euler's Theorem also suggests that the so-called "adding-up" problem will be solved, *if the production function is homogenous' of the first degree*, that is, if the returns to scale are proportionate and consequently the AC and MC of an individual firm are equal and constant.

Other economists, such as Wicksell, Walras and Barone, rejected Wicksteed's solution mainly on two counts (i) it was pointed out that production function is not homogenous of the first degree and consequently, the total product will not be just exhausted, if factors are paid according to their respective marginal productivity. (ii) Secondly, if we assume production function to be homogenous of the first degree, the cost curves will be horizontal and there will be no equilibrium of the firm under perfect competition. The solution suggested by Wicksell and others was that, under perfect competition, a firm in long-period equilibrium operates at the minimum point on its LAC. In that position the returns to scale as well as returns to factor proportions become momentarily proportionate so that Euler's Theorem would be applicable and the total product would be just exhausted, if each factor was rewarded according to its marginal product.

Self Check Exercise-3

Q.1 Discuss Euler's Theorem.

12.6 SUPPLY FUNCTION

We have seen that the demand function of a factor is negatively sloped and we have also explained the factors which determine the position and the extent of the slope of this demand function. We have now to enquire into the nature of the supply function of a factor of production. It will be useful to note at the very outset that while there is a sort of a general theory explaining the nature of the demand function of all factors, there is no such general principle governing the supply of all factors. It is on the side of supply that factors of production fundamentally differ from one another.

12.7 SUPPLY FUNCTION OF LAND

From the point of view of supply, the factor, land, is a fixed factor by itself, because its supply to an economy as a whole is fixed by nature. Therefore, the supply of land to the economy or society as a whole is perfectly inelastic. But, from the point of view of an individual producer or even an individual industry, its supply is elastic. A given industry for example, can attract additional supplies of land from other industries by offering prices which are a little higher than what these units can earn in the alternative employments. Such earnings of a factor are described as its "transfer earnings". If we suppose that all units of land are of equal efficiency in the industry under our consideration, but their efficiency differs in all other industries, the supply curve of land for the individual industry, under our consideration, will be less than infinitely elastic like the curve SS' in Fig. 15.2 on next page.

If the price for the service of land paid in this industry is OR, all such units of land which are earning less than OR in alternative employment will be attracted to this industry. But, if the industry needs still larger quantities of it, it will have to attract additional units from such other employments where these units are earning more than OR. Hence the price offered by the industry will have to be raised in order to have an increase in the supply of land to it. This suggests that the supply curve of land to an individual industry or an individual firm is elastic.



If land is of equal productivity in all employments, all units of it must be earning the same reward wherever they may happen to be employed. This means that the 'transfer earnings' of all units are equal. In such a case an individual firm or industry can get any supply of land by offering a price slightly higher than the ruling price so that the supply of land to it becomes practically perfectly elastic.

Self Check Exercise-4

Q.1 Discuss Supply Function

12.8 SUPPLY FUNCTION OF LABOUR

As regards the supply of labour, it is not fixed by nature. Even when in the short period, the size of the working population is fixed, the supply of labour is not perfectly inelastic even to the economy or society as a whole, if nothing else at least a redistribution of the existing working population's time between leisure and work can bring about a change in the supply of labour to the society as a whole. To an individual industry or an individual firm, the supply of labour is likely to be even more elastic, for labour can be attracted from its alternative employments.

An individual worker's supply curve of labour can be derived from his indifference map reflecting his preference between work and leisure. In Fig. 15.3 indifference curves I, II, III represent our hypothetical worker's preference between money income (work) and leisure. Leisure is measured along OX and money income is measured along OY. It is assumed that the time which is not spent on leisure is devoted to work to earn money income. OH is the maximum number of hours per day available to be distributed between leisure and work. Therefore, while leisure is

measured in the direction OH, work or labour is measured in the direction HO. For example, the point L on X- axis represents OL hours of leisure and HL hours of wor¹



Let us Suppose that the prevailing wage rate equals the slope of the line WH in Fig. 15.3 (i.e. $\frac{OW}{OH}$). WH will then be the wage-income line of our worker and he will be on the highest level of satisfaction at the point P where the wage income line becomes tangent to an indifference curve of the worker. The position P implies that the worker will have OL hours of leisure and LP amount of money income by offering to work for HL hours. Let the wage rate rise to become equal to the slope of W₁H. Now W₁H will be the wage-income line and the worker will be optimizing his satisfaction on the higher indifference curve II at point p_1 , which implies OL_1 hours of leisure and HL_1 hours of work. Similarly, if there is a further rise in wage rate such that it equals the slope of W₂H, the worker will go over to the position P₂ on indifference curve III. P₂ indicates OL₂ hours of leisure and HL₂ hours of work. This shows that with a rise in the wage rate, the labour supplied by an individual worker increases. Hence, given the preference scale of the above type, the individual supply curve of labour will be positively sloped. If all the workers have similar preferences, the aggregate supply curve of labour, which is only a lateral summation of the individual supply curves, will also be positively sloped.



However, it is possible that an individual's preferences between income (work) and leisure may be such that the individual supply curve of labour is backward sloping. This possibility is depicted in Fig. 15.4 When the wage rate equals the slope of WH, labour supply- is HL when the wage rate rises to equal the slope of W_1H larger amount of labour, HL₁ is supplied. But as the wage rate rises further to equal the slope of W_2H the supply of labour decreases from HL₁ to HL₂

In this case the labour supply curve will not be positively sloped throughout but will become negatively sloped, that is backward sloping, after a certain point as shown in Fig. 15.5. A possible explanation of this type of supply curve is that at some sufficiently high wage rate, the marginal significance of money income to the in terms of leisure falls very much. Once an individual crosses a certain level of standard of living, his wants are mostly such that can be satisfied in a state of leisure. This makes his demand for money income in terms of effort inelastic.



A rise in money wage rate implies a fall in the price of money income in terms of effort, and inelastic demand for money income in terms of effort implies a fall in total expenditure of effort (or labour supply) with a rise in money wage rate. In underdeveloped countries such a stage (when the labour supply curve begins to slope backward) may arrive earlier than in advanced countries due to the attitudes and habits peculiar to the peoples of the under-developed countries.

Although an individual's supply curve of labour is likely to be backward sloping, we cannot be very certain that the aggregate supply curve of labour can also be backward sloping. Firstly, it is not necessary that all the individual supply curves must be backward sloping. If the effect of the backward sloping individual supply curves of labour is outweighed by that of the still forward rising individual labour supply curves, the aggregate labour supply curve will be positively sloped throughout. Secondly, even when all individual labour supply curves are backward sloping, they need not begin sloping backward at the same point. This also enhances the possibility of the aggregate labour supply curve being positively sloped throughout.

Self Check Exercise-5

Q.1 Discuss Supply Function of Labour.

12.9 FACTOR PRICE DETERMINATION

As stated at the very beginning, the price of a factor is determined by the interaction of the forces of demand and supply as they are reflected in the aggregate demand and-supply functions of the factor. This price becomes a datum, under perfect competition, to an individual employer as well as an individual supplier of the factor cerned. Every employer will employ so much of the factor that its marginal revenue productively becomes equal to the price. When the product market is also perfect, the marginal revenue productivity (MRP) of a factor to an individual employer equals its marginal value productivity (MVP). Therefore, we can say that in equilibrium under perfect competition, the price of a factor equals its MVP.

Self Check Exercise-6

Q.1 What do you mean by factor price determination.

12.10 WAGE RATE UNDER PERFECT COMPETITION

We may explain the above principle by taking the example of labour, the price of which is wages.



The Fig. 15.6 (i) shows the demand and supply conditions of labour for a given industry. S (W) is the supply function and D (W) is the initial demand function of labour. The equilibrium wage rate is OW. At this level of wage rate, an individual employer of labour can employ as much or as little of it as he likes without changing the wage rate thereby. This implies that his AW curve will be horizontal at the level OW as shown in Fig. 15.6 (ii). It follows that the same horizontal line, AW = MW, will also represent the marginal wage cost of the employer. The individual employer's profit on the employment of labour is maximum, when (i) his marginal wage cost (MW) equals the marginal revenue productivity (MRP) of labour to him and (ii) to the right of this equality, MW is greater than MRP. These conditions are fulfilled, when he employs OL amount of labour. Under perfect competition, MRP of a factor equals its MVP also. Thus, in a perfectly competitive equilibrium, the wage rate equals the value of the marginal product of labour. But note that this statement is different from the statement that the marginal productivity of labour determines the wage rate.

If the labour market is perfect but the final product market is imperfect, the MRP of a factor is less than its MVP. In that case, the equilibrium wage rate equals the MRP of labour but it is less than the MVP of labour.

Now the equilibrium position referred to above and denoted by E in Fig. 15.6 (i) and A in Fig. 15.6 (ii) is only a short-period equilibrium. When wage rate is OW and an individual firm employs OL labour to maximize its profit, the average net revenue productivity (ANRP) of labour is greater than the wage rate. This implies super-normal profits for the firm. On the assumption that all the firms are homogenous, all the existing firms will be earning supernormal profits on account of the ANRP of labour

being greater than the wage rate. This will, in the long run attract new firms into the industry. Consequently, the demand curve for labour will shift to the right until it takes the position D, (W) in Fig. 15.6 (i) This raises the wage rate to OW ₁. The AW1 = MW line of the individual employer (firm) is lifted up to the position AW ₁ = MW1. Now the conditions of equilibrium for the individual employer (firm) are satisfied at B, where the wage rate OW₁ equals not only MRP (=MVP) but also ANRP of labour. Therefore, the individual firms will now be earning only normal profit.

Thus, we can state that in a state of long-run equilibrium under perfect competition, the wage late equals the marginal revenue product as well as the average net revenue product of labour.

Now it should be obvious that any wage rate determined by the demand and supply conditions of labour in a particular industry cannot be less than the 'transfer earnings' of labour. Under perfect competition 'transfer earning' of a factor, as stated earlier in this lesson, are the earnings which it can make in the best alternative employment available. If the wage rate is less than the 'transfer earnings' of labour, the workers will begin to move out of this industry the supply of labour to this industry will fall and the wage rate will ultimately rise to equal the 'transfer earnings' of labour.

Secondly, the equilibrium wage rate as determined by the demand and supply conditions of labour becomes a datum for the individual suppliers of labour. A rational individual will distribute his time between leisure and work (money income) in such a manner that his marginal rate of substitution between work (money income) and leisure becomes equal to the wage rate.

Self Check Exercise-7

Q.1 How wage rate is determined under perfect competition?

12.11 WAGE RATE UNDER IMPERFECT COMPETITION:

If the factor market is imperfect on the side of the employers, the principle that in equilibrium the price of a factor equals its MRP will not hold. It will be found that the price of the factor will be less than its MRP. We shall illustrate this point with the example of labour, when there is monopsony in the labour market, that is when there is only one employer of a particular kind of labour.



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When there is only one employer of labour, his demand makes up the total demand for that kind of labour. Therefore, any increase in it will push up the wage rate.

This implies that AW function of the monopolist employer will be positively sloped like the AW function of Fig. 15.7. It follows that the marginal wage cost function will be above it like the MW function. in Fig. 15.7. The employer's equilibrium will take place at E where (i) M W = MRP of labour and (ii) to the right of E the marginal wage cost (MW) is greater than the MRP of labour. This gives the value of equilibrium employment as ON. The AW function tells us that when ON amount of labour is demanded, the wage rate (average wage rate) will be NA=OW, so that equilibrium wage rate is OW which is less than the MRP of labour.

The above conclusion applies to any factor when there is monopsony or some other kind of imperfection in the factor market on the side of the employers. When the factor market is imperfect, the price of a factor is less than its marginal revenue product. Joan Robinson has defined such a situation as 'exploitation' of the factor concerned.

Self Check Exercise-8

Q.1 How wage rate is determined under Imperfect competition?

12.12 SUMMARY

- A competitive firm determines the Quantity of labor to employ such that the value of the Marginal produce equals the worker's wage.
- On the long run the market demand function of for labour is negatively sloped. Firms demand more units of labour at a lower wage.
- The supply function of labour of an individual is derived from utility Maximization. An individual's supply of work function may have either a positive or a negative slope.
- A minimum wage creates two wage rates for the same Quality of worker.
- The worker pays for general training, while the worker and the firm share the case of firm specific training.
- By paying a worker less than his or her value of marginal product initially, a firm can structure its wage policy to reduce shirking by workers.

12.13 GLOSSARY

Difference between Factor pricing and Product Pricing

Like product pricing factor pricing is based on the forces of demand and supp ly, yet there are fundamental differences between the two which make factor pricing as a distinct theory.

- (i) There are difference in the nature of demand for a product and a factor. The demand for a product is direct. demand based on its marginal utility, while the demand for a factor is derived demand-derived from the demand for the product it helps to produce.
- (ii) The supply of a product depends on its money cost, of production, while the supply of a factor depends on its opportunity cost, the minimum earning which it can earn in the next best alternative use.
- (iii) The pricing of some of the factors like labour and enter preneur are influenced by social and human factors, where product pricing is influenced little by these factors.

12.14 ANSWERS TO SELF CHECK EXERCISES

Self Check exercise -1 Ans.1 Refer to Section 12.3 Self Check exercise -2 Ans.1. Refer to Section 12.4 Self Check exercise -3

Ans.1 Refer to Section 12.5

Self Check exercise -4

Ans.1 Refer to Section 12.6

Self Check exercise -5

Ans.1 Refer to Section 12.8

Self Check exercise -6

Ans.1 Refer to Section 12.9

Self Check exercise -7

Ans.1 Refer to Section 12.10

Self Check exercise -8

Ans.1 Refer to Section 12.11

12.15 REFERENCES/ SUGGESTED READINGS

- Stonier and Hague: A Textbook of Economic Theory Ch. XI, XII.
- M. Blaug Economic Theory in Retrospect Ch. II.
- Joan Robinson: Economics of Imperfect Competition.
- L. Robbins: "On the Elasticity of" Demand for Income in Term of Effort" reprinted in the Readings in the Theory of Income Distribution (AEA).

12.16 TERMINAL QUESTION

- Q.1 How is the price of a factor determined when there is perfect competition in the product marked as well as factor market?
- Q.2 Discuss wage determination under perfect and Imperful competition. How wages are determined under trade Unionism?

WAGES AND RENT

Structure

- 13.1 Introduction
- 13.2 Learning Objectives
- 13.3 Determination of wage rate Under Collective bargaining Self Check Exercise-1
- 13.4 Rent
- 13.5 The classical theory of Rent Self Check Exercise-2
- 13.6 Modern Theory of Rent Self Check exercise-3
- 13.7 Summary
- 13.8 Glossary
- 13.9 Distinction between Rent and Quasi Rent
- 13.10 Answers to Self Check Exercises
- 13.11 References/ Suggested Readings
- 13.12 Terminal Questions

13.1 INTRODUCTION

In the last lesson we discussed the essentials of wage determination under perfect competition and a particular type of imperfect competition, namely, monopsony. Before going over to the discussion of rent, we shall examine another model of wage determination in which the labour market is characterized by collective bargaining.

13.2 LEARNING OBJECTIVES

After reading this chapter you will be able to explain :-

- How wages are determined?
- What is rent
- Classical theory of rent
- Modern theory of rent

13.3 DETERMINATION OF WAGE RATE UNDER COLLECTIVE BARGAINING

Under collective bargaining wage rate results from a process of bargaining between workers' union, on the one side, and the employers' association, on the other. It should not be difficult for you to perceive that such a situation in labour market resembles a situation of bilateral monopoly that we analyzed towards the end of Lesson 11. You may perhaps recall that it was found in that analysis that equilibrium under bilateral monopoly is indeterminate. The same can be said with regards to the equilibrium rate of wage and the equilibrium level of employment under collective bargaining.

However, it is possible to delimit the area within which the equilibrium levels of wage rate and employment will be indeterminate. The higher limit of the wage rate will be one above which the employers will not be willing to employ any labour at all, and the lower limit will be the one below which worker's union will not accept any wage rate. Between these two limits the equilibrium can take place anywhere, depending upon the balance of many forces, some of which are economic and others non-economic.



It will be immediately seen that the upper limit cannot be precisely defined. What the upper limit of the wage rate will be depend on the assumptions we make with regard to the behaviour of trade unions. Trade unions behave like monopolists and therefore, they tend to bargain for a wage rate that will equal the average net revenue productivity (ANRP) of labour so that the workers appropriate the whole product of labour, leaving no surplus for the employers. This conclusion is obviously based on the assumption that a trade union does not bother about the level of employment at all, its objective is to seek as high a rate of wages as possible, whatever be the loss of employment associated with it. This assumption will give us an indifference map of the trade union in which the indifference curves are horizontal like l_1, l_2, l_3, \ldots in Fig 16.1

which shows that the higher is the wage rate, the higher is the trade union's level of satisfaction of what happens to employment. Under this assumption, the wage rate which the trade union will seek to get will be the one at which a horizontal indifference curve of the trade union becomes tangent to the ANRP curve. In our example as depicted in fig. 16.1 above, this takes place at wage rate OW ₃, when the indifference curve I₃, becomes tangent to ANRP.

If the trade union succeeds in fixing the wage rate at W $_3$ equal to the highest ANRP of labour, this wage rate becomes a datum for the employers who can employ as much of labour as they desire at this wage rate. Therefore, the horizontal line W $_3$,I $_3$ can be regarded as the AWMW line for the employers who will employ so much of labour that the marginal wage cost (MW = AW) becomes equal to the margin revenue product (MRP) of labour. Hence the employment that goes with the wage rate W $_3$, is ON.

If the trade union tries to get a wage rate higher than W,, the point at which the MRP of labour equals the higher wage rate will lie above the ANRP of labour. This implies that the employers will have to pay a wage rate higher than the ANRP of labour and hence, they will be suffering losses Therefore, such a wage rate is not feasible in the long run.

One may rightly object to the behavioural assumption underlying the above model. It is wrong to presume that a trade union behaves like a typical monopolist. Labour is not an inanimate object like a commodity that a monopolist can afford to hold back without any resentment' on the part of unsold units. That labour cannot be separated from the labourer is a special characteristic of labour as a factor of production which Marshall had very rightly stressed. Hence the assumption that a trade union's objective is to maximize the wage rate regardless of the level of employment that goes with it, is unrealistic. Therefore, it is more realistic to assume that a trade union cares not only for the level of wage raté but also for the level of employment. If it is so the indifference curves of a trade union showing its collective preference between wage rate and employment will be negatively sloped and convex to the origin like the normal indifference curves. They are like I, II, III n Fig. 16.2.



Under the above assumption, a trade union will be able to get on to its highest possible indifference curve at the point of tangency between the MRP curve and an indifference curve of it. In terms of Fig. 16.2, this condition is satisfied at point P where the trade union's indifference curve III becomes tangent to the MRP curve. This implies that the trade union- will bargain with the objective to secure the wage rate OW. If it succeeds in it, the employment provided by the employers will be ON.

If the wage rate had been entirely within the power of the employer's association, it would have sought to fix it at the lowest level feasible. The lowest feasible wage rate would be the one below which the workers will withdraw themselves from the industry concerned. The workers will withdraw themselves from one industry and shift to an alternative industry, if they do not get in the former a wage rate equaling their "transfer earnings." Another factor which is likely to influence the level of the minimum feasible wage rate is the customary standard of living of the workers. If the wage rate offered to them is, lower than the minimum necessary to enable them to maintain the standard of living to which they have become accustomed, they will prefer to go on a strike rather than accept such a wage rate. These considerations will set the lower limit to the wage rate under collective bargaining.

The actual wage rate may lie anywhere between these two limits. Whether it is closer to the upper limit or the lower limit will depend on the relative bargaining power of the two parties as well as on a number of psychological, social, ethical and political factors.

Self Check Exercise-1

Q.1 How wage rate is determined under collective bargaining?

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13.4 RENT

Rent is the price of the services of land towards production. It is to be distinguished from the popular meaning of the term, 'rent'. The popular meaning of this term is the price paid for the use of a thing, say a house or a scooter or a fan, and so on. Price paid for the use of a thing may include 'economic rent', but usually it includes in it a number of other elements too. All these other elements may be brought together under one head, cost of production". Any surplus over and above the cost of production is usually referred to as 'economic rent'. We shall examine here two theories of rent, the and the modern. During the explanation of these theories, the further details of the meanings of economic rent' will unfold themselves. From now on we shall be using the term rent, in the sense of economic rent' without using the adjective 'economic'.

13.5 The Classical Theory of Rent was systematized, first of all by Ricardo who defined rent as that part of the total produce of land which is given to the landlord for the use of the original and indestructible qualities of the soil. A careful look at this definition will give the impression that rent is an income which is peculiar to land. Secondly, it is an income which is caused by some characteristics of land which Ricardo described as original' and 'indestructible'. In fact, he seemed to identify the 'original' and 'indestructible' qualities of land with its fertility and geographical situation. He seemed to assume that the fertility or productivity of land differs from plot to plot and then rent on land is caused, by these differences in the productivity of different plots of land. Thus the classical theory of rent came to be known as the "Differential" Theory of Rent.

According to this theory, as the demand for agricultural produce goes on increasing, the margin of cultivation goes on extending from more productive pieces of land to the less productive. At any given time, the price of the produce of land equals the cost of production on the least productive land in use, where cost includes the cost of only two other factors, labour and capital. The factor, enterprise, was not recognized by the classical economists as a separate factor. The produce of land being assumed to be homogeneous, it receives the same price regardless of whether it was produced on a more productive land or a less productive one. The farmers on lands superior in productivity to the least productive land in use are able to produce a larger output of the same cost. The price being the same, their total revenue is greater than their total cost (wages plus profit on capital). The difference is a surplus which arises on account of superior productivity of land, Ricardo characterized this surplus as rent which in his opinion was appropriated by the landlord. On the least productive land in use, that is on the 'marginal' land, there is no surplus. Therefore, it was also described as no-rent land. All lands superior to it in productivity enjoy a surplus over and above their costs of cultivation. This surplus or rent varies in direct proportion to the variation in the productivity of the different plots of land.

The Ricardian theory of rent can be explained better, with the help of the marginal analysis. The Ricardian or the classical theory is based on the following assumptions, explicit or implicit; (i) there is pure competition in the product market; (ii) land differs in productivity but the other factors of production employed on all lands are equally efficient; (iii) land has only one use, say the production of corn; (iv) diminishing returns operate.



The first assumption stated above implies a horizontal AR = MR curve for all producers of corn, whether they are working on A-grade land or B-grade land or any other grade land. We have taken only three grades of land A, B and C, for illustrative purposes. A grade land is the most productive, B less and C the least productive. So the second assumption stated above implies that on A-grade land the cost curves will be the lowest as shown in Fig. 16.3. On C-grade land they are the highest. The third assumption stated above implies that land has no opportunity cost. Because there is only one specific use for it. Therefore its 'transfer earnings' are zero. Hence land has no costs. Therefore, the cost curves include wages and profits alone. As already stated, the classical did not isolate profits from interest. Therefore, profits in the classical model include normal profits as well as interest. The assumption (iv) would rather imply that cost curves are rising ones while we have shown them to be U-shaped This will not make any difference, because under pure competition equilibrium takes place only when the returns are diminishing and therefore, the costs are rising.

Let the demand conditions for corn be such that its price equals OP. Then P-AR-MR line in Fig 16.1 will indicate the average revenue as well as the marginal revenue functions for all producers. A producer will produce so much that his marginal cost becomes equal to his marginal revenue which on our assumption (i) equals the price. A producer on C-grade land will therefore, produce Qe quantity such that the price equals not only his marginal cost (MC) but also his average cost (AC), and he just manages to break even i.e. his total costs equal his total revenue. There is no

surplus on this land and hence there can be no rent on it. If a rent is demanded, none will cultivate this land as total costs will then, exceed the total revenue. However, in the case of superior grades, A and B of land, at the output where the marginal cost of cultivation (MC) equals the marginal revenue equals the price, the average cost is less than the price. This causes a surplus over and above the cost on these land. This surplus is rent according to the Ricardian theory. In Fig. 16.3 above, the rent is shown by the shaded areas. Rent is greater on A-grade land than on the B-grade, for productivity on A-grade land is greater than on B-grade land.

The above analysis explains Ricardian rent on the extensive margin, that is when the margin of cultivation extends from more fertile to less fertile lands. But Ricardo had pointed out that rent arises not only on the extensive margin but also on the intensive margin of cultivation. In this case the area of land of given fertility is assumed to be fixed, and production on it is increased, in response to increase in demand, by employing more and more doses of labour and capital on it. Labour and capital are assumed to be perfectly complementary to each other so that they can be employed only in a fixed proportion. That is why they are written as 'labour and capital'. Diminishing Returns to variable proportions (between land and labour and capital) are assumed.

According to Ricardo, the intensive margin of cultivation would be taken to the point where the marginal product of labour and capital equals the price of labour mid capital. Perfect competition is assumed in the labour and capital market such that the average cost of labour and capital remains constant and therefore, the marginal cost of labour and capital also remains constant and equals the average cost. The horizontal line CC' in Fig. 16.4 represents the AC and the MC of labour and capital, and the negatively sloped MRP curve represents the marginal revenue product of labour and capital. A cultivator will employ such a quantity of labour and capital that the marginal cost of employing the variable factor labour and capital, equals its marginal revenue product. In terms of Fig. 16.4. OQ quantity of it will be employed. The total revenue product will be represented by the area OQRA and the total costs will be " represented by the area OQRC and the different between the two the area ACR is the surplus over and above the costs. This is the Ricardian rent on the intensive margin.



When we go deep into the Ricardian analysis of rent, we shall discover that his model of the 'intensive margin' is more relevant than his model of the 'extensive margin' in so far as the basic cause of rent is concerned. If the factor labour and capital, is assumed to be homogeneous, the diminishing marginal product is due to the perfectly inelastic supply of land. Even in the "extensive margin" model depicted in Fig. 16.3 above, it can be shown that rent arises not on account of differences in the fertility of different pieces of land but due to the scarcity or perfectly inelastic supply of land. Supposing the price of corn rises above OP and now no more land is available for cultivation, there will be surplus and rent on the C-grade land too. Therefore, it is right to stress that differences in fertility or situation are not the causes of rent but they are only the causes of differences in rent. This will suggest that the so- called 'original' and "indestructible" qualities of land are to be found not in the differences of fertility and situation as such but in the fixity of its supply.

A fundamental weakness of the classical theory of rent is that it looks at land from the point of view of the economy as a whole only. From this point of view there can be no doubt that the supply of land is fixed and perfectly inelastic. But when looked at from the point of view of an individual industry or an individual cultivator, its supply is quite elastic. This point was explained in the last lesson while explaining the supply function of land. From the point of view of an individual industry or an individual firm, land has a supply price. To an industry, the supply price of land equals its 'transfer earnings', the earnings that it can get in the next best alternative use. To an individual cultivator the supply price of land equals what the rival firms are offering for the use of its services. The classical particularly Ricardo, not only looked at land from the point of view of the economy as a whole but also ruled out its opportunity cost by assuming that land has only one specific use. This is a highly unrealistic assumption.

Self Check Exercise-2

Q.1 Discuss Classical theory of rent.

13.6 MODERN THEORY OF RENT

The modern theory of rent has been developed so as to meet the criticism against the classical theory of rent and to broaden the traditional theory. The theory of rent, as it stands today, has the following features. Firstly, rent in this theory is regarded just like any other price which is determined by the interaction of the forces of demand and supply. Secondly, it explains rent not only from the point of view of the economy as a whole but also from the point of view of an individual industry. Thirdly, it emphasizes that rent is an income which is nor peculiar to the factor land, it is the income of any factor the supply of which is perfectly inelastic. Fourthly, it makes a distinction between rent proper and quasi-rent. We shall now take these features one by one for explanation.

From the point of view of the economy as a whole, rent is regarded as the price paid and charged for the use of services of land in production. The whole of this price is rent or a surplus over and above the supply price of land. To the economy as a whole the supply of land is perfectly inelastic and its "transfer earnings" are zero. Therefore, from the point of view of an economy the whole of the earnings of land is a surplus or rent.

However, the above does not imply that rent, which is the price of services of land, is determined by demand alone. Rent is determined by the interaction of the demand function for land and its supply function. The only peculiarity about its determination is that, from the point of view of the economy as a whole its supply is perfectly inelastic in the short period as well as in the long period. This makes the force.

Supposing the total supply of land in an economy to be OS in Fig. 16.5, the supply curve of land will be vertical like SS' in Fig. 16.5. DD' represents the demand function for land. As explained in the last lesson, the demand curve DD' is arrived at by horizontally adding up the MRP curves of the individual cultivators of land. Rent of land is determined at the level where the demand curve for land, DD', intersects the supply curve SS'. So OR is the rent. If we assume that all the individual cultivators have identical MRP curves like the MRP curve in Fig. 16.5, in equilibrium each one of them will be hiring OQ quantity of land for cultivation and paying OR rent unit of land which equals the MRP of land to him. Since land has no supply price to the economy as a whole, the whole of OR is the rent per unit of land, Each farmer will be paying a total rent equaling OQAR.



The above analysis is based on the implicit assumption of perfect competition which implies that land is homogeneous. If the land is heterogeneous with its individual units differing in fertility or situation or both, there will not be a uniform rate of rent. Rent will be higher on lands which are more fertile or more favorably situated. Even when there are difference in the fertility or situation of different units of land, rent is determined by the same basic principle of demand and supply and is caused by the scarcity of land of a particular variety. As it was stressed earlier too, differences in fertility or situation do not explain rent they explain only the differences in rent.



While the supply of land to the economy as a whole is perfectly inelastic, it is elastic to a particular industry. If we assume that all units of land are equally productive in a given industry say wheat growing, they will have a single uniform price for the use of their services. However, if their productivities in the other industries differ, their 'transfer earnings' which determine their respective supply prices to the wheat-growing industry, will also differ. The price for the use of land in wheat industry will equal the supply price of the marginal unit of land, employed in the industry and this is the unit which has the highest "transfer earnings" of all the units employed, it is because as the wheat industry requires more and more units of land, these additional units will have to be attracted from other industries such as rice- growing, sugarcanegrowing and so on. Units with lower "transfer earnings" and therefore, lower supply price will be attracted first. If more units are required to be supplied, they will have to he attracted from industries where they are earning more. Hence the supply price of land to a particular industry goes on rising, which implies that the supply function of land to a particular industry will be positively sloped like SS' in Fig. 16.6 with its elasticity > 0< ∞ .

DD' represents the demand condition. for land in the wheat industry. The price paid for the use of the services of land in this industry must be OR at which the demand Function DD equals the supply function SS. OQ is the quantity of land employed. Qth unit is the marginal unit and its supply price is QE = OR. Thus, it can be said that the price paid for the services of land in a particular industry is determined by the forces of demand and the supply of land in that industry, and in equilibrium, this price equals the MRP of land in that industry, on the one hand, and the supply price of the marginal unit, on the other.

It is to be noted that in this case the whole of the earnings of land. OQ. OR = area OQER is not rent. For, there is a positive cost of supplying OQ quantity of land to this particular industry. This cost is measured by the area under SS curve which is represented in Fig. 16.6 by the area OQES. The differences between the total earnings, OQER, and the total supply cost, OQES, is the surplus or rent.

This argument brings out an important difference between the classical theory and modern theory. While the classical theory viewed the whole of the earnings of land as a surplus and rent, the modern theory stresses that from the point of view of an individual industry, only that part of the income of land which is over and above its supply price of "transfer earnings", is rent. In Fig. 16.6, OR equals the supply price OE of the marginal Qth unit. But the intra-marginal units, that is, the units to the left of Q have lower supply prices and earn a surplus or rent which, in each case, is measured by the difference between the price OR and the supply price of the unit of land concerned.

If we assume that all units of land are of equal productivity in all the industries, the supply curve of land to an individual industry will be perfectly elastic at a level equaling its "transfer earnings". The price of the services of land will still be determined at the interaction of the demand and supply functions of land. But now this price equals the "transfer earnings" of land which are uniform for all units of land. Hence there will be no surplus earned by any unit of land over and above its supply price of "transfer earnings".

The modern theory has also stressed that rent can arise on any kind of productive service other than the services of land, if its supply is perfectly inelastic. Let us suppose that there is a musician who has natural gift in the form of his musical

talent which is unequalled by any other musician. This talent helps him to earn say. Rs. 5000 per month. Now, if he can earn only Rs. 1000 per month in the next best employment open to him, he will he earning a surplus of Rs. 4000 over and above the "transfer earning' of his natural ability as a musician, the supply of which is perfectly inelastic.

Lastly, the modern theory of rent, as it developed in the hands of Marshall, makes a distinction between factors like land, whose supply is fixed in the short period as well as the long period and the man-made agents of production, that is capital equipment whose supply is fixed in the short period but is elastic in the long period. While the income earned by the former is rent proper or pure rent, the income earned by the latter in the short period, when their supply is fixed, was categorized by Marshall as *quasi-rent*.



You may recall that there is a particular form a physical capital which cannot be varied in the short-period. It is capital in the form of machines and buildings. Since such capital goods cannot move out of one industry or firm into another industry or firm in the short-period, their transfer earnings from the short-period point of view are zero; hence the whole of their short-period earnings are in the nature of a surplus. Their short-period incomes resemble rent and, hence, they were described as 'quasirent' by Marshall.

The concept of quasi-rent can be explained with the help of a diagram depicting the equilibrium of a firm in the short period. In Fig. 16.7, SAC, SMS and AVC are respectively the short-period average cost, short-period marginal cost, and average variable cost curves of the firm. If the price of the product happens to be OP. PP will represent AR=MR line and the firm's equilibrium will be at point B where it produces OQ output. Its total revenue equals OP.OQ= area OQBP.

The variable costs. OQ.QA area OQAC are the necessary costs in the shortperiod. The difference between the total revenue and the total variable costs (OQBP -OQAC CABP) may be imputed as the income of the fixed plant. The whole of if (CABP) is a surplus over and above the "transfer earnings" of the fixed factors which are zero in the short period. Hence CABP is quotient earned by the firm on its fixed factors. If the price falls to OP_1 , P_1P_1 becomes the AR-MR-line and the equilibrium of the firm takes place at B_1 . Now the total revenue $OQ_1B_1P_1$ equals total costs which are also $OQ_1B_1P_1$ Yet, there is a surplus over and above the variable costs which are the only necessary costs in the short period. This surplus now is given by the difference between the total revenue area $OQ_1B_1P_1$ and the total variable cost area $OQ_1B_1P_1$ which equals the area $C_1A_1B_1P_1$.

In brief, a firm's short-period earnings that are over and above the variable costs are quasi-rent.

Self Check Exercise-3

Q.1 Discuss Modern theory of rent.

13.7 SUMMARY

The relation between rent and price is an old controversy. According to Ricordo rent is price determined and not price determining. Rent is a differential surplus between the produce of the superior and the Marginal land. The price of corn equals the cost of production on the Marginal land. Sine Marginal land is no-rent land, therefore, by hypothesis, rent does not enter into the price of corn. On the other land, rent is price determined. When the price of corn starts rising, the existing A grade Land's are cultivated more intensively and the inferior grades of land are brought under plough. As a result the superior lands starts earning rent. Rise in the price of corn above the cost of production on the marginal land makes it possible for the marginal land owners to earn rent. The higher the price of corn, the higher will be rent.

According to Modern Analysis, Land has alternative uses. What land concern in its most profitable alternative use the transfer cost of land. The transfer cost of land forms part of the cost of production and thus enters into price.

13.8 GLOSSARY

• **Quasi Rent :** The doctrine of Quasi rent was introduced into economic literature by Marshall who extended Ricardo's theory of land rent to other factors fixed in supply during the short period. It refers, in Marshall's words, to "Income derived from machines and other appliances made by man". There are certain durable factors whose supply cannot be increased or decreased during the short period. Machisev, ships, houses and even human ability like land are fixed in supply but only in the short run.
When the demand for them increases, their supply being fixed, they earn a surplus which is not rent but is like rent as their supply can be increased in the long run. Marshall preferred to call it Quasi rent.

13.9 DISTINCTION BETWEEN RENT AND QUASI-RENT

Quasi-rent is often distinguished from rent. Quasi-rent resembles rent in in more than two ways. Quasi-rent arises when the for non made goods increases, while rehearses with the rise in demand for the products of land. Just as the supply of manmade appliances is fixed in the short period, so is that of land. Transfer earnings are as much important for determining Quasi rent as they are for determining rent. Quasi rent, like the rent of land is price determined and not price determining. There are, however, important points of differences between the two. Quasi-rent is a payment is non-made appliances during the short period when their supply is temporarily fixed. Rent is a payment for natural gifts like land whose supply is fixed both in the short and long run. Quasi-rent is a temporary phenomenon which disappears in the long run, when the supply of man-made guards is increased. Rent persists in both the periods because the supply of land cannot be changed.

13.10 ANSWERS TO SELF CHECK EXERCISES

Self Check exercise -1

Ans.1 Refer to Section 13.3

Self Check exercise -2

Ans.1. Refer to Section 13.5 Self Check exercise -3

Ans.1 Refer to Section 13.6

13.11 REFERENCES/ SUGGESTED READINGS

- 1. Stonier and Hague: A Textbook of Economic Theory, Ch. XIII
- 2. Joan Robinson: Economics of Imperfect Competition, Ch. VIII
- A Marshall: Principles of Economics, Book V. Ch. 9 to 11, Book VI, Ch. 9 & 10.
- 4. Carter: Theory of Wages and Employment Ch. 7 & 8:

13.12 TERMINAL QUESTIONS

- Q.1 Critically analyse the main elements in the modern theory of rent. How does an element of rent enter into prices of factors other than land?
- Q.2 Discuss in detail classical theory of rent.

THEORIES OF INTEREST (I)

Structure

- 14.1 Introduction
- 14.2 Learning Objectives
- 14.3 Classical Theory of Interest Self Check Exercise-1
- 14.4 Neo-classical Theory of Interest Self Check Exercise-2
- 14.5 Summary
- 14.6 Glossary
- 14.7 Answers to Self Check Exercises
- 14.8 References/ Suggested Readings
- 14.9 Terminal Question

14.1 INTRODUCTION:-

In common parlance interest is a payment made by a borrower to the lender for the money borrowed and is expressed as a rate percent per year. But in economics widely different-views have been put forth from the time of Aristotle. Aristotle recognised only animal has boundary and stock-raising as two legitimate industries whose products could be lent and interest earned on then. In economics, interest has been defined in a variety of ways. Commonly, interest is regarded as the payment for the use or service of capital. If retained by the owner. It can be used by win for further production and the additional products he gets through the employment of his capital includes interest. If he had lent his capital to someone else, he would have received interest in return.

In the present lesson we propose to examine two of the theories of interest namely the classical and the neoclassical.

14.2 LEARNING OBJECTIVES:-

After reading this chapter you will be able to explain

- Classical theory of Interest
- Neo classical theory of Interest

14.3 CLASSICAL THEORY OF INTEREST:

The classical theory of interest was developed gradually by a number of classical writers and it was ultimately consolidated in the writings of J.S. Mill. Marshall and Fisher. This theory looks upon the rate of interest as a price paid and charged for the use of savings and it, therefore, seeks to explain the rate of interest in terms of the demand for and the supply of savings.

The demand for savings, according to this theory, comes from those who need funds for investment. The greater is the demand for investment, the greater is the demand for savings. Thus, investment makes up the demand side of savings. But, what is it that determines the demand for investment? At any given rate of interest, the demand for investment depends on the marginal productivity of capital. Marginal productivity of capital is the net yield from an additional unit of capital. It is to be noted that capital here refers to real capital in the form of machines and other capital goods. It does not refer to money capital. Secondly, yield of an additional unit of capital to which marginal productivity of capital refers is net yield over its whole life. How do we calculate this net yield? In the first place, we have to deduct from the additional yield, made possible due to the employment of this marginal unit of capital, the reward of the co-operant factors. Let us suppose that the additional unit of capital (say, a machine) costs Rs. 10 and it has a life of only one year after which it is of no use. Let us suppose that at the end of the year, the machine yields an additional gross income of Rs. 150. But to make use of this machine, additional guantities of some other factors are required to be employed. The payment be Rs. 40. After allowing for this payment only Rs. 110 are left. But out of it, Rs. 100 account for the value of the machine itself. Hence the net yield in this simple example is Rs. 10 only, and this is the marginal productivity of capital, according to the classical theory. The investor in real capital compares this marginal product of capital with the prevailing rate of interest. If the marginal product of capital is greater than the going rate of interest, additional investment would be undertaken, otherwise not.



Marginal product of capital, in the above sense depend on (i) what happens to the marginal physical product of capital and (ii) what happens to the price of the final product which that capital turns out as more and more of capital is employed. Due to the Law of Eventually Diminishing Marginal Returns, the marginal product of capital must diminish after a point. Assuming perfect competition in the product market, an increase in the total product of an individual investing firm will not change the price of the final product. Therefore the marginal product of investment curve of the firm will have a shape like that of MP curve in Fig. 17.1. The horizontal lines, i₁,i₂ etc, represent different levels of the rate of interest to an individual investor in a perfect capital market. You may recall from what was explained in Lesson 15 that a profit maximizing employer employs so much of only factor that (i) its marginal product equals its price and (ii) its marginal product is diminishing. So if the rate of interest is i1 an individual entrepreneur will invest OQ₁. If the rate of interest falls to I₂, the investment rises to OQ₂. This shows that the individual investment demand function (investment demand as a function of rate of interest) is negatively sloped. A lateral summation of the individual investment demand function gives us the total investment demand function which must also be negatively sloped. In the case of the total investment demand function, there is an additional reason for its being negatively sloped. This reason is that as the total product of the industry increases the price of the final good must also fall.



Thus, the investment demand for the capital or savings is inversely related with the rate of interest. The classical economists believed investment to be interestelastic. The classical investment demand function is of the shape. I (i) in Fig. 17.2. A change in the factors influencing productivity will shift the investment demand function.

A basic feature of investment is that its yield is available not immediately but only in future after the lapse of a certain period of time. In the meanwhile, some people in a community have to go without consumption of an amount equal to the investment made in order to make available savings equal to investment. In order to elicit the required amount of savings a bait has to be offered to the people to induce them to sacrifice their present consumption. This bait is the rate of interest which the classical economists looked upon as a reward for sacrificing or abstaining from consumption. However, when the notion that saving involves sacrifice of consumption came under criticism, later economists like Marshall emphasized that saving involves not sacrifice of consumption as such but a mere postponement of present consumption for the sake of future consumption which implies that savers are not under-taking sacrifice of consumption but are under taking 'waiting'. So Marshall regarded interest as the reward for 'waiting' the supply of which had a 'real cost' like the supply of labour. This real cost arises from the psychological fact that human beings, as a rule, are prone to underestimate their future satisfactions in relation to the present ones such that they generally prefer present satisfaction to a future satisfaction of the same value and of the same degree of certainly Due to this myopia, the value of future consumption is discounted and the rate at which it is discounted is said to be the rate of interest. An alternative formulation of the same idea was given by the American-economist, Fisher, who emphasized that peoplé, as a rule, prefer present goods to future goods and the rate of interest is the measure of the rate of people's preference for present goods over future goods. Fisher described this rate as their rate of time preference. In order to induce people to save, their preference for present goods over future goods has to be overcome, 'interest, argued Fisher, was the reward which induced the potential savers to overcome their time preference. The higher is the rate of time preference the higher will be the inducement in the form of the rate of interest.



The important point to note is that whether you call it sacrifice of consumption or waiting or 'time preference, the factor that lies behind saving is a real factor and not a money factor. Secondly, we have to see how savings vary in response to change in the rate of interest. People's rate of time preference is given by their tastes or preference scale. As one goes on saving more and more, other things remaining the same, his rate of time preference will go on increasing because his future becomes more and more secure and well provided for. A rise in the rate of interest increases the future income and raises the rate of time preference. Therefore, if a further increase in the supply of savings is needed, a bigger inducement in the form of a higher rate of interest has to be offered. This led the classical writers to stipulate that savings are a direct function of the rate of interest, and when it is shown through a curve, it will be positively sloped like the S(i) curve in Fig. 17.3.

Thus in the classical theory the demand for savings depends on investment which in turn depends on the productivity of capital. The supply of savings depends on people's time preference or their preference between present and future goods. We have already explained that investment demand for savings is inversely related to change in the rate of interest, the chief cause of which is that, due to the operation of the Law of Diminishing Returns, greater investment is associated with a lower marginal yield expected from investment, and it follows from the profit maximizing condition that the rate of interest has to be lower, if a greater amount of investment is to be undertaken.

The equilibrium rate of interest, according to this theory, is determined at the point of intersection of the investment function, I (i), and the saving function, S(i), as shown in Fig. 17.3. So the equilibrium condition is: I (i)-S(i). This condition is satisfied at point E in Fig. 17.3 so that i_0 is the equilibrium rate of interest and Q_0 is the amount of income saved and invested.

This theory has rightly been described as the real theory of the rate of interest, because the forces, in terms of which this theory explains interest, are all real forces. Investment itself refers to real investment the form of addition to capital stock and so does savings, for it represents savings of real resources devoted to the production of consumer's goods which are made available in the form of savings for the production of capital goods. Secondly, the factors underlying the investment and saving functions are real factors. It is the real factor of productivity that lies behind the investment function, and it is the real factor of 'thrift' or 'time preference' that lies behind the saving function. Thirdly, as in the case of the general classical model, even so in the case of the classical model of interest rate determination, any change in the supply of money simply changes the money values of the variables without any effect on their real values. For example, if the supply of money is doubled, the equilibrium of the system will be immediately disturbed but when it finds its new equilibrium, the price level will be doubled. The rate of interest in money terms will also double and the amount of equilibrium savings and investment will also double in money terms. But, in real terms everything will remain as it was in the original equilibrium position. For example, if the money values of the different variable in the initial equilibrium are represented as i₀, Q₀ and P₀ for the rate of interest, saving and investment, and the

price level respectively, and the same take on the values $i_1 Q_1$ and P_1 after the change in the supply of money has brought a new equilibrium, the real name of interest in the initial equilibrium (i_0/P_1) equals (i_1/P_1), the real rate of interest in the new equilibrium position and (Q_0/P_0), savings and investment in real term, in the initial equilibrium equal (Q_1/P_1), savings and investment in real terms in the new equilibrium position. Only a change in some real factor can cause a change in the real rate of interest. For example, if due to an improvement in productivity conditions, the investment function, I (i) to the right, it will intersect the saving function, S (i) above E in Fig.3 which implies a higher real rate of interest. Similarly, if the people become more thrifty, that is, their preference scales undergo a change in such a way that their preference for future goods increases in relation to their preference for present goods, the savings at any given rate of interest will be larger than before which implies that the saving function, S (i) will shift to the right, if the I(i) function remains at its original position. This shift of the saving function will cause a fall in the rate of interest.

It should be obvious from the above that in the classical theory, it is through changes in the rate of interest that savings and investment are brought into equality. We emphasis this point because it was particularly picked up by Keynes for criticizing the classical theory of the rate of interest.

Before we make a critical examination of the classical theory of interest, it may be noted that this theory represents a 'flow' analysis of rate of interest, because saving and investment in this analysis refer to flows and not to stocks. Saving is that part of income per unit of time which is not consumed, and investment is the addition made to the capital *stock per unit of time*.

A critical examination of this theory immediately reveals that this theory offers only partial and one sided explanation of interest. It assumes implicit that saving is the only source of the supply of loanable funds. It does not take note of the fact that, in a modern economy, a substantial portion of the total supply of loanable funds comes in the form of credit money created by the banking system. Therefore, it focuses attention solely on the real forces and completely ignores the monetary factors influencing the rate of interest. However, while making this sort of criticism, one should not forget that the classicals made a distinction between the money rate of interest or the bank rate of interest and the real rate of interest. This is obvious in the writings of Thornton whose monetary analysis was adopted by Ricardo and Mill too. Their monetary analysis admitted that any increase in the supply of money via the banking system lowers the bank or the money rate of interest. Since the real rate of interest which reflects the yield of capital is higher, demand for loanable funds increases which tends to push up the money rate of interest. The money loans provided by the banking system are employed to bid the real resources from consumption to investment. This raises the prices not only of the factors of production but also of the final goods So long as there is dis-equilibrium. Prices as well as money rate of interest will go on

rising, and when the new equilibrium is attained, the price level as well as the money rate of interest would be found to have risen in the same proportion so that (i/P) (where i is the money rate of interest and P is the price level) remains the same as it was in the initial position. Money is 'neutral' in the classical analysis.

It was said above that an increase in supply of bank loans to entrepreneurs leads to a rise in the price level. This obviously implies that the economic system is already working at the level of full employment. This, in fact, is a basic assumption implicit in the classical analysis. Keynes questioned the realism and relevance of this assumption. Once we admit the existence of unemployed-resources, it can be shown that the classical conclusions become invalid. Any rightward shift of the investment function in such a situation need not increase the rate of interest and reduce consumption as it is implied in the classical analysis. Increase in investment expenditure increases the income of the people through the multiplier effect. The increase in income is made possible by the mobilization of the unemployed resources which increases incomes as well as the savings of the people without any rise in the rate of interest. It was thus Keynes that contended that saving and investment are brought into equality with each other not through changes in the rate of interest but through changes in the level of income. Moreover, as incomes of the people increase, not only saving but consumption too rises. This result contradicts the classical proposition that an increase in investment is necessarily at the expense of consumption. It is the basic assumption with regard to the level of employment that makes the difference. The classical analysis assumes equilibrium to be unique at full employment and thus reaches one set of conclusion; Keynesian analysis assumes underemployment equilibrium and consequently, arrives at a different set of conclusion.

The classical notion of interest also implied that the rate of interest is a reward for saving. Keynes controverted this suggestion too. He liked to stress that interest is a reward not for saving but for not hoarding'. He argued that the mere fact of savings does not entitle any one to earn interest. Only when savings are not hoarded but are parted with that they earn interest. Robertson, however, had disposed of this criticism of classical theory by Keynes by pointing out that consuming is an alternative to invested; therefore, interest can be looked upon both as a reward for not consuming as well as a reward for not hoarding. The fact that the rate of interest measures the marginal convenience of keeping idle cash balances need not prevent if from measuring, at the same time, the marginal inconvenience of not consuming. Therefore, Robertson pointed out that such loose as that the rate of interest is the reward not for saving but for parting with liquidity show "a curious inhibition against imagining more than two margins at the same time."

However, if we admit the Keynesian proposition that equilibrium level of income is not uniquely the full employment level, a further Keynesian criticism of the classical theory becomes relevant. This criticism is that the classical theory if interest is indeterminate, that is to say, the theory does not give us a determinate solution to the problem of interest rate determination. It is because we cannot know the rate of interest unless we know the position of the saving function. The position of the saving function cannot be known unless we know the level of The level of income cannot be known unless we know the level of investment. And the level of investment cannot be known unless we know the rate of interest. Thus, this puzzle remains unsolved. Hence the theory is said to be indeterminate.

Self Check Exercise-1

Q.1 Discuss Classical theory of Intrest.

14.4 NEO-CLASSICAL THEORY:

The neoclassical theory, which is also known as the *loanable-fund* theory of Interest, is a refinement of the classical theory which is primarily the work of Wickshell and his followers, on the one hand, and Robertson, on the other. This theory too regards rate of interest as a price. But, in this theory, this price is determined in the loan market through the interaction of the forces of demand for and supply of loanable funds. If you assume, that saving is the only source of supply of loanable funds and investment the only source of demand for loanable funds, and if you further assume that no part of saving is ever hoarded but the whole of it is always supplied as loans, then there would be no difference between the classical and neoclassical versions of the theory of interest. However, the neo-classical theory not make the above said classical assumptions. In this sense it is a departure from the classical theory, and the refinement introduced by it is the stipulation that there are sources of supply of loanable funds other than saving alone, and similarly, that there are sources of demand for loanable funds other than investment alone.

We shall now enquire into the nature of the various components of the supply of as well as the demand for loanable funds and try to know how these components and, therefore, how the aggregate supply of and the 'aggregate demand for loanable funds behave in response to changes in the rate of interest. However, before we perform this task, it will be in place to make one clarification. In a modern economy, in which a bond market exists, supply of loanable funds takes the form of demand for bonds. A bond yields a fixed income per unit of time, which is usually a year. This fixed income in relation to the price of the bond gives the rate of interest. If a bond yielding a fixed annual income of Rs. 5 and is priced at Rs. 100, the rate of interest will work out to be 5%. If the same bond is priced at Rs. 125, the rate of interest will be 4% and if it is priced at Rs. 80, the rate of interest will work to be 6.25%.

(The formula is rate of interest yield = x100). price It can price be seen that the rate of interest is inversely related to bond prices. An increase in the demand for bonds implies an increase in the supply of loanable funds, and other things remaining the same, it raises the prices of bonds and lowers the rate of interest. While the supply of loanable funds takes the form of the demand for bonds, the demand for loanable funds takes the form of supply of bonds. An increase in the supply of bonds implies an increase in the demand for loanable funds. As the supply of bonds increases, the bond prices fall and the rate of interest goes up.

Once we remember the above point, it is possible to do the analysis of the rate of interest in terms of either money or bonds. If we assume that the whole economy has three markets, the product market, the money market and the bond market and further assume that the product market is in equilibrium, then it follows from Walras Law that the equilibrium in the bond market automatically implies an equilibrium in the money market too. If the demand for bonds equal the supply of bonds, the demand for money must also equal the supply of money. Hence provided the product market is always in equilibrium, it is immaterial whether rate of interest is explained in terms of demand and supply of loanable funds (or bonds) or in terms of demand and supply of money.

According to the neo-classical theory, the supply of loanable funds has the following sources: (i) saving, (ii) dis-hoarding, (iii) disinvestment, and (iv) bank credit. Saving is assumed to be a function of the level of income as well as the rate of interest. At any given level of income, the higher is the rate of interest, the larger is the amount of saving done for reasons already discussed in connection with the classical theory. Therefore, the saving function, $S(i,Y_0)$, would be positively sloped as shown in fig 17.4 Y₀ refers to a given level of income, when we assume that all the savings need not be offered as loans, we have to recognize that a part of the past savings might be lying with the people in the form of idle cash balances or hoards of money. There is a certain advantage in keeping one's assets in the form of idle cash balances on account of their perfect liquidity. On the other hand, keeping one's assets in the form of hoards of money has a price in the form of interest that is lost.



Marginal convenience of keeping money hoarded in the form of idle cash balances. This marginal convenience is assumed to be inversely related to the volume of idle cash balances. A rise in the rate of interest will, therefore, induce the people to reduce the volume of their idle cash balances through dishoarding so that the marginal convenience of keeping one's assets in a liquid form comes in line with the new higher rate of interest. The dishoarded funds be supplied as loans through the purchase of bonds. It should be noted that higher is the rate of interest the greater will be the amount of dishoarding. So the dishoarding function, DH (i), is also positively sloped as shown in Fig. 17.4. It may be noted that dishoarding does not imply an increase in the total supply of money it merely implies the activation of idle balances or an increase in the velocity of circulation of money.

Another source of supply of loanable funds is disinvestment made by firms either because of idle season in the case of seasonal industries or because the expected yield from investment happens to be less than the going rate of interest. Normally, the higher is the rate of interest, the fewer will be the lines of production which promise net profits higher than the current rate of interest. This induces firms to increase their disinvestment by neglecting replacements. The released funds are invested in bonds which increases the supply of loanable funds. So the disinvestment component of the loanable funds supply schedule is also positively sloped as shown by DI (i) Fig. 17.4.

The fourth source of the supply of loanable funds is the banking system. The banks advance loans by creating deposits. So long as a bank has not created so much credit that its cash reserves are the minimum necessary, an increase in the rate of interest encourages the bank to create more credit. In fact, the creation of bank credit has little or no marginal cost, in view of which the schedule showing the supply of bank money, B (i), may sometimes assume dangerous elasticity. The schedule showing the supply of loanable funds by banking system is, in any case, positively sloped as shown by D(i)in Fig. 17.4.

When we add laterally all the above four schedules [S (i, YO), 1)DH (i) DI (i) and B (i)], we get the aggregate schedule of the supply of loanable funds as shown by SL (i, Y_0) in Fig. 17.4. Because all its individual components are positively sloped, it too must be positively sloped.

The demand for loanable funds comes from (i) investment (ii) hoarding and (iii) dis- saving. Investment demand of loanable funds is inversely related to the changes in the rate of interest. An increase in investment lowers the marginal productivity of capital. Therefore, unless the rate of interest falls, a larger investment cannot be undertaken. Similarly, as the rate of interest rises, investment has to be decreased so that marginal productivity of capital also rises to come in line with the increased rate of interest. So the investment demand schedule 1 (i) for loanable funds is negatively sloped like the I(i) schedule in Fig. 17.4. The demand for hoarding cash balances is also inversely related to the rate of interest, for interest is the opportunity-cost of keeping wealth in the form of idle hoards. The higher is the rate of interest, the greater will be the cost of hoarding and, hence, the demand for funds for hoarding will be less. At a lower rate of interest, the cost of keeping hoards of money is less and, consequently, the demand for funds for hoarding is greater. Thus, the demand schedule for funds on account of hoarding will be negatively sloped like H(i) in Fig. 17.4. At any time, some people must be borrowing to meet their demand for current consumption. Such people are in fact, dis-saving. The demand for loanable funds on account of this motive is also inversely related to changes in the rate of interest, like the DS(i) function in Fig. 17.4 for obvious reasons. When we add laterally all these three components of the demand schedule for the loanable funds, we get the aggregate demand schedule for the loanable funds which, like its components, must also be negatively sloped like the DI(i) function in Fig. 17.4.

According to the neo-classical theory, the equilibrium rate of interest is that at which the aggregate demand for loanable funds equals the aggregate supply of loanable funds. It is determined at the point of intersection between the aggregate demand schedule for loanable funds DL(i), and the aggregate supply schedule of loanable funds, SL(i): These two schedule intersect at point E in Fig. 17.4. This is the equilibrium point and the equilibrium rate of interest is i_0 .

It should he noted that, while on the side of supply we include dishoarding disinvestment and saving, we have, on the side of demand, their counterparts in the forms of hoarding, investment and dis-saving. If we wish to simplify and reduce the number of variables, we can have, on the side of supply, only net dishoarding and do away with hoarding on the side of demand, for net dishoarding equals total dishoarding minus hoarding. Similarly, dis-saving can be dispensed with on the side of demand by including, on the side of supply, only net saving (saving minus dis-saving), and disinvestment on the side of supply can he dispensed with by making investment net investment. In equilibrium,

S+ DH +DI+B=I+H+ DS Or (S-DS) + (DH-H) + B = (I-DI)

i.e. Net Saving + Net Dishoarding + Bank Money = Net Investment.

The neo-classical theory is, no doubt, a refinement of the classical theory in the sense that its analysis is a nearer representation of the real world than the classical one. It seeks to combine the real as well as the monetary factors in explaining the rate of interest, while the classical theory confined the determination of the rate of interest to only one part of the loan market.

But, in spite of this refinement, the neo- classical theory does not provide a determinate solution of the equilibrium rate of interest. When the neo-classical theory makes saving a function of the level of income as well as the rate of interest, it implicitly assumes that sayings cannot be determined without first knowing the equilibrium level of income. The equilibrium level of income cannot be known without knowing the size of investment, and the size of investment cannot be known without knowing, first, the rate of interest. The rate of interest cannot be known without knowing the saving component of the schedule of the supply of loanable funds. Hence, Keynes rightly observed that the neoclassical theory is as most indeterminate as the classical theory.

If you carefully look at Fig. 17.4 you-will find that the "equilibrium" rate of interest i₀'equates the aggregate demand for loanable funds with the aggregate supply of loanable funds. But it does not equate saving with investment. Even when we take saving and investment net of dis-saving and disinvestment respectively, they may not be equal at the rate of interest at which the aggregate demand for loanable funds equals the aggregate supply of loanable funds. If it so it would be wrong to characterize such a rate of interest-as the equilibrium rate. It is because the level of income will not be in equilibrium. Depending on whether investment is greater or less than saving at this rate of interest, the income will tend to increase or decrease, in consequence of which S(i,Y), the component of the supply schedule of loanable funds, will also shift. The shift in S(i,Y) will cause a shift in the aggregate. supply schedule (i,Y) too. An equilibrium rate of interest in a general equilibrium system is the one at which not only the demand for and supply of loanable funds are equal but saving and investment are also equal. The neo-classical theory does not provide the clue to such a rate of interest. So, despite its refinements it is still indeterminate of the rate of interest.

This theory has been further subjected to the charge that it suffers from a conceptual confusion and that it does not make a distinction between "stocks" and "flows" and consequently, adds "stocks" to "flows" which is impermissible. For example saving and investment are "flows", but hoarding and dishoarding and bank

credit are stocks. Therefore, while deriving the loanable fund demand and supply schedules, the "stocks" and "flows" are added together.

Self Check Exercise-2

Q.1 Discuss Neo- Classical theory of Intrest.

14.5 SUMMARY

Despite of few weaknesses, the no classical theory also knows as loanable funds theory is better and more realistic then the classical theory on a number of counts . (i) the classical theory is a real theory of interest and neglects monetary influences on interest. With the inclusion of real as well as monetary factors, the loanable funds theory becomes superior to the classical theory. (ii) The classical neglect the role of bank credit as a constituent of money supply influencing the rate of interest which is an important factor in the loanable funds theory. (iii) The classicists also do not consider the role of warding. By including the desire to Ward Money in the demand for loanable funds, the loanable funds theory becomes more realistic. (iv) To the classicists money is merely a 'Veil' a passive factor influencing the rate of interest. The Loabable funds theory is superior because it regard money as an active factor in the determination of the interest rate.

14.6 GLOSSARY :

The payment which the borrower makes to the lender excluding the principal is gross interest. It is a composite item which includes the following payments.

- **Pure or net interest :** It is the payment for the use of capital or money only. This is interest in the pure economic sense. It is normally the some during a period of time even in different markets.
- **Reward for Risk Taking :** The Lender expose himself to risk when he lender money. Gross interest includes the reward for risk taking. The greater the risk element, the higher is the rate of gross interest. unsecured loans are more risky than secured ones and they carry a wish premium rate.
- **Reward for in Convenience :** When a lender loans money we forgoes it s use for the duration of the Loan. His money's locked up and cannot be used for more profitable purposes. Or, if he needs the amount for his personal use, we will have to undergo the inconvenience of arranging it from some other source. In fixing the rate of interest the lender includes in it the reward for such inconveniences.

• **Reward for management :** The Lender has to incur expenditure in keeping proper accounts of borrowers. The payment that the lender receives from the borrower also includes the expenses for management.

14.7 ANSWERS TO SELF CHECK EXERCISE

Self Check exercise -1

Ans.1 Refer to Section 14.3

Self Check exercise -2

Ans.1. Refer to Section 14.4

14.8 REFERENCES/ SUGGESTED READINGS

- 1. Irving Fisher: The Theory of Interest Ch. 1-9
- 2. Stonier and Hague: A Text Book of Economic Theory, Ch. XIV Hague
- 3. G Ackley: Macroeconomic Theory, Ch. 14.
- 4. A.H. Hansen: A Guide to Keynes, Ch. 7.

14.9 TERMINAL QUESTION

- Q.1 Critically discuss classical theory of Interest.
- Q.2 Diagrammatically discuss Neo-classical theory of Interest. Also give its criticism.

THEORIES OF INTEREST (II)

Structure

- 15.1 Introduction
- 15.2 Learning Objectives
- 15.3 Keynes's Liquidity Preference theory of Interest Self Check Exercise-1
- 15.4 Criticism of Keynesian theory of Interest Self Check exercise-2
- 15.5 Modern Theory of Interest (Post Keynesian theory) of Interest Self Check exerciose-3
- 15.6 Summary
- 15.7 Glossary
- 15.8 Answers to Self Check Exercises
- 15.9 References/ Suggested Readings
- 15.10 Terminal Questions

15.1 INTRODUCTION

We examined, in the preceding lesson, two theories of interest, the classical and the neoclassical, both of which were rejected by Keynes. The classical theory did not appeal to him because it sought to explain interest in real terms, while they believed interest to be a monetary phenomenon. He did not agree with the classical proposition that the rate of interest is determined by the marginal productivity of investment. According to him, rate of interest is determined independently of the marginal productivity of investment, and is marginal productivity of investment which adjusts itself to the rate of interest rather than the either way about. Similarly, as already noted in the last lesson, Keynes also rejected the other classical notion, namely that the rate of interest is reward for saving, for, as he argued, hoarded savings do not bring in interest. He did not agree with the classical postulate that additional investment necessarily implies a curtailment of consumption to bring forth a matching amount of saving through changes in the rate of interest. On the contrary, he suggested that investment can increase along with increase in consumption, the matching increase in saving coming about through changes in income rather than in the rate of interest. In other words, while the classical theory proceeded from the

assumption of a unique macro-economic equilibrium at full employment, Keynes had assumed equilibrium at less than full employment. Furthermore, while the classical theory implied that the supply of money did not matter, because it did not change the real factors, Keynes implied that the quantity of money does matter, because it, in conjunction with the demand for money, determines the rate of interest which, in turn, determines investment, it also determines the marginal productivity of Investment. Keynes rejected the neoclassical theory too, in so far as it clung to the real factors of the classical analysis. In addition, he described both the classical as well as neoclassical theory as indeterminate.

15.2 LEARNING OBJECTIVES

After reading this chapter you will be able to explain:

- Keynes Liquidity Preference theory of Interest.
- Modern Theory (Post Keynesian Theory) of Interest.

15.3 KEYNES LIQUIDITY PREFERENCE THEORY OF INTEREST

Let us now have a look at Keynes's own theory. As already observed, Keynes regarded rate of interest as à monetary phenomenon rather than a real phenomenon; so he believed that it is determined in the money market. Therefore, according to him it must be analyzed in money terms rather than in real terms. The essence' of a loan transaction is that the lender parts with his command over a certain stock of money, while the borrower gets into the possession of this command. What is being borrowed and lent is money and what is given and charged for this exchange (interest) is also money. So interest is a monetary phenomenon that must be explained in money terms alone.

In Keynes's theory too rate of interest is a price, but it is price which is determined by the demand for and the supply of money.

The demand for money means the demand for holding money and the demand for holding money comes from what Keynes described as liquidity preference. Liquidity preference is the preference of the people to keep their assets in the form of cash balances rather than in any other form. An individual consumes a part of his income and saves-the other part. The savings may be invested in bonds or stocks or these may be spent on consumers durables or they may be kept in the form of cash balances. It is this preference for keeping one's assets in cash balances that is termed liquidity preference. However, it should be noted that 'cash balances is to be interpreted not literally but in the sense of readily available purchasing power which may be in form of cash as such or in the form of. bank deposits which can be withdrawn without notice.

Interest is the inducement which the borrower offers to the lender to make the latter part with his liquidity preference. So interest is a reward not for saving but for parting with liquidity.

The demand for holding money, or liquidity preference of the people depends, according to Keynes, on the operation of three motives: (i) Transaction Motive, (ii) Precautionary Motive, and (iii) Speculative Motive. During the discussion on Keynes's General Theory. Keynes subsequently admitted a fourth motive too, which came to be known as the financial motive, and to that we shall come some time later on. We shall first explain Keynes's analysis of the demand for holding cash balances on account of the above said three motives. Firstly, people keep some amount of money with them because they have to make cash payment in day to day transactions. The main reason for keeping cash balances for this purpose is that while people receive their incomes at the end of certain period of time, such as a week or a month, their expenditure is done more or less daily because they cannot buy all their daily necessaries on credit Therefore they have to keep a part of their income in the form of readily available purchasing power. The cash balances kept on account of this motive are known as transaction demand for money. The demand for holding money on account of this motive depends not on the rate of interest but on the level of income on the one hand, and the institutional factors, on the other. The institutional factor refer to such matters as the period for the payment of wages and salaries, and the method of making payments for purchases. Let us suppose that an individual's monthly income is Rs. 200 and he receives it at the end of every month. Let us further suppose that this individual starts the month with Rs. 200 and by the end of the month, he sponds the whole of it. In that case his average holding of money will be Rs 100 =

the same income is received on a weekly basis such that an individual receives Rs. 50 every week rather than Rs. 200 at the end of four weeks, his average holding of money will be only Rs. 25, because he will be starting every week with Rs. 50 and at the end of the week he will be left with a zero stock of money. In the first case, the proportion of income held in the form of cash balances is $\frac{100}{200} \text{ or } \frac{1}{2}$, while in the second case. It is $\frac{25}{200} \text{ or } \frac{1}{8}$. Hence the demand for holding money on account of this, motive

will change only with changes in income. Thus, the transaction demand for holding money is insensitive to changes in the rate of interest. It is a function, of the level of income and not a function of the, rate of interest. In the above example, we referred to individuals. But firms also keep a part of their assets in the form of readily available purchasing power or cash balances in order to carry on their day-to-day transactions. Their demand for cash balances also depends on the value of their turnover, on the one hand, and the institutional factors, on the other. The turnover of firm is positively correlated with the level of national income. So their demand for holding money on account of the transaction motive is also a function of the level of income and not of the rate of interest.

The demand for holding money on account of the precautionary motive is also insensitive to changes in the rate of interest. People as individuals as well as firms keep a part of their assets in the form of money balances in order to meet unforeseen contingencies, such as sickness and unemployment in the case of individuals and sudden unanticipated demands for cash payments in the case of firms. The demand for money balances to meet this purpose cannot be influenced by changes in the rate of interest. It solely depends on the level of income, given the institutional factors.

The demand for holding cash balances on account of the above two motives is usually referred to as the demand for active balances, for they are intended to be employed actively to carry out transactions. This component of the total demand for cash balances is generally indicated by the symbol M and in view of what has been said above, the transaction demand (inclusive of the precautionary motive) function for money may be written as $M_1 = L_1$ (Y).

As far as the above analysis of the demand for money is concerned, Keynes made no departure from the classical analysis. Keynes's innovation in the analysis of the demand for money was by way of introducing the third motive, the speculative motive, into this analysis. Keynes pointed out that people, as individuals and firms, like to keep their assets in the form of cash balances not only for the transaction and precautionary motives but also because of the hope to make profit from the prospective changes in bond prices, alternatively, from changes in the rate of interest. The classical analysis had not recognized this motive for holding money, but Keynes not only recognized it but also made it the crucial factor in the determination of the rate of interest.

The cash balances held on account of the speculative motive are usually referred to as idle cash balances, and the demand for them is referred to as the speculative or asset demand for money balances as distinguished from the transaction demand for them. The speculative demand for money, unlike the transaction demand, is sensitive to changes in the rate of interest or bond prices. If the rate of interest is at a higher level than its normal long-run level, the cost of holding idle cash balances is rather high in the form of interest that has to be foregone. Secondly, which is more important, when the current rate of interest is higher than what is generally believed to be the normal level, people will expect the rate of interest to fall and bond prices to rise in future. The current rate of interest being higher, the current bond prices will be low. Therefore, rational people will hold less cash-balances and more bonds, the current rate of interest is high and the current bond prices are low. When the bond prices are low and bonds yield a high rate of interest, the fear of capital loss due to a fall in the bond prices is rather less. This also accounts for the fact that at high rate of interest, people prefer to hold more bonds and less cash balances. On the other hand, when the current rate of interest is lower than what is generally believed to be the normal rate, the demand for cash balances is greater and the demand for holding

bonds is less. At lower rate of interest, the loss of interest on idle cash holdings is relatively less. Secondary, the rate of interest will be expected to go up and the bond prices will be expected to go up and the bond prices will be expected come down in futures. Therefore, people will prefer to keep larger amounts of cash balances with them to take advantage of the expected rise in the rate of interest. Moreover, when the rate of interest is low and the bond prices are high, the fear of capital loss due to prospective rise in the rate of interest and fall in bond prices is rather great. It discourages the people to hold bonds and encourages them to hold cash balances. Thus, we find that the speculative demand for holding money is sensitive to changes in the rate of interest; it changes with a change in the rate of interest. The above analysis also shows that the speculative demand for money is an inverse function of the rate of interest; it increases with a fall in the rate of interest and decreases with a rise in the rate of interest. It is usually indicated by $M_2=L_1$ (i).

At any given level of income, the transaction and precautionary demand for money is constant at all levels of rate of interest, but the speculative demand for money varies inversely with the rate of interest. When we add the demand for money on account of all the three motives we shall find that this aggregate will also change inversely with a change in the rate of interest so that the liquidity preference function will be negatively sloped like the L function in Fig. 18.1.



An integral part of Keynes's Liquidity Preference Theory is what has come to be known as the Liquidity Trap Hypothesis. Relevant to this hypothesis is the elasticity of the liquidity preference function. Keynes believed that there must be some min imum rate of interest at which the demand for holding money becomes perfectly elastic. In terms of Fig. 18.1 such a rate of interest is i_2 at which the liquidity preference function L becomes horizontal. Keynesian liquidity preference function is therefore, perfectly elastic at some minimum rate of interest. The basic reason for it, as given by Keynes, is that the risk of capital loss at a very low rate of interest is much greater than it is at a high rate of interest. When the rate of interest is very low the capital loss from a future

rise in the rate of interest and the consequent fall in bond prices may be much greater than the earned from the holding of bonds. Let us suppose that a bond yielding an income of Rs. 50/- per annum is purchased at Rs. 1,000 when the rate of interest is 5%. Now if the rate of interest rises to 6% the same bond will be priced at Rs. 833.33 so that the capital loss on the holding of the bond is Rs. 166.67. Let us now suppose that the rate of interest is 2 per cent Then a bond yielding an income of Rs. 20 per annum will be priced at Rs. 1.000. Now, if the rate of interest after say four years rises by the same 1 percent to 3 per cent the same bond will be priced at Rs. 666.67 so that the capital loss will be Rs. 333.33 which is much greater than that when the interest rate rises from 5 per cent to 6 per cent. During the four years, when the rate of interest remains at 2 per cent, the total income earned on the bond will be only Rs. 80 which is too meager as compared to the capital loss. Therefore at such a rate of interest the demand for holding money becomes infinitely elastic.

When we take account of both the transaction-cum-precautionary motive and the speculative motive for holding money, liquidity preference function is indicated by $M_1+M_2=L_2$ (Y)+L, (i) Briefly it is indicated by L (Y.i). This implies that any change in the level of income (Y) will shift the liquidity preference function L of Fig. 18.1 above and increase Y will shift it to the right and fall in Y will shift it to the left.

As regards the supply of money, Keynes believed it to be autonomous of the rate of interest, that is, it is determined autonomously by the banking system. If the autonomously determined supply of money is indicated by M, the condition for the determination of the equilibrium rate of interest is that the supply of money M equals the demand for money, $M_1 + M_2 = L_1(Y) + L_2$ (i). Therefore the equilibrium condition is:

 $M=M_1+M_2 L_1 (Y) + L_2(i)$

Supposing that the supply of money is M₀, while the total liquidity preference function is Las in Fig. 18.1 the equilibrium rate of interest will be i₀. Now let the supply of money increase from M₀, to M₁. The people will find in their possession more money than they desire to hold at i₀ rate pf interest. Therefore, they will try to get rid of the unwanted money by purchasing bonds. The increased demand for bonds will push up the bond prices and lower the rate of interest. The bond prices will go on rising and the rate of interest will go on falling till the demand for money becomes equal to the increased supply of money M,. This will happen when the rate of interest falls to i1 as shown in Fig. 18.1 Thus at any given level of income, an increase in the supply of money lowers the rate of interest A decrease in the supply of money will have the opposite effect of raising the rate of interest. Once again, take the case depicted in Fig. 18.1. Let us suppose that the initial supply of money is M₁ The rate of interest, then is i₁. Now let the supply of money decrease to M₀. People will now find in their possession less money than what they desire to hold at the rate of interest i1. Therefore they will try to sell their bonds in order to satisfy their desire for more money. The supply of bonds in the bond market will increase in consequence of which

bond prices will fall and the rate of interest will rise. The bond prices will go on and the rate of interest will go on rising till there is a new equilibrium between the for money and the decreased, supply of money M_0 at a higher rate of interest $i_{0.}$

The above in nutshell is Keynes's Liquidity Preference Theory of the rate of interest. It recognizes that the position of the liquidity preference function (L in Fig. 18.1) depends on the level of income Arise in the level of income shifts it to the right for the transaction demand for money will rise with the rise in income and it will shift the total liquidity preference function to the right although the pure liquidity preference function showing only the speculative demand for money does not change. Given the supply of money, an increase in income increases the demand for money on account of the transaction and precautionary motives so that less money is now available to satisfy the speculative demand for money. Consequently, the rate of interest rises with an increase in income, others things remaining the same and it will fall with a decrease in income.

Self Check Exercise-1

Q.1 Discuss Keynes liquidity preference theory of Interest.

15.4 CRITICISM OF KEYNSIAN THEORY OF INTEREST

Keynes's Liquidity Preference Theory is a monetary explanation of the rate of interest. It ignores the influence of real factors in the determination of interest rate. Therefore, it is as much subject to the charge of being a one-sided explanation as the classical theory which Keynes himself criticized. The only difference is that while the classical theory ignored the monetary factors, Keynes's theory neglects the real factors. As you know, saving and investment are representative of real factors. Keynes argued that they are of no consequence to the rate of interest which, according to him, is only a monetary phenomenon. Keynes vehemently asserted that interest is a reward not for saving but for 'not hoarding'. Similarly, he asserted that marginal productivity of capital does not determine the rate of interest, for the rate of interest is rather sticky and it is the marginal productivity of capital which adjusted itself to the rate of interest rather than the other way about. Both of these assertions of Keynes have been questioned. As it was observed in the preceding lesson, Robertson argued that hoarding is not the only alternative to investing in bonds. Consuming is also an alternative to it. Therefore the rate of interest may be reward for not consuming or saving as well as for not hoarding. This led Rohertson to remark (in connection with Keynes's assertion) that such loose phrases as the rate of interest is a reward not for saving but for not hoarding argue a curious inhibition against imagining more than two margins at the same time.

Keynes's assertion that marginal productivity of capital and investment do not influence the rare of interest has also been questioned. In fact if you admit the liquidity preference to be a function of both the level of income and the rate of interest, it is difficult to maintain that rate of interest is not affected by the marginal productivity of capital. Supposing that there is an improvement in the marginal productivity of capital, in consequence of which investment increases the level of income will rise due to the multiplier effect. The rise in income will shift the total liquidity preference function to the right and the supply of money remaining the same, the rate of interest goes up. It is not quite helpful to state that marginal productivity and investment have not a direct but an indirect effect on the rate of interest.

Perhaps the real cause of the above blemish of Keynes's theory of interest is to be found in his "misleading method of presenting a single general equilibrium system in two separate parts of income theory in which rate of interest enters exogenously, and a monetary theory in which income enters exogenously. (H.G. Johnson. "The General Theory After Twenty Five Years. " AER, May 1961). It is this methodology which creates the false impression that holding securities is the only relevant alternative to holding money and that the classical alternative of spending money on consumption or investment play no part in determining the demand for money and the rate of interest. This implication of Keynes's interest theory is not valid, because consumption and investment enter the transaction demand for money via their role in determining the levels of income associated with different levels of the rate of interest.

H.G. Johnson, in his article referred to above, has also charged Keynes's monetary (interest) theory with incompleteness. It is incomplete, firstly because it deals with the transaction demand in a cursory manner. Keynes explained it on the classical lines of personal convenience and economic structure and regarded it as a simple proportion of income. The demand for money in his theory depends partly on income in a way not rigorously analyzed and partly on the influence of current and expected interest rate. But Baumol (of his The transaction Demand For Cash An inventory Theoretic Approach, QJE, Nov. 1952) and Tobin (cf. his The Interest Elasticity of Transaction' Demand for Cash, RE, and S. Aug. 1956) have shown now that transaction demand can be treated as a problem in capital theory, and that the transaction demand for money so derived varies inversely with the rate of interest. Secondly, Keynes's analysis is based on the assumption that wages and prices are constant and it lumps all types of securities together in an aggregate of yielding a single rate of interest. This aggregation, a procedural error, tends to exaggerate the importance of the speculative motive, because it rules out the possibility that when there is a large variety of equities and securities of different maturity speciation may take the form of movements between securities of different types rather than between securities and cash Further, the assumption of a given wage-price level excludes the influence of price expectations on the asset demand for money. The, assumption of constant wage-price level also prevented the theory from considering the effects of changes in the real value of assets on the demand for money. Modigliani, in his Liquidity Preference and Theory of interest and Money, has shown that, if wages and

prices are perfectly flexible, liquidity preference and the nominal quantity of money would determine the price level and not the rate of interest in Keynes's model, unless a liquidity trap intervenes.

The Liquidity Trap Hypothesis which is an integral part of Keynes's Liquidity Preference Theory has also been questioned. The empirical testing of this hypothesis by Bronfenbrenner and Mayer (cf their "Liquidity Functions in the American Economy." Econometrica Oct. 1960) has revealed that there is no evidence for the proposition that interest elasticity of demand for either speculative cash balances or for total cash balances goes to zero for high rate of or for the proposition that some floor or bottom stop exists for interest rates at which elasticity goes to infinity.

It has also been alleged that it is not clear what Keynes means by the term "money" whether it includes bank deposits or not. At one place in his General Theory, he regards as money all such purchasing power, the command over which has not been parted with for a period longer than three months. This is quite confusing, because people keeping fixed deposits with banks for a period up to three months do earn interest and yet, according to the definition of money referred to above, the owner of deposits is regarded not to have parted with his liquidity. Some economists question that the supply of money is autonomous of the rate of interest. It may be autonomous so long as bank cash reserves bear a very high proportion to the total bank credit created by them as compared to what is the minimum desirable. But as this ratio approaches the minimum desirable a further increase in bank credit may not come about unless there is a rise in the rate of interest.

Boulding, has also pointed out that, under certain circumstances, the implication of the liquidity theory would be invalidated. If an increase in the supply of money first comes into the hands of those who are operating in the commodity market rather than the bond market, it will push up the commodity prices and increase the money value of income. This will increase the demand for active cash balances $[M_1=L_1=Y)]$, thus reducing the supply of money that is available to satisfy the speculative demand for money and, consequently, raising the rate of interest. This is contrary to the prediction of the Liquidity Preference Theory. It can be seen that the failure to see such a contrary behaviour of the interest rate is again due to the assumption of a constant wage price level with which the theory works.

Last, but not least, an important defect of this theory is that it is as much indeterminate as the classical and neo-classical theories which Keynes himself criticized as indeterminate explanation of the rate of interest. The Liquidity Preference Theory of Keynes cannot tell us the equilibrium rate of interest, unless we know liquidity preference schedule along with the autonomously determined supply of money. But we cannot know the position of the liquidity preference schedule, unless we know the level of income and the level of income cannot be known, unless we know the volume of investment, and. the volume of investment cannot be known, unless first we know the rate of interest. Hence this theory is indeterminate in the same manner as the classical and neoclassical theories. Proceeding from a given equilibrium position, an increase in money supply lowers the rate of interest which, in turn, increases investment. Increase in investment increases income and this shifts the liquidity function which causes a new sequence of changes in interest rate, investment, income and. the liquidity function. There is nothing in the Liquidity Preference Theory as such which can tell us as to where the new equilibrium will take place, once we admit such a chain of reactions.

The indeterminate nature of Keynes's Liquidity Preference Theory is to be traced to his analytical error of dichotomizing the general equilibrium into two separate parts an income theory in which rate of interest enters exogenously and a monetary theory in which income enters exogenously.

Self Check Exercise-2

Q.1 Discuss weaknesses of Keynes liquidity preference theory of Interest.

15.5 MODERN THEORY OF INTEREST (POST-KEYNESIAN THEORY) OF INTEREST.

Post Keynesian Theory of interest is based on the ideas suggested first of all by Hicks in his 1937 article entitled "Mr. Keynes and the Classics: A Suggested Interpretation" and further elaborated upon by Hansen. This theory has therefore come to be known as the Hicks-Hansen Theory of the rate of interest.

The chief merit of this theory is that it helps to remove the indeterminateness of equilibrium which as we have already noted was found in Keynes's Liquidity Preference Theory as well as in the alternative classical and neo- classical theories. This theory removes this indeterminateness of the rate of interest, because it proceeds from the realistic assumption that the level of income and the rate of interest are simultaneously determined in a system of general equilibrium, and thus it is able to focus its analysis on the simultaneous equilibrium of the product and money markets.

Hansen has rightly observed that though Keynes's Liquidity Preference Theory does not provide us with a determinate solution of the problem of interest rate determination, the essential ingredients of a determinate theory. of the rate of interest, nevertheless, are found in General Theory This determinate theory of the rate of interest is built upon the following pillars: (i) the consumption function or its inverse, the saving function; (ii) Investment as a function of rate of interest which reflects a given state of technology as well as expectations; (iii) The liquidity preference function; and (iv) An autonomously given supply of money.



The classical theory, when suitably modified, gives us a family of saving schedules, each schedule of which is related to a given level of income as shown in Fig. 18.2 The higher is the level of income, the greater is the amount of saving done (on the basis of a given consumption function) at any given rate of interest, and the more to the right the saving schedule pertaining to that particular income levels will be. In Fig. 18.2 $y_1y_2y_3y_4$ are different income levels where $y_4 > y_3 > y_2 > y_1$. The investment function 1(i) reflects given state of technology and expectations. The points a, b, c, , are the different points of equilibrium between the desired saving and the desired d investment. But this model, that is the classical model does not tell us what the equilibrium rate of interest is. It tells us only the different levels of income at which desired saving equals the desired investment. $y_1y_2y_3y_4$, possible equilibrium levels of income but which of these will represent the actual equilibrium level, cannot be known unless first we know the equilibrium rate of On the suggestion provided by Hicks and Hansen, the variables depicted in Fig. 18.2 can provide us with the now quite famous IS curve or function as shown in Fig. 18.3.



If you look at Fig. 18.2, you will find that the various points of equality between the desired saving and desired investment, such as *a,b,c,d*........... associate a higher

level of income with a lower rate of interest The point a, for example, refers to Y, and of all the income levels depicted in Fig. 18.2 Y_1 is the lowest, and of all the interest rates depicted there, i_1 , is the highest. A lowering of the rate of interest increases investment as well as income. Therefore, a lower rate of interest must be associated with a higher income at which saving equals investment. Now the Hicksian IS curve as shown in Fig. 18.3 is but the locus of at such combinations of income (Y) and the rate of interest (i) at which desired saving desired investment.



Any point on such an IS curve is a point of possible equilibrium of the product market. But without knowing the equilibrium rate of interest we cannot find the equilibrium income. Behind the IS curve lie the consumption function or its inverse, the saving function, on the one hand, and the investment function on the other.

The Keynes's Liquidity Preference Theory provides us with a family of liquidity preference schedules each of which is related to a given level of income. We also know it that the higher is the level of income, the further away to the right is the liquidity preference schedule as shown in Fig. 18.4, where as before $y_4 > y_3 > y_2 > y_1$. The Liquidity Preference Theory also tells us that given the supply of money the rate of interest is determined by the intersection of the relevant liquidity preference schedule with the vertical fine showing the autonomous money supply (M). Thus the points a, b, c, d...., are all points of possible equilibrium of the money market, where the demand for money, L(y,i), equals the supply of money, M. But which of these is the actual equilibrium point cannot be determined, unless we first know the equilibrium level of income. What we can derive from the Keynesian proposition is the now famous LM curve which is the focus of all such combinations of interest rate (i) and income (y) which equate the demand for money, M.



A look at Fig. 18.4 shows that given the supply of money a higher rate of interest is associated, with a higher level of income at which the demand for money equals the given supply of money. This implies that the said LM curve must be positively sloped as shown in Fig. 18.5. All points on LM curve are possible points of equilibrium of the money market. But which of these is the actual equilibrium point cannot be determined, unless we first know the equilibrium level of income. It should be noted that behind the LM curve. lies the liquidity preference function, L(Y,i), and a given supply of money (M).

Now, neither the IS curve nor the LM curve by itself can tell us the equilibrium level of income or what the equilibrium rate of interest will be. But both the curves taken together can help us to find out the equilibrium level of income as well as the equilibrium rate of interest as shown in Fig. 18.6. The Fig.-18.6 shows the IS an LM curves which have been explained above. Behind IS lie a given consumption function and given technology and expectations. Behind LM lie a given liquidity preference function and a given supply of money. The point of intersection between the IS and LM curves gives us the equilibrium income as well as the equilibrium rate of interest. I is the equilibrium - rate of interest and y_e is the equilibrium level of income. At a point like E. in Fig. 18.6 the conditions of equilibrium of the product market as well as of the equilibrium of the money market are simultaneously satisfied so that the economic system is in a state of general macro economic equilibrium.



The condition of equilibrium in the product market is S(Y,i) = 1(i).

The condition of equilibrium of the money market Is: L(Y,i) = M.

These two conditions can be satisfied only on a point which lies on both the IS curve as well is the LM curve and such a point lies at the intersection of the two curves.

An increase in the supply of money will shift the LM function downwards to a position like LM, in Fig. 18.6 which implies a lower rate of interest and a higher level of income. A decrease in the supply of money will have the opposite effect. On the other hand an improvement in technology and/or expectations will shift the IS function upwards. Other things remaining the same, it will imply a higher rate of interest as well as a higher level of income. A deterioration in technology or an adverse change in expectations will shift the IS functions downwards implying a lower rate of interest as well as a lower level of income.

It may be recalled that the crude Keynesian liquidity preference function is based on constant wage price level. But the demand for holding the cash balances is, in fact, a demand for real balances. Any change in the price level will change the demand for nominal money balances. A rise in the price level reduces the total value of money and therefore, increases the demand for nominal money balances. This has the effect of shifting the liquidity preference schedule to the right so that, given the supply of money, the rate of interest will rise. Its implication for the LM curve is that it will shift upwards with a rise in the price level thus pushing up the rate of interest. A fall in the price level will shift the LM curve downwards and will thus lower the rate of interest, all other things remaining the same.

Self Check Exercise-3

Q.1 Discuss Modern theory of Interest.

15.6 SUMMARY

Hicks - Hansen Synthesis of classical and Keynesian theories of interest wakes a significant-advance in explaining the determination of the rate of interest. it represents a more general, inclusive and realistic approach to the interest rate determination. Further, Hicks-Hansen integration succeeds in synthsising fiscal with monetary policies and theory of income-determination with the theory of money. But Hicks-Hansen synthesis of interest theories is not without limitation. First, it is based upon the assumption that the rate of interest is guite flexible, that is free to very and not rigidly fixed by central bank. If the rate of interest is quite inflexible, then the appropriate adjustment explained above will not take place. Secondly, the synthesis is also based upon the assumption that investment is interest elastic, that is, investment. Varies with the rate of interest of investment is interest inelastic, then also the Hicks-Hansen synthesis breaks down since the required adjustment do not occur. Thirdly, Don Palinkin and Millon Freidman have criticised Hicks-Hansen synthesis as being too arlificial and over simplified. According to them, monetary and real sectors are Quite interwoven and out and react on each other. Further, Palinkin has pointed out that Hicks-Hansen synthesis has ignored the possibility of change in the price level of commodities.

15.7 GLOSSARY

Superiority of Modern Theory of Interest :

Keynsian theory of interest is simply a monetary theory which neglects the real further that lie behind the determination of the rate of interest. The modern theory is not only superior but it is also realistic because it takes into consideration both monetary and real factors that go to determine the rate of interest.

The Keynesian Liquidity Preference theory is an indeterminate theory whereas the modern theory is a determinate one. In the Keynesian theory the Liquidity preference schedule is not related to the level of income. It determines the interest rate without knowing the income level. But unless the income level is known before hand, the demand and supply curves of money cannot tell about the level the rate of interest.

The modern theory is superior to the Keynesian theory of interest because it explains many policy implication which the Keynesian theory could not explain.

15.8 ANSWERS TO SELF CHECK EXERCISES

Self Check exercise -1

Ans.1 Refer to Section 15.3 Self Check exercise -2 Ans.1. Refer to Section 15.4 Self Check exercise -3 Ans.1. Refer to Section 15.5

15.9 REFERENCES/ SUGGESTED READINGS

- 1. J.M. Keynes, General Theory. Chs. viii, xv.
- 2. D. Dillard, The Economics of J.M. Keynes. Ch. xiii.
- 3. Dernberg and Macdougall. Macroeconomics, Chs. 8.9.

15.10 TERMINAL QUESTION

- Q. 1 Critically explain Keynesian theory of interest.
- Q. 2 Explain in detail Modern Theory of Interest.

Unit-16

PROFITS

Structure

16.1 Introduction

- 16.2 Learning Objectives
- 16.3 Dynamic surplus Theory of profit Self Check Exercise-1
- 16.4 Reward for Risk-taking Theory of Profit Self Check Exercise-2
- 16.5 Reward for uncertainty bearing Theory of Profit Self Check Exercise-3
- 16.6 Innovations Theory of Profits Self Check Exercise-4
- 16.7 Marxian Theory of Profits Self Check exercise-5
- 16.8 Summary
- 16.9 Glossary
- 16.10 Answer to Self Check Exercises
- 16.11 References/ Suggested Readings
- 16.12 Terminal Question

16.1 INTRODUCTION

We have seen how the price of services of labour (or wage rate) and the price of the services of land (or rent) are determined. The other two factor prices are discussed under the headings, 'interest' (which is the price of the services of capital) and 'profits' (which is regarded as the price of the services of the entrepreneur in production.). Of these two, we have discussed, in the preceding lesson, the determination of the rate of interest. In the present lesson, we shall be dealing with the analysis of profits. It is sometimes observed that the theory of profits is one of the least satisfactory parts of economic theory. This is indeed so in spite of quite a plethora of theories seeking to explain the phenomenon of profits. One of the reasons of this unsatisfactory state of the theory of profits may be that profits are not a homogenous income. It usually contains more than one kind of reward. The individual theories of profits focus attention on some particular aspect of the phenomenon of profits with the result that any single theory provides us with only a partial explanation of profits.

In order to avoid confusion, it will be useful to know at the very outset as to what we mean by profits in economics. A layman is likely to regard profits as the difference between the total revenue proceeds of a given volume of output and the total expenses of producing that output However, economists would describe this difference as "gross profits" which is different from the 'net profit' that the economists mean by the term 'profits' Gross profits include some elements of costs too in addition to the 'net' profits.

These costs are those which do not form a part of explicit expenses of production. The imputed rent on the entrepreneur's own land and the imputed interest on his own capital invested in his business are such costs which are not included in his expenses of production. Another such cost is the reward due to the entrepreneur on account of his work of management. This reward is wages like the wages of a salaried manager. Such wages of management, which under perfect competition are in fact the 'transfer earnings' of the entrepreneur, are often identified with 'normal profit. When we deduct these three elements of imputed costs from the gross profits, the remainder is 'net' profit.

Even 'net' profits are not homogeneous income. It includes at least two distinct types of income namely, 'monopoly' profits, or more appropriately, 'monopoly' rents and 'pure' profits. While 'monopoly' rents are that part of 'net' profits which are due to causes other than uncertainty, which restrict the entry of new firms into an industry or do not allow the product of one firm to become a perfect substitute of the products of other firms in the industry. Pure profits are that part of 'net' profits which are related to uncertainty-bearing, which, in the opinion of most of the economists, is the chief, perhaps the only function of an entrepreneur that distinguishes his services from the services of other factors of production.

It should be clear from what has been said above that 'net' profits are profits over and above 'normal' profits which, as stated earlier, should be treated as wages of management and thus part of the cost of production. As we have been observing throughout this series of lessons, super-normal profits are competed away in the long run under conditions of perfect competition which stipulates perfect knowledge (and therefore, no uncertainty), perfect mobility of factors, perfect divisibility of factors and products, and homogeneity of all factors including enterprise. Under perfect competition of this type, it is impossible to think of causes that can restrict the entry of new firms into an industry and can thus prevent the super-normal profits from being competed away. It has been, therefore, rightly observed that there is no place for a theory of profits in the neoclassical economics which is founded on the assumption logically rule out the possibility of supernormal profits or 'net' profits, what is there that we need a theory of profits for?

So, any theory of profit, if it is to be at least plausible, must start by discarding the assumptions of perfect competition. Anyway, the real world is not a world of perfect or even pure competition. What has been said in the preceding paragraph should immediately suggest that the existence of 'net' profits, whether they are 'monopoly' rents or 'pure' profits must be due to causes which restrict the entry of new firms into the industry or industries earning these profits.

Entry of new firms into an industry, where the established firms are earning 'net' profits, may be restricted due to any one of the following factors: (i) institutional or legal factors, (ii) immobility of factors, (iii) inferior entrepreneurial ability of firms outside the industry, (iv) less knowledge ability of the outsiders firms compared to that of the insiders, (v) indivisibility of plant, (vi) exclusiveness of the product markets of the insiders and (vii) divergence in the profit estimates of the insiders and the outsiders.

If the outsiders are prevented from entering an industry earning 'net' profits only on account of the last of the causes listed above, the profits being earned will be 'pure' profits because they, as we shall presently see, are related to uncertainty. If profits are maintained because new entry is prevented by some cause or causes other than the last one the profits being earned are not 'pure profits' but monopoly rents.

If the establishing of a firm requires government licence according to the law and the licence is not freely available, this legal factor will block the entry of new firms. The supply of enterprise in the industry remains fixed so that the insiders enjoy a sort of monopoly position and earn monopoly profits. Since these profits are maintained due to the inelastic supply of enterprise, they are to be regarded as "rent" rather than profits. A single test of finding out whether the profits are 'monopoly' rent or not is to know if those profits will be capitalized or not into the price which an outsider will be willing to pay, if such a business were to be auctioned as a going concern. If the profits are capitalized into this price, they are 'monopoly' rent. Existence of patent laws also has an identical effect. You are advised to work out the implication of causes from (ii) to (vi) for yourself to show that profits resulting from these causes are 'monopoly' rents.

The outsiders may be reluctant to enter an industry where the insiders are enjoying 'net' profits because their profit estimates fall far short of those of the insiders. An entrepreneur produces in anticipation of demand. He is planning for the future which is uncertain on account of the dynamic changes which are taking place almost all the time. An entrepreneur does nor perfectly know what the future demand for his product will be, what prices he can get in the time period he is planning for, what the prices of his inputs and what his costs in the future periods will be. Therefore, he has to make some estimates with regard to the most likely price as well as the most likely average cost. Let us denote this estimated price as p and this estimated average cost as c. Estimates are after all mere guesses which may go wrong. Hence a rational entrepreneur may be expected to have a safety margin for the estimated price as well as the estimated average cost to provide against his guesses going wrong due to the unpredictable dynamic changes that give rise to uncertainty. Such a safety margin will have to be subtracted from the estimated price and added to the estimated average cost in order to limit the range of possible loss, if the estimates are completely believed by the actual events. If the safety margin for price is denoted by a and that for cost by b, the estimated profits will equal (p-a)(c+b). While the estimates of price and cost depend on the view an entrepreneur takes of the uncertain future, the value of the safety margins depends on the entrepreneur's attitude towards uncertainty-bearing.

It is possible that the profit estimates of the insiders and the outsiders may diverge such that to the outsiders they appear to be much less than they appear to the insiders. The divergence may be either because they have different views of the uncertain future or because they have different attitudes towards uncertainty-bearing and therefore they have different safety margins. If for example the insiders are more enterprising and adventurous than the outsiders, their safety margins will be less than those of the outsiders, consequently, the profit estimate of the insiders will be quite high, while those of the outsiders may be so low that they do not expect to earn larger profits by entering this industry than what they might be earning in the industry they are already in or what they could earn, if they joined some other industry. It is also possible that their estimated profits may be negative, that is, they may fear losses rather than expect profits. In all such cases, the outsiders will not enter the industry and the insiders may continue to make 'net' profits, even when there is no other hindrance in the way of new entry. In this case the 'net' profits will be pure profits which may be interpreted as a reward for uncertainty bearing. But as Machlup has pointed out, these 'pure' profits are a reward for *uncertainty bearing* as it is viewed by the outsiders, who are reluctant to bear it.

16.2 LEARNING OBJECTIVES

After reading this chapter you will be able to explain:

- Why profit is considered as a dynamic surplus.
- Why profit is called Reward of Risk-taking.

- Why profit is known as Reward for uncertainty
- Why profit is called fruit of innovation

What is Marxian theory of profit.

16.3 DYNAMIC SURPLUS THEORY OF PROFIT

'Pure' profits were described as a dynamic surplus by J.B. Clark who pointed out that in a state of equilibrium under perfect competition, 'pure' profits are completely competed away so that each entrepreneur earns just 'normal' profits, which are his wages of management. In a stationary economy, in which either no change is taking place or the rates of change are uniform, an entrepreneur has no function other than that of managing the business. So he earns only the wages of management. But Clark argued that the real-world economy is not stationery economy, it is a dynamic economy in which various types of changes are taking place all the time. These changes usually push an economic system into a state of disequilibrium, on account of which prices may turn out to be lower than expected and costs higher than estimated, with the result that there are negative profits or losses. A special characteristic of profits is that it is a residual income which accrues to the hiring factor, entrepreneur after he has paid contractual incomes to the hired factors, land labour and capital. Therefore, the residue, that is profit may be positive or negative, depending upon how the dynamic changes work out.

Clark had listed five types of dynamic changes which turn a static equilibrium into a dynamic-disequilibrium. They are changes in the size and composition of population, changes in the size and composition of wants, changes in the capital stock, changes in the forms of business organization and changes in the techniques of production. However, these are not the only types of changes that make an economy a dynamic one. There might be quite a number of others too. For example, there may be sudden unexpected break-out of war. The general economic environment may be passing through a particular phase, prosperity or depression of a business cycle. There might be changes in the government tax policy or expenditure policy. All these changes may have either favourable or unfavourable repercussions on the price and costs of entrepreneurs. If the effect of such changes is favourable there is a surplus in the form of positive 'pure' profits. Since it is caused by the dynamic changes in the economy, these profits are described as a 'dynamic surplus'.

Self Check Exercise-1

Q.1 Discuss Dynamic surplus theory of Profit.

16.4 REWARD FOR RISK-TAKING THEORY OF PROFIT
There are other economists who will acknowledge that a dynamic economic environment is a necessary condition for profits to arise, but they will rather deny that these dynamic changes by themselves can create profits. In any case the dynamic theory of profit does bring into focus the fact that these dynamic factors make a business enterprise a risky affair. Unless someone is coming forward to undertake the risk of the business, the question of profits does not arise. From this point of view, profits may well be a dynamic surplus but it is also a reward for undertaking risk. If profits are the price of the services of the entrepreneur, then according to the risk theory of profits, it is the entrepreneur's reward for risk-taking. This theory assumes that the most important function of an entrepreneur, which distinguishes him from other factors, is to undertake the risk of the business. If an entrepreneur expects to earn more than what he invested, he would rather loan out his capital and get himself employed as a salaried manager rather than undertake the risk of the business by working as an entrepreneur. This reduces the supply of enterprise to an industry and the supply of product of the industry is reduced. Price rises and 'pure' profits emerge. They must be sufficiently high to keep the required number of entrepreneurs in the industry. The requirement for their services will depend on the marginal revenue productivity (MRP) function of entrepreneurial services in the industry.

Self Check Exercise-2

Q.1 Discuss reward for risk-taking theory of Profit.

16.5 REWARD FOR UNCERTAINTY-BEARING THEORY OF PROFIT

Frank H. Knight did not accept the crude risk theory of profit briefly described above. It was considered to be crude, because it did not make a distinction between risks which can be foreknown and the risks which cannot be foreknown. There are certain types of risks for example, risk due to death, theft and fire-the average incidence of which can be known on the basis of the law of probability. Such risks can be insured against and the premium that is paid out to the insurance company by an entrepreneur becomes a part of his costs. However, there is another type of risk, the average incidence of which cannot be known. Risks connected with an entrepreneur's price output decisions are unknown risks. Risk lies there, because the expected profits may actually turn into losses. The average incidence of losses. due to a particular price-output decision cannot be That is why one never hears of an insurance company that insures firms against losses or falling profits. Risks connected with sudden outbursts of political events or changes in the fiscal and monetary policies of the government are also unknown risks.

According to Knight, the latter type of risks which cannot be foreknown and therefore cannot be insured cause against uncertainty in business prospects. Knight

emphasizes that the chief function of an entrepreneur is to bear uncertainty caused by unknowable risks. Hence, he looks upon profits as the reward for uncertainty bearing. However, it is to be noted that the unknowable risks which cause uncertainty are themselves caused by the dynamic changes taking place in an economy. Therefore, the uncertainty-bearing explanation of profit is not independent of the dynamic explanation. It only supplements it.

Moreover, Machlup as we have already seen, has modified Knight's uncertainty bearing theory by demonstrating that the profits in an industry measure uncertainty as it is viewed by the outsiders and not as it is viewed by the insiders.

Self Check Exercise-3

Q.1 Discuss reward for Uncertainty-Bearing theory of Profit.

16.6 INNOVATIONS THEORY OF PROFITS

Another explanation which is in line with the explanations of profits considered above is Schumpeter's Innovation Theory. This theory starts from the assumption that the most important function of an entrepreneur is to act as an innovator. An innovator is distinguished from an inventor or a discoverer. An innovator is one who makes an economic use of an invention or a discovery which might have been made by himself or someone else. A successful innovator succeeds through an innovation in either lowering his cost function or raising the demand function for his product or both in relation the cost and demand functions of the rival entrepreneurs. The innovations may take the form of an improvement in technology or the use of a new method of business organization or the exploitation of a new source of raw materials or a new material itself. All such innovations will have the effect of improving the production function of the innovator and thus lowering his cost curves, while the cost curves of the rival entrepreneurs remain at the old level. Consequently, the innovator is able to make super-normal profits of the pure type. Similarly innovation may take the form of putting a new product or a new design of a product on the market, or the discovery and exploitation of a new market, or a use of a new method of advertising the good. All such innovations have the effect of raising the demand function for the product of the innovator in relation to those of his rivals. It is possible that such an innovation may even lower the elasticity of demand for the product of the innovator. This too will bring in pure profits to the innovating entrepreneur.

The above would suggest that even if the economy had been in a state of static equilibrium, the activity of a true entrepreneur, who is an innovator, would have disturbed this equilibrium. This innovational activity by itself acts as a dynamic force creating uncertainty which favours the innovator at the expense of his rivals. However, these profits which, according to Schumpeter are a reward for innovation are transitional under perfect competition. For, soon, the rivals will imitate the successful

innovations and compete away the supernormal profits. A stationary equilibrium may again arrive. But, sooner or later, new innovations will again be introduced, the static equilibrium will; once again, be converted into a dynamic disequilibrium, and profit of innovations will again emerge. This process gives rise to profits within freely competitive economy.

The survey of the few profit theories that we have made suggests that whether profits are looked upon as a reward for uncertainty bearing or as a reward for making innovations, they are basically connected with change. This connection is obvious in the fact that the entrepreneurial decisions either produce change (as in Schumpeter's Innovations Theory) or involve adaptation to change or both. When there is no charge or when the change and the risks connected with it are predictable, there are no entrepreneurial functions to be performed and hence, there are no 'pure' profits. In this sense 'pure' profit may still be described as a 'dynamic surplus'.

Self Check Exercise-4

Q.1 Discuss Innovations theory of Profit.

16.7 MARXIAN THEORY OF PROFITS

Marxian theory of profits throws open an entirely different perspective on the explanation of profits. Instead of looking at it as a superficial market phenomenon, this theory claims to go deeper into the historical and institutional sources of the phenomenon of profits.

The foundation of the Marxian theory of profits is Karl Marx's theory of value which is an improved version of the classical labour theory of value. According to Marx's theory of value, the value of a good is determined by the amount of socially necessary labour time that is required to produce it. Socially necessary labour time is that amount of labour which, under the generally prevailing technology, is necessary to produce a good. Moreover, Karl Marx made a conceptual distinction between constant capital and variable capital, a distinction which is different from the distinction between fixed capital and variable capital of mainstream economics with which we have been dealing so far in all these lessons. Marx had argued that a commodity is produced with the help of machines and other fixed capital in the conventional sense such as raw materials and labour. He further argued that the fixed capital and raw materials did not transfer more than their own value into the final commodity. Therefore, he categorized the fixed capital in the conventional sense plus the raw materials as constant capital. However, he explained that labour is a commodity which, in the process of production, produces more than its own value, that is, this is the only commodity which produces surplus value which is the source of capitalist profits. A fundamental criticism of the theories of profits we have examined above is

that they seek to explain how profits are determined but they do not explain the source of profits. The Marxist economists believe that the Marxian theory removes this lacuna and lays bare the source of profits. Anyway, since labour, in the Marxian view, is the only factor input which reproduces more than its own value, it is categorized as the *variable capital*. To be more correct, capital devoted to the purchase of labour is the variable capital.

The Value of labour, like the value of any other commodity is also determined by the amount of *socially necessary* labour time required to produce it. This amount is determined by the amount of necessary labour required to produce the subsistence of worker which enables him to keep his body and soul together and to perpetuate his "race" (class). This amount determines his wage rate. However, what the capitalist employer of labour purchases and pays for is *labour power* but what he makes use of is labour. Supposing it requires only four hours of work for a labourer to reproduce the value of his own wages, while he is made to work eight hours a day by his employer, then the worker is producing a *surplus over* and above the value of his own labour that is wages. This is the *surplus value* which is the source of profits. Thus the value of a commodity according to Marx equals the sum, c+v+s, where c is the value of the *constant* capital and v is the value of the *variable* capital employed by the capitalist, s is the additional or surplus value produced by labour. The capitalist's cost are c+v. The difference between the total value of the (c+v+s) and the costs of its production to the capitalist (c+v) is the profit.

In this simple abstract model of Karl Marx, only two social classes, capitalists and workers, are assumed. Therefore, the whole of surplus value (s) is characterized as profit. The rate of profit is given by the ratio $\frac{s}{c+v}$ while the ratio $\frac{s}{v}$ gives the rate of exploitation of labour.

Thus, in the Marxian theory, profits represent the exploitation of labour and they directly depend on the rate of exploitation of labour. The rate of profit equation, $\rho = \frac{s}{c+v}$ can also be written as $\rho = \frac{s/v}{(c/v)+1}$ which shows (c/v)+1 that the rate of profit is a direct function of s/v, that is the rate of exploitation, and it is an inverse function of c/v which ratio has been categorized by Marx *as organic composition of capital*.

The *inverse* functional relationship between the rate of profit and the organic composition of capital implies that the rate of profit will fall with rise in the organic composition of capital (c/v).

Marx had also pointed out that the logic of the dynamic of capitalist economic development is such that as capitalism goes on developing, the organic composition of capital goes on rising and, therefore, the rate of profit tends to fall under capitalism.

Self Check Exercise-5

Q.1 Discuss Marxian theory of Profit.

16.8 SUMMARY

The early classical economists regarded profit as accruing to the capitalist. Who supplied capital and owned the business. They did not distinguish between interest and profit. At least, profits were residually determined after making all necessary payments from the total income of the business.

The first systematic explanation of the nature of profits was given by nor shall in terms of demand and supply of entrepreneurs. In the long run, an entrepreneur can earn only normal profits which from part of the cost of production. Profits are thus akin of wages. But Marshall's explanation is one-sided because it neglects the factors that determine the demand for entrepreneurs. If fair to explain the nature of wish persisting in the long-run in certain competitive industries and those earned by monopoly concerns.

Walker looked upon profit as a determinate return for a production function performed by the entrepreneur with a superior ability then other. Entrepreneur is regarded as distinct from labour and profit is the reward for his organisational and coordinaling activities. Hawley ascribed it to the entrepreneur's risk-taking. The greater the risk under taken, the larger the profits.

According to Clark Knight and Schumpeter, it is an income which arises out of change, uncertainty and friction inherent in a dynamic world and which the belated operation of competitive forces tends to eliminate.

Veblen and Hobson regard profit as unearned income and attribute it to the existence of institutional monopolies established by a few capitalists.

16.9 GLOSSARY

The profit of a businessman is regarded as gross profit. It is distinct from pure or net profit because it includes the following constituents.

- (i) Rent on Land
- (ii) Interest on capital
- (iii) Wages of Management
- (iv) Depreciation charges

(v) Insurance charges

All these elements are present in gross profit even in the long run as they are relatively stable. Frequent and violent charges accuring in gross profit are due to the presence of net profit within the former.

16.10 ANSWERS TO SELF CHECK EXERCISES

Self Check exercise -1 Ans.1 Refer to Section 16.3 Self Check exercise -2 Ans.1. Refer to Section 16.4 Self Check exercise -3 Ans.1. Refer to Section 16.5 Self Check exercise -4 Ans.1. Refer to Section 16.6

Self Check exercise -5

Ans.1. Refer to Section 16.7

16.11 REFERENCES/ SUGGESTED READINGS

- 1. Ryan: Price Theory. Ch. 10, pp. 308-319.
- 2. F. Machlup: Economics of Sellers Competition.
- 3. Stonier and Hague: A Text-book of Economic Theory, Ch. XV.
- 4. Joan Robinson: An Essay on Marxian Economics.
- 5. Paul Sweezy: Theory of Capitalist Development.

16.12 TERMINAL QUESTION

Q. 1 Discuss in detail Marxian theory of Profit.

WELFARE ECONOMICS

STRUCTURE

- 17.1 Introduction
- 17.2 Learning Objectives
- 17.3 Paretian Optimum Self Check Exercise-1
- 17.4 Compensation Principal Self Check Exercise-2
- 17.5 Social welfare function Self Check Exercise-3
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- 17.7 Summary
- 17.8 Glossary
- 17.9 Answers to self check questions
- 17.10 References/ Suggested Readings
- 17.11 Terminal Question

17.1 INTRODUCTION

In this last lesson of the series, we shall be discussing some of the more important topics in the modern welfare economics. We should start with clarifying the manning of 'welfare' in economics. Welfare in economics refers to the level of satisfaction. It is assumed to be a direct function of satisfaction. Social welfare, as distinguished from individual welfare, refers to the level of satisfaction of the society as a whole. However, the concept of welfare is based on the assumption that an individual himself is the sole judge of the level of his satisfaction and welfare. From this it follows that social welfare is the sum total of the welfare of the individuals who make up the society. A society has rather an independent preference scale nor can a collective scale of preference be imposed from above by a dictator. The latter, that is, the imposition of a collective scale of preference from above, will violate the assumption of consumer's sovereignty.

The modern welfare economics is founded on subjective utility which, as you know, cannot be quantified and therefore, is not additive. The question then arises how to aggregate the individual welfare to arrive at social welfare. Pigou, who rather represented the 'old' welfare economics which came to him from the classical economics through Marshall, has suggested that if we assume that the individuals belonging to a given society have, on the average, an equal capacity for enjoying money income, we can solve this problem as well as arrive at meaningful and operational welfare principles. But the "positivists", and almost all the followers of the modern welfare economics claim themselves to be "positivists", object to Pigou's suggestion on the ground that it would impart value judgements into welfare analysis and make welfare economics a normative rather than positive study. Thus, modern welfare economics starts with the basic assumption that it is not possible to make interpersonal comparisons of utility. Utility of one individual cannot be compared with that of another, for utility is a subjective magnitude for which there can be no common measure. Money cannot serve as a common measure, because it does not have the same utility for all the individuals. The utility of money to individuals varies, because their total money income and wealth as well as 'tastes' (capacity to enjoy a given money income) differ

17.2 LEARNING OBJECTIVES

After going through this unit, you will be able to explain :

- what is paretian optimum
- what is compensation principle
- what is social welfare function
- what are externality effects.

17.3 PARETIAN OPTIMUM

The assumption of impossibility of making interpersonal comparisons of utility on a objective and positive basis led Pareto, the father of the modern school of welfare economics, to define welfare optimum for a society as, a position in which it is not possible to increase the welfare of an individual without at the same, time, decreasing the welfare of some other, individual or individuals. For when, due to a particular change in the organization of resources and/or distribution, some people are made better off, while some others are made worse off, it is not possible to say whether the aggregate social welfare has increased or decreased,, unless we are prepared to and are capable of making inter- personal comparisons of utility. Besides assuming ordinal utility and impossibility of making interpersonal comparisons of utility, Pareto made the following additional assumptions: (i) individual preference functions are given and constant; (ii) All production functions in the economy are given and constant; and (iii) There are no externality effects, that is, external economies and diseconomies are ruled out.

On the above assumptions, Pareto laid down seven conditions that must be fulfilled if social welfare was to be optimized. These conditions have come to be known as the seven 'marginal' conditions of a Pareto Optimum. These conditions are as follows:

(i) First, there is the condition of optimum allocation of goods which states that the marginal rate of substitution between any pair of must be the same for any pair of consumers of those goods, It should not be difficult for you to tell that the MRS between a pair of goods to a pair of consumers will be equal where the indifference curves of the two. consumers are tangent to each other in an Edgeworthian box diagram that we derived while explaining pricing under bilateral monopoly (see Lesson 11). It was observed therein that there is not one but almost an infinite number of points of such tangency between the indifference curves of the two individuals. Therefore, all points on the locus of these tangencies (i.e. on the Edgeworthian *contract curve*) are positions of optimum social welfare, each one of which relates to a particular distribution. Since the Paretian welfare economics fights shy of making welfare pronouncements on changes in distribution, this theory is unable to tell us which of these infinite optima is the optimum.

(2) Second, there is the condition of optimum production of goods, which states that the marginal rate of transformation (MRT) between any pair of goods must be the same for any pair of producers of those goods. You know that the MRT between a pair of goods is given by the slope of the transformation or production-possibility curve at that level. This condition is satisfied where the production-possibility curves of the two producers in a box diagram become tangent to each other.

(3) Third, there is the condition of the optimum allocation of factors of production which states that the marginal rate of technical substitution (MRTS) between any pair of factors employed in the production of any good must be the same for any pair of producers employing those factors to produce that good. You know that the MRTS between a pair of factors in a given position is indicated by the slope of an iso-product curve in that position. Therefore, this condition will be satisfied at the point of tangency between the iso-product curves of any pair of producers in a box diagram. In this case too there will not be a unique optimum but almost an infinite number of optima. Which of these is the optimum optimorum cannot be determined within the Paretian theory for reasons already given in relation with the first condition above.

(4) Fourth there is the condition of the optimum utilization of a factor, which states that the marginal rate of transformation of a factor into a product must be the same for all producers employing that factor and producing that good. This marginal rate of transformation is given by the slope of the transformation curve which, in this case, is the same as the total product curve of the given factor. Therefore, this condition will be satisfied where the transformation curves (the total product curves of the given pair of producers) become tangent to each other in a box diagram. The MRT of a factor into a product is only another name for the marginal product of the factor in the production of the given good. So this condition implies that the marginal product of any factor must be the same for all producers employing that factor and producing that good.

(5) Fifth, there is the condition of the optimum pattern of production, which states that the MRT between any pair of goods to the society must equal the MRS between that pair of goods to all the consumers consuming those goods. This condition will be satisfied where the society's transformation curve becomes tangent to the highest possible indifference curve of an individual as shown in Fig. 20.1, PP' is the society's transformation curve and I, II.... are the indifference curves of the individual. At all points on PP' the total cost of the society is the same. But the point c, at which it becomes tangent to an indifference curve of an individual enables him to reach the highest level of satisfaction or welfare. At this point, MRT_{AB} = MRS _{AB}



(6) Sixth, there is the condition of the *optimum use of a factor units time*. A factor service may be supplied to produce some good or it may be kept idle. We may state this condition with reference to the factor, labour. *The marginal rate of substitution of an individual between leisure and product (income) must equal the*

marginal rate of transformation of work into product to the society. This implies that an individual's MRS between leisure and product (income) must equal the MRT of work into product (i.e. marginal product of labour) to the society. This condition will be satisfied where the labour product transformation curve of the society becomes tangent to an individual indifference curve showing his preference between leisure and product (income). In Fig. 20.1, let OX represent product and OY leisure.

A position like C will show the optimum with respect to this condition.

(7) Seventh, there is the condition of intertemporal optimum allocation of assets, which states that the MRS between any pair of assets yielding income at different points of time must be the some for any pair of individuals. The condition relates to borrowing and lending in the absence of risk. Assuming the borrower to be a producer, this condition will imply that an individual lender's MRS between present and future income (i.e. his marginal rate of time preference') must equal the marginal product of capital. This condition will be satisfied where a borrower's time-production possibility curve becomes tangent to an indifference curve of an individual showing his preference between present and future income. The time production possibility curve shows the product of capital invested by the borrower. If, in Fig. 20.1 above, OX represents present income and OY future income at some specified moment of time, and I, II... are lender's indifference curves, the position C will show the optimum.

The above marginal conditions of Pareto Optimum are only the necessary but not sufficient conditions of optimum social welfare. The 'second order' conditions, which must also be satisfied along with the above 'first order' conditions, are that in the neighborhood of the optimum, all indifferences curves must be convex to the origin and all transformation curves must be concave. Hicks has further. pointed out that despite the fulfillment of both, the 'first order' and the 'second order' conditions, a position may not be a position of optimum welfare, if it is possible to increase welfare by producing a product not otherwise produced (or produced only by One firm). Hence, Hicks has pointed out that the whole set of optimum welfare conditions may be stated in terms of the total conditions as follows:

Welfare is optimized if it is impossible to increase it by varying the output of any product by any firm, including variations from zero, or by varying the amount of any product consumed by any consumer including variations from zero; or by varying the amount of any factor unit used to yield direct service to any individual, including variation from zero.

However, the above welfare optimum is not unique, for it presupposes a given distribution of income.

Self Check Exercise-1

Q.1 What do you know about Paretian Optimum?

17.4 COMPENSATION PRINCIPLE

One of the basic deficiencies of Paretain welfare economics was that it could not indicate the welfare implication of a policy which increased the total product of the society and in the process, made some people better off. and some others worse off. Since interpersonal comparisons of utility were ruled out, the Paretian theory could not determine whether the gain of the beneficiaries of the policy was or was not greater than the loss of the victims of such a policy.

Kaldor and Hicks made a bold but, as we shall see, an unsuccessful attempt to remove this lacuna of the Paretian welfare theory without dispensing with its basic assumptions. Their reformulation of the Paretian theory has come to be known as the Compensation Principle.

Kaldor, in his 1939 article, "Welfare Propositions of Economics and Interpersonal Comparisons of Utility," argued as follows. If a policy has the of increasing the national product of a society, it *becomes potentially* possible that every individual member of the society may be made better off as compared to his original position, for the increment in the national product could be distributed among all the members. Kaldor argued that it is not necessary for the economist to prove that none will be made worse off as a result of the policy It is enough if he can demonstrate that if the gainers from the change are made to compensate the losers for their loss from the change, they will still remain the gainers.

Hicks too seemed to agree with Kaldor, when the former wrote in his *Foundations of Welfare Economies* which was published only a couple of months after Kaldor's above mentioned article, that a permitted reorganization (from the welfare point of view) is the one which allows compensation being paid to the losers and yet leaves a net advantage. So long as such a reorganization is possible, the welfare optimum of the society is not reached.

The Compensation Principle can be illustrated and explained by bringing in the state. Let the state gather the whole benefit from the beneficiaries of the change through a compensating tax and utilize this tax revenue to compensate the loss of the losers from the change in the form of bounties to them. If, at the completion of this compensatory operation, the state is left with a surplus, the change, according to the Compensation Principle will be welfare-increasing. Or, as Reder observed. "Welfare will be increased, decreased or left unchanged, if the algebraic sum of all compensating taxes and bounties is positive, negative or zero" (*Studies in the Theory of Welfare Economics*).

The Compensation Principle of Kaldor and Hicks has not been able to remove the gaps in the Paretian welfare theory. It too, like its parent theory, assumes welfare to be a function of production alone, ignoring the fact that the efficiency of production itself is determined, among other things, by distribution. Moreover, any evaluation of national product before and after a reorganization has of necessity to be done on the basis of the market prices of goods. But the market prices themselves are the result of the prevailing distribution.

The claim of its authors that it enables us to point out the welfare implications of a policy in situations where as a result of the policy some individuals are made better off and some others are made, worse off without recourse to interpersonal comparisons of utility, is not valid. The only method by which the losses and gains of welfare can be measured is to employ money as a measure. But-this necessarily implies the assumption that the marginal utility of money to all individuals is the same. One may very well ask if it is not making interpersonal comparisons of utility, then what it is?

Besides, once it is recognized that potential compensation will not ensure actual increase in the welfare of all the individuals, the payment of actual compensation becomes necessary. But how are we to calculate losses and gains of welfare from a given policy? The utility scales of all individuals cannot be known and therefore the losses and gains cannot be known. Questionnaires either will not help, for the losers are likely to exaggerate their losses and the gainers are likely to understate their gains. This makes the principle non-operational.

Scitovsky had shown that if, on the basis of the Kaldor Hicks compensation principle, actual compensation is not paid, then the actual redistribution resulting from the change may be such that a reversion to the pre- change situation may also be advisable on the basis of Kaldor Hicks criterion. For example, the losers from the change may be in a position to bribe the gainers not to accept the change and yet remain better off as compared to their post change condition. Hence Scitovsky suggested his *double criterion* for judging the welfare effect of a change (policy): A change in economic organization will increase social welfare, if (i) the gainers are able to the losers and yet remain the gainers, and (ii) the losers are unable to bribe the gainers not accepting the proposed change.

Self Check Exercise-2

Q.1 Discuss about compensation Principal.

17.5 SOCIAL WELFARE FUNCTION:

The so-called 'new' welfare economics that we have examined so far leaves out a very important variable determining social welfare, namely, distribution because it fights shy of making interpersonal comparisons of utility. It also ignores the 'externality' effects on welfare, for it fails to see that the welfare of an individual may be a function not solely of his own consumption but also of the consumption of other individuals. Some economists, notably Bergson, Samuelson and Tintner, acknowledged that welfare analysis cannot be done without some sort of interpersonal comparisons of utility which, they confessed, meant making value judgements. Therefore, they expressed the view that welfare economics was essentially a normative study. It however, should be studied scientifically. So it was they, particularly Bergson, who reformulated the welfare theory by introducing info welfare analysis a set of value judgements, including judgement on distribution from outside economics. This has come to be known as the Social Welfare Function Theory.

The essence of this theory lies in the rule by which the individual welfare functions can be aggregated into a social welfare function. Furthermore, this theory, looks upon the individual welfare as a function not only of his own consumption but also of the consumption of other individuals, his attitude towards distribution as well as any other variable that could influence an individuals' welfare. In the words of Bergson, the value of welfare function is understood to depend on all the variables that might be considered as affecting welfare the amounts of each and every kind of goods consumed and service performed by each and every household, the amount each and every kind of capital investment undertaken and so on. (cf. Bergson, "Socialist Economics". *A Survey of Contemporary Economics, ed. Ellis, Vol.1*)

Social Welfare Function has been described as a brilliant theoretical device which "completes the formal mathematical system of welfare economics," (Little). But, in spite of its sophistication, it is non-operational and of little practical significance. The only possible device suggested by this theory for constructing social welfare function is the voting system. All the individual members of a society or their representatives are assumed to order all possible alternatives according to their own preferences, and these individual scales of preferences can then, be reduced to a single collective ordering on the basis of the majority vote.

But the snag in it as pointed out by Arrow in his "Social Choice and Individual Values", is that due to the "Paradox of voting", the social welfare function so arrived at may turn out to be non-transitive and inconsistent in situations when choice is to be made from among more than two alternatives. Let us suppose that society is made up of only three individuals, X, Y and Z and there are three alternative choices. A. B and C. Furthermore, suppose that X prefers A to B to C. Y prefers B to C to A, and Z prefers C to A to B. Let us now consider how the majority choice on the social welfare function will work out to be in this case.

Choice	For	Against
A preferred to B	X and Z	Y
B preferred to C	X and Y	Z
C preferred to A	Y and Z	Х

The above table shows that majority prefers A to B and the majority also prefers B to C. Therefore, transitivity of choices will require that majority should prefer A to C. But the above table shows that actually the majority also prefers C to A, Hence, the social welfare function built on majority decisions turns out, in this case, to be inconsistent.

The main reason of the above- mentioned inconsistency is that all individual votes have been assigned equal weight. critics of the theory rightly point out that it is not different from giving equal weights to all individuals satisfactions as is implied in the 'old' Pigovian welfare economics which is much more simple and practical than the Bergson Samuelson type of social welfare function theory.

Lastly, in so for as social welfare is concerned with every individual's welfare, and not only with the welfare of the majority, a social welfare function built on majority decision will not be quite satisfactory.

Self Check Exercise-3

Q.1 What is social welfare function?

17.6 Externality Effects:

Paretian welfare theory had an implicit assumption that, under perfect competition, the private marginal utility from a good equals its social marginal utility, and the private marginal product of a factor equals its social marginal product. This can happen only in the absence of externality effects. *Externality effect refer to the effects of external economies and diseconomies in production as well as consumption, on account of which the private marginal utility differs from the social marginal utility and private marginal product diverges from social marginal product. This divergence was, first of all, highlighted by Pigou in his famous work, Economics of Welfare. It was pointed out that in the presence of externality effects, welfare will not be optimized under perfect competition, even when we disregarded the effects of direct changes in-distribution.*

It is to be noted that the external economies and diseconomies in production and consumption, to which externality effect refer, are non-pecuniary economies and diseconomies that is they are the external economies and diseconomies which are not reflected in their market prices.

External economies in production arise when the production of one product or of one firm has a direct beneficial effect on the production of another product or another firm. When apple orchards increase in size and number, it may directly benefit the bee-keeping industry, for the latter is able to have an increased supply of an input for which it is not paying. This input is the services' of the apple blossoms to the beekeeping industry. This is an external economy of the bee-keeping industry. When external economies are present in production, the social marginal product of a factor or factors is greater than the private marginal product. On the other hand, when there are external diseconomies, the social marginal product is less than the private marginal product Pigou's famous example of factory smoke polluting the environment and increasing for others the cost of sanitation and health illustrates this case. Or, suppose that the bees eat away the apple- blossoms and thus are instrumental in reducing the output and increasing the cost of apple industry. The bee-keepers around the apple orchards cannot be made to pay for this loss inflicted on the apple industry. This is an external diseconomy caused by the growth of the bee-keeping industry to the apple industry. In consequence of it social marginal product of bee- keeping industry will be less than its private marginal product.

External economies and diseconomies may be present in consumption too. External economies in consumption are present when the consumption of a good by an individual increases the utility of some other individuals in the society. For example, the utility a telephone-owner gets from his telephone increases with the number of persons using telephones. A person who installs a television set in his house increases the satisfaction of his neighbors also who can, at least, occasionally visit him and enjoy the programmes on the television. In such cases, social marginal utility of a good is greater than its private marginal utility. On the other hand, if the consumption of a good by an individual creates a sort of nuisance for others and thus reduces their satisfaction (welfare), it will be a case of external diseconomy in consumption. A person playing his radio loudly creates nuisance for others. In such cases, social marginal utility of a good is less than its private marginal utility.

In view of what has been said above, it is suggested that an additional condition has to be satisfied for attaining welfare optimum even when we ignore the distribution factor. This condition is that the private marginal product of any factor must equal its social marginal product, and the private marginal utility from the consumption of any good or service must equal its social marginal utility.

Since one of the conditions of optimum social welfare is that private marginal product should equal the social marginal product and private marginal utility should equal the social marginal utility, the question arises how we should bring about this equality, when external effects are present. Two types of policies are generally suggested to solve this problem. The one of these policies has the aim of preventing an individual's (a producer's or a consumer's) action from interfering with another person's well-being. This applies to situations of external diseconomies. For example, the government may require the factory-owners to use smoke- abating equipment to prevent the external diseconomy in the form of the pollution of the environment due to the smoke from the factories. Similarly, playing of radio-sets at high volume may be prohibited. The other policy aims at discouraging the expansion of production and consumption of goods causing external diseconomies and encouraging the expansion of production and consumption of goods yielding external economies.

that the first kind of industries should be taxed and the second kind should be subsidized.

Self Check Exercise-4

Q.1 What do you know about externality effects?

17.7 SUMMARY

Untill now we have focussed on considerations of Pareto efficiency in evaluating economic allocations. But there are other important consideration. It must be remembered that Pareto efficiency has nothing to say about the distribution of welfare across people, giving everything to one person will typically be Pareto efficient. But the red of might not consider this a reasonable allocation. Pareto efficiency is in itself a desirable goal of there is some way to make some group of people better off without-hurting other people. More generally, a welfare function provides a way to rand different distributions of utility among consumed.

Pareto Laid the foundation of the modern welfare economics by formulating the concept of social optimum which is based on the concept of ordinal utility and is free from interpersonal comparisons of utilities and Value Judgements. He aimed at formulating a value-free objective criterion designed to test whether a proposed policy charge increases social welfare or not. Pareto criterion states simply that an economic charge which harms no one and makes someone better off indicates an increase in social welfare.

17.8 GLOSSARY

External Economics and Dis economics in Production:

As the firm expands its scale of production, it becomes possible for the firm to produce a unit of product at a relatively lower cost due to internal economics of large scale product in. On the other hand, external economic occur when the expansion of a firm's output creates benefits, parts of which goes to others.

Let us now explain some external dis economics of production. There are good number of external dis economics which may be created by the productive activity of a firm. The pollution of air by the factories through emitting smoke and the wastes of factories poured into streams or ocean create health wizard for men, especially those who live in surrounding areas. A factory owner pays nothing to the residents of the neighbouring colony who happen to be the victims of pollution by the factory.

External Economics and dis economics in consumption

External economics in consumption arise when the consumption of a person creates beneficial effects on others. For example, the satisfaction of a telephone

owner increases with the increases in number of telephone owners because he can now contract. Large number of persons on telephone.

On the contrary external dis economics of consumption occur when a person's consumption creates un favourable inpart on the other consumer. A good example of it is provided by the conspicuous consumption of a person who through demonstration effect causes a lot of dissatisfaction to his friends and neighbourers who now feel themselves inferior to him.

17.9 ANSWERS TO SELF CHECK QUESTIONS

Self Check exercise -1 Ans.1 Refer to Section 17.3 Self Check exercise -2 Ans.1. Refer to Section 17.4 Self Check exercise -3 Ans.1. Refer to Section 17.5 Self Check exercise -4 Ans.1. Refer to Section 17.6

17.10 REFERENCES/ SUGGESTED READINGS

- 1. Syed: Introduction to Welfare Economics.
- 2. Little Critique of Welfare Economics.
- 3. Reder: Studies in the Theory of Welfare Economics.

17.11 Terminal Question

Q.1 Discuss in detail the Pareto Optimality Concept of Welfare Economics

Unit-18

Marshallian and Pigovian Welfare Economics

Structure

- 18.1 Introduction
- 18.2 Learning Objectives
- 18.3 Marshall's Individual Consumer's Welfare Self Check Exercise-1
- 18.3.1 Diagrammatical representation

Self Check Exercise-2

18.3.2 Marshall's Tax-Bounty Analysis of Aggregate Welfare:

18.3.3 Conclusion

Self Check Exercise-3

- 18.4 Pigovian Welfare Economics Self Check Exercise-4
- 18.5 Criticism of Pigovian Welfare Economics Self Check Exercise-5
- 18.6 Summary
- 18.7 Glossary
- 18.8 Answers to Self-Check Exercises
- 18.9 References/ Suggested Readings
- 18.10 Terminal Questions

18.1 Introduction

Welfare economics is the study of how the allocation of resources and goods affects <u>social welfare</u>. This relates directly to the study of <u>economic efficiency</u> and income distribution, as well as how these two factors affect the overall well-being of people in the economy. In practical terms, welfare economists seek to provide tools to guide public policy to achieve beneficial social and economic outcomes for all of society. In this chapter, we will discuss the views of neo-classical economists Prof. Marshall and Prof. Pigou on welfare economics.

18.2 Learning Objectives

After reading this chapter, you will be able to explain:

• The Marshallian concept of Welfare Economics

• The Pigovian concept of Welfare Economics

18.3 Marshall's Individual Consumer's Welfare:

The Marshallian theory of economic welfare is based on his tool of consumer's surplus. Marshall defines consumer's surplus as the excess of the price which he would be willing to pay rather than go without the thing, over that which he actually does pay, is the economic measure of this surplus satisfaction.

The price which a consumer pays for a commodity like salt, match box, postcard, etc. is always less than what he is willing to pay for it so that the satisfaction which he gets from its purchase is more than the price paid for it and thus he derives a surplus satisfaction which increases his welfare. He explains the consumer's surplus from a given change in price as the area between the demand curve and the price axis within a range of the price variation.

Marshall begins with the individual consumer's surplus or welfare and then makes the transition to the aggregate consumer's surplus. To explain the aggregate welfare of the community, he uses his tax-bounty analysis. First, we explain the individual consumer's surplus or welfare and then the aggregate economic welfare.

Self Check Exercise-1

Q1. Discuss Marshall's Individual consumer's welfare.

18.3.1 Diagrammatical representation

Consumer's surplus is represented diagrammatically in the figure 18.1 where DD_1 is the demand curve for the commodity. If OP is the price, OQ units of the commodity are purchased and the price paid is OP × OQ = area OQRP.



But the total amount of money, he is prepared to pay for OQ units is OQRD. 8 Therefore, consumer's surplus =OQRD-OQRP = DRP. If the price of the commodity falls to OP_1 , the consumer's surplus increases to DR_1P_1 and conversely a rise in price would diminish it.

According to Prof. Hicks, this Marshall's measure of the consumer's surplus involves nothing more introspective or subjective than the demand curve itself. The area under the demand curve after deducting consumer's expenditure on the commodity represents consumer's surplus. This is based on the assumption of constant marginal utility of money for the consumer.

It is thus free from interpersonal comparisons of utility. So far we have studied the individual consumer's surplus which is the sum total of the surplus from a number of commodities he buys, with a given money income.

By adding up consumer's surplus from anyone commodity enjoyed by a number of individuals, the market consumers' surplus for that commodity can be known. The demand schedule so formed will be the market demand curve. But it presupposes the nonexistence of interpersonal differences in customs, habits and incomes of the consumers.

18.3.2 Marshall's Tax-Bounty Analysis of Aggregate Welfare:

The above analysis relates to the individual consumer's surplus (welfare). In order to arrive at the aggregate consumers' surplus, Marshall adds the individual consumer's surpluses in a market. This he does by assuming that most markets are homogeneous with respect to the income class of the buyers and regards the individual buyer as a model representative of the group.

To get rid of the problem of interpersonal utility comparisons and value judgements, Marshall says that for practical purposes the area between the demand curve and the price is taken to be a good approximation of the sum of the individual consumers' surpluses.

Marshall uses his tax-boundary analysis to explain the aggregate economic welfare. According to Marshall, aggregate economic welfare can be increased by taxing diminishing returns industries and using the tax receipts to subsidies increasing returns industries. To arrive at this conclusion, he explains the following three possible cases.

Self Check Exercise-2

Q1. Discuss Marshall's Tax-Bounty Analysis of Aggregate welfare.

18.3.2 (a) Constant Returns to Scale:

Marshall shows that a tax imposed on a commodity obeying the law of constant costs or constant returns results in a loss of consumer's surplus greater than the amount of tax receipts, and conversely, a subsidy in this case exceeds the gain in consumers' surplus. This is illustrated in Figure, where SS is the supply curve of the commodity before the tax.

Since constant cost conditions prevail, the supply price is the same for all units of the commodity. Thus, the supply curve is perfectly elastic. DD_1 is the demand curve for the commodity. E is the initial equilibrium point where the consumers' surplus is SDE (Fig. 18.2).



Fig. 18.2

Suppose, a uniform tax TE per unit of the commodity bought is levied. The supply curve shifts up by the amount of the tax to S_1 - S_1 , parallel to the old supply curve SS. As a result, the loss of consumers' surplus is the area SS_1AE (= $SDE - S_1DA$). The tax receipts to the government are equal to the area SS_1AB . Thus the loss of consumer's surplus is greater than the gain to the government because $SS_1AE > SS'AB$.

The net loss of consumers' surplus is the shaded area ABE. In the same way, if a subsidy shifts the long-run supply curve down from S_1S_1 to SS (whereby supply increases) the triangle ATE above the demand curve means the excess of subsidies paid out over consumers' surplus gained.

18.3.2(b) Diminishing Returnsto Scale:

When the industry is operating under diminishing returns to scale or (increasing costs), the effects of a tax is not so certain. Whether the tax receipts will exceed the loss in consumers' surplus will depend upon the steepness of the long-run supply curve.

This case is illustrated in the figure 18.3where the initial supply curve is SS. After the imposition of tax, it shifts to S_1S_1 . The demand curve DD_1 intersects the supply curve SS at point E and the new supply curve at point .4. TA per unit of tax is levied on OX_1 quantity of the product purchased and the total tax receipts are equal to the area C RAT and the loss in consumers' surplus is RAEP. The receipts from tax shown as the shaded rectangle CPBT are greater than the net loss in consumers' surplus, shown as the shaded triangle AEB.



Fig. 18.3

18.3.3(c) Increasing Returnsto Scale:

When the industry is operating under increasing returns to scale or diminishing costs, then the long-run supply curve slopes downward, as SS in Fig.18.4. With the DD₁ demand curve, OX commodity is produced at the equilibrium point E. If a tax is levied, the cost of production will increase, the price of the commodity will rise and there will be loss in consumers' surplus. (Not shown in the figure). However, the effect of a subsidy on a decreasing cost industry depends on the slope of the supply curve. If the supply curve is less elastic, as shown in the figure, the grant of AT amount of subsidy per unit of output to this industry will increase its output to OX_1 .



Fig 18.4

The total amount of subsidy is RTAK and the gain in consumer's surplus is RPET. As the area RPET > RTAK the gain in consumers' surplus is greater than the amount of subsidy payment by the government. If the long-run supply curve is more elastic, as in the case of constant cost industry, subsidy payment will exceed consumers' surplus even in diminishing cost industry.

18.3.3 Conclusion

Marshall concludes that aggregate welfare can be increased if the government imposes a tax on diminishing returns or increasing cost industries (where tax receipts are greater than the loss in consumers' surplus) and spends the proceeds to subsidies increasing returns or diminishing cost industries where the gain in consumers' surplus is more than subsidy payments.

Self Check Exercise-3

Q1. Diagramatically Discuss constant diminishing and Increasing, and returns to scale.

18.4 Pigovian Welfare Economics

Arthur Cecil Pigou succeeded Prof. Marshall as the Professor of Economics at the University of Cambridge. After Marshall, he became the leading neo-classical economist. He is the founder of Welfare Economics^{||}. His leading ideas on welfare economics are found in his Economics of Welfare^{||} (1920). Prof. Pigou popularized the word welfare and gave a concrete meaning to it. **The Pigovian Welfare Economics deals with three things:**

(1) A definition of economic welfare

(2) Spelling out the condition under which welfare is maximised and

(3) Pronouncement of policy recommendations for increasing welfare.

Prof. Pigou gave a clear meaning to the concept of welfare. He defined individual welfare as the sum of satisfactions obtained from the use of goods and services. Social welfare is the summation of all individual welfare in a society. Since general welfare is very wide and complicated, he limited his study to economic welfare. He defined economic welfare as that part of social welfare that can be brought directly or indirectly into relation with the measuring rod of money. Pigou regards economic welfare and national income as coordinate. He lays down two conditions for maximizations of welfare:

(i) Given the taste and income distribution, an increase in national income represents an increase in welfare,

(ii) For welfare maximisation, the distribution of national income is equally important.

If national income remains constant, transfer of income from rich to the poor would improve welfare. With income subject to diminishing marginal utility, transfers of income from the rich to the poor will increase social welfare by satisfying the more intense wants of the poor. Thus it is economic equality that maximises welfare.Prof. Pigou had a dual criterion for detecting the increase in social welfare.

First, he measured the economic welfare of the society in money value and thus, given the supply of resources, an increase in national dividend meant an increase in social welfare.

Second, Pigou favoured an income equalisation policy and therefore, reorganization of the economy which increases the share of the poor without offsetting adversely productive effort enterprise and development of capital equipment was to be taken as a gain in social welfare.

Pigou has made a distinction between private and social costs. The private marginal cost of a commodity is the cost of producing an additional unit. The social marginal cost is the expense or damage to society as a consequence of producing that commodity. Private marginal benefit can be measured by the selling price of the commodity.

Social marginal benefit refers to the total benefit that society gets from the production of an additional unit. By making a distinction between social and private valuations of economic activity, he paved the way for the analysis of external effects or externalities in social welfare economics. The presence of external effects in production was seen by Prof. Pigou in the divergence between social net product and private net product. He defined social net product as the aggregate contribution made to the national dividend and the private net product as the contribution which is capable of being sold and the proceeds added to the earnings of the person responsible for investment.

The divergence between the two products shows itself in the form of external effects of production associated with marginal increments of output. In some cases social net product is more than the private product while in others private product is greater than the social product. As an example of the former, Pigou pointed out to the greater social benefit from technical training of workers by a private firm.

As an illustration of the latter he cited the fact that the smoke rising from the chimneys of private factory spoils the atmosphere of the locality and increases the laundry bills of the people of the neighbourhood. But people are not compensated in any way by the factory owner.

He was of the opinion that the state should equalize the private net product with social net product, if in an industry where private net product is more, it should be taxed, and if another industry shows a lesser private net product, it ought to be subsidized. Of course, Prof. Pigourecognised that the divergence between private net product and social net product cannot always be quantified and measured in terms of money.

Prof. Pigou made the first attempt to lay down the conditions of social optimum which he termed the ideal output of the economic system as a whole. In his view, the social optimum prevails when marginal social products are equal in all industries and thus production of real wealth is maximised.

Assuming that all the productive resources are being employed and that there is no cost of movement between different occupations and places, it can be concluded that the national dividend is the largest when the values of the marginal social net products are equal in all industries. If this arrangement prevails, the society is having its ideal output.

Pigovian welfare conditions presuppose the existence of the following assumptions:

1. It was assumed that everybody as consumer acts rationally to maximise his satisfaction.

2. Pigou believed that utility is not measurable cardinally. But inter personal and intra personal comparisons of utilities are also possible so that it is possible to find out quantitatively whether welfare has increased or decreased.

3. Pigou put forward a basic postulate that a man possesses equal capacity for satisfaction when placed in similar circumstances. Pigou held that different people derive the same satisfaction out of the same real income.

4. Pigou also believed that the marginal utility of money income falls as money income increases. As a result, the marginal utility of an addition to the income of a poor man is greater as compared to the loss of utility from the loss of the same amount of income to a rich man.

Self Check Exercise-4

Q1. Discuss Pigovian Welfare Economics.

18.5 Criticism of Pigovian Welfare Economics

Pigou provided the first systematic theoretical base of welfare economics and integrated the normative problems with the positive ones. He provided a rationale for state intervention at places where private and social net product diverged. But his policy recommendations were all value based. As such his study was more normative than theoretical.

Though Pigou's Economics of Welfare was the first clear analysis of welfare economics, yet the Pigovian conditions of welfare have been criticised on the following grounds. Pigou lays emphasis on the maximisation of welfare, but he does not clarify the notion of maximisation.

Pigovian assumption of equal capacity for satisfaction is scientifically untenable. This represents a broad value judgement in favour of equal distribution of wealth. The capacity for satisfaction of any individual is a subjective thing incapable of objective quantification.

Another trouble with Pigovian welfare economics, is the lack of rigour and operational content in the distinction between private and social products. Pigou seems to have assumed that the divergence between the two is not inherent in the working of the free enterprise system. It is traceable to and can be corrected through governmental intervention. In the real world, structural failures resulting from immobility, indivisibility and imperfect knowledge are so numerous as to defy correction through social action.

The classification of general welfare into _economic' and _non-economic' welfare has also been criticised as too superficial to be made the basis of all welfare analysis. The most destructive criticism of the Pigovian welfare economics was the unrealistic nature of the assumptions of cardinal additivity of the individual utility functions to get the social welfare functions. Economists do not agree with this view because quantitative measurement of utility is not possible.

Pigou's welfare conditions are related to national income. But it is not easy to calculate national income. Again, social welfare does not increase by a mere increase in national income. It is possible that national income may increase due to inflationary rise in prices and poor may become worse off than before.

Welfare economics is closely related to ethics but Pigou does not clarify it. Welfare economics is essentially a normative study in which value judgements and inter personal comparisons are made. By not relating these concepts with his notion of welfare, Pigou's economics of welfare is not considered as an objective study of the causes of welfare.

These drawbacks in the Pigovian analysis have led modern economists to expound the _compensation principle' and the _social welfare function' which are attempts at giving a new tinge to welfare economics.

Self Check Exercise-5

Q1. Give Criticism of Pigovian Welfare Economics.

18.6 Summary

Prof. Marshall made the concept of consumer's surplus as the central tool of his welfare analysis. He considered the community's welfare to be maximum when aggregate consumer's surplusis maximum. To explain the aggregate welfare of the community, he uses his tax-bounty analysis. Marshall advocated that an industry which is working under increasing returns must produce beyond its equilibrium point and an industry working with diminishing returns should stop producing before their equilibrium output. For this he suggested the policy of giving a bounty to increasing returns industry and levying a tax on the industries subject to diminishing returns. The proceeds of the tax could be used for giving bounties.

Prof. Pigou defined individual welfare as the sum of satisfactions obtained from the use of goods and services. Social welfare is the summation of all individual welfare in a society. According to Pigou, To maximize the welfare, the distribution of national income is significant. If national income is fixed then transfer of income from rich to poor will further the welfare. Such transfers have less impact on rich compared to poor as a result of which the economic condition of poor improves. The condition of welfare is based on Pigou's dual concept equal capacity for satisfaction and marginal utility of income.

18.7 Glossary

- Welfare Economics: refers to the allocation of goods and resources for promoting social welfare. It deals with an economically efficient distribution of resources for the well-being of the people.
- **Consumer Surplus:** happens when the price that a consumer pays for a product or service is less than the price he/she is willing to pay.
- **Constant Returns of Scale:**is an economic condition where a company's inputs, like capital and labor, increase at the same rate as their outputs.
- **Increasing Returns of Scale**: This law states that the volume of output keeps on increasing with every increase in the inputs.
- **Diminishing Returns of Scale**lt means increase in all inputs leads to a less than proportional increase in the output of the firm.
- **Diminishing Marginal Utility of Income**:suggests that as an individual's income increases, the extra benefit to that individual decreases.

18.8 Answers to Self-Check Exercises

Self Check exercise -1 Ans.1. Refer to Section 18.3 Self Check exercise -2 Ans.1. Refer to Section 18.3.2 Self Check exercise -3 Ans.1. Refer to Section 18.3.2(a),18.3.2(b) and 18.3.3(c) Self Check exercise -4 Ans.1. Refer to Section 18.4 Self Check exercise -5 Ans.1. Refer to Section 18.5

18.9 References/ Suggested Readings

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- 2. S.P.S. Chauhan: Microeconomics- An Advanced Treatise, PHI Learning.
- 3. Sampool Bowels: Microeconomics- Behaviour, Institutions and Evolution, Oxford University Press, 2004.
- 4. Sanjay Basotiya: Microeconomics- Principles, Applications and Tools, DND Publications, 2010.

18.10 Terminal Questions

- 1. Explain in detail Marshallian concept of welfare economics.
- 2. Critically explain Pigovian concept of welfare economics.

Unit-19 Pareto Optimality and Economic Efficiency

Structure

- 19.1 Introduction
- 19.2 Learning Objectives
- 19.3 Pareto Criterion of Social Welfare Self Check Exercise-1
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 - 19.3.3 A Critical Evaluation of Pareto Criterion and Pareto Optimality
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19.1 Introduction

Economists defined social welfare as a sum total of cardinally measurable utilities of different members of the society. An optimum allocation of resources was one which maximised the social welfare in this sense. Vilfredo Pareto was the first to part with this traditional approach to social welfare in two important respects.

First, he rejected notion of cardinal utility and its additive nature and, second, he detached welfare economics from the inter-personal comparisons of utilities. Pareto's concept of maximum social welfare which is based upon ordinal utility and is also free from value judgements occupies a significant place in modern welfare economics.

Pareto optimum may not be sufficient condition for attaining maximum social welfare but it is a necessary condition for it. To repeat, Pareto optimum (often called Economic Efficiency) is a position from which it is impossible to make anyone better off without making someone worse off by any re-allocation of resources or distribution of outputs.

Thus, in the Pareto optimum position, the welfare of any individual of the society cannot be increased without decreasing the welfare of another member. Before explaining the conditions of achieving Pareto optimality, we shall explain Pareto criterion of evaluating changes in social welfare because the concept of Pareto optimality or maximum social welfare is based upon Pareto criterion of welfare.

19.2 Learning Objectives

After reading this chapter, you will be able to explain:

- the meaning of Welfare Economics
- the Pareto Criterion of Social Welfare
- Marginal Conditions of Pareto Optimality
- the Second-Order Conditions of Pareto Optimality
- Perfectly Competitive Equilibrium and Pareto Optimality

19.3 Pareto Criterion of Social Welfare

The concept of Pareto optimum or economic efficiency stated above is based on a welfare criterion put forward by V. Pareto. Pareto criterion states that if any reorganisation of economic resources does not harm anybody and makes someone better off, it indicates an increase in social welfare. If any reorganisation or change makes everybody in a society better off, it will, according to Pareto, undoubtedly mean increase in social welfare.

Thus, in the words of Prof. Baumol "any change which harms no one and which makes some people better off must be considered to be an improvement." Pareto criterion can be explained with the help of Edgeworth Box diagram which is based on the assumptions of ordinal utility and non-interpersonal comparison of utilities.

Suppose two persons A and B form the society and consume two goods X and Y. The various levels of their satisfaction by consuming various combinations of the two goods have been represented by their respective indifference curves.

In Figure 19.1 O_a and O_b are the origins for the utilities of two persons A and B respectively. I_{a1} , I_{a2} , I_{a3} , I_{a4} and I_{b1} , I_{b2} , I_{b3} , I_{b4} are their successively higher indifference curve. Suppose the initial distribution of goods X and Y between the members of the society, A and B, is represented by point- K in the Edgeworth Box.



19.1 Pareto Criterion and Pareto Optimality

Accordingly, individual A consumes O_AG of X + GK of Y and is at the level of satisfaction represented by indifference curve I_{a3} . Similarly, individual B consumes KF of X+ KE of Y and gets the satisfaction represented by indifference curve Ib_1 .

Thus, the total given volume of goods X and Y are distributed between A and B. In this distribution, individual A consumes relatively large quantity of good Y and individual B of good X. Now, it can be shown with the aid of Pareto's welfare criterion that a movement from the point K to a point such as S or R or any other point in the shaded region will increase social welfare. Any movement from K to S through redistribution of two goods between two individuals increases the level of satisfaction of A without any change in the satisfaction of B

because as a result of this A moves to his higher indifference curve I_{a4} , and B remains on his same indifference curve I_{b1} (K and S lie on B"s same indifference curve I_{b1}). In other words, as a result of the movement from K to S, individual A has become better off whereas individual B is no worse off. Thus, according to Pareto criterion, social welfare has increased following the movement from K to S and therefore K is not the position of economic optimum.

Similarly, the movement from K to R is also desirable from the point of view of social welfare because in this individual B becomes better off without any change-in-the satisfaction of individual A. Therefore, both the positions S and R are better than K. The tangency points of the various indifference curves of the two individuals of the society are the Pareto optimum points and the locus of these points is called "contract curve".

Pareto criterion can also be explained with the help of Samuelson's utility possibility curve. Utility possibility curve is the locus of the various combinations of utilities obtained by two persons from the consumption of a particular bundle of goods.

In Figure 19.2, CV is a utility possibility curve which shows the various levels of utilities obtained by two individuals A and B of the society resulting from the redistribution of a fixed bundle of goods and its consumption by them.



Fig. 19.2: Pareto Criterion Explained with Utility Possibility Curve

According to Pareto criterion, a movement from Q to R, or Q to D, or Q to S represents the increase in social welfare because in such movements the utility of either A or B or both increases. A movement from Q to R implies that the utility or welfare of B increases, while that of A remains the same.On the other hand, a movement from Q to S implies that while A has

become better off, B is no worse off. And a movement from Q to D or any other point on the segment between R and S will mean increase in welfare or utility of both the individuals. Thus points R, D and S are preferable to Q from the point of view of social welfare.

But unfortunately Pareto criterion does not help us in evaluating the changes in welfare if the movement as a result of redistribution is from the point Q to a point outside the segment RS; such as point E on the utility possibility curve CV. As a result of the movement from point Q to E, the utility of A decreases while that of B increases. In such circumstances, Pareto criterion cannot tell us as to whether social welfare increases or decreases.

Self Check Exercise-1

Q1. Discuss Pareto Criterion of Social Welfare.

19.3.1 Marginal Conditions of Pareto Optimality

Pareto concluded from his criterion that competition leads the society to an optimum position but he had not given any mathematical proof of it, nor he derived the marginal conditions to be fulfilled for achievement of the optimum position. Later on, Lerner and Hicks derived the marginal conditions which must be fulfilled for the attainment of Pareto optimum. These marginal conditions are based on the following important assumptions:

1. Each individual has his own ordinal utility function and possesses definite amount of each product and factor.

- 2. Production function of every firm and the state of technology is given and remains constant.
- 3. Goods are perfectly divisible.
- 4. A producer tries to produce a given output with the least-cost combination of factors.
- 5. Every individual wants to maximise his satisfaction.
- 6. Every individual purchases some quantity of all goods.
- 7. All factors of production are perfectly mobile.

Given the above assumptions, various marginal conditions (first-order conditions) required for the achievement of Pareto optimum or maximum social welfare are explained below:

1. The Optimum Distribution of Products among the Consumers: Efficiency in Exchange:

The first condition relates to the optimum distribution of the goods among the different consumers composing a society at a particular point of time. The condition says: "The marginal rate of

substitution between any two goods must be the same for every individual who consumes them both."

The marginal rate of substitution of one good for another so as is the amount of one good necessary to compensate for the loss of a marginal unit of another so as to maintain a constant level of satisfaction. So long as the marginal rate of substitution (MRS) between two goods is not equal for any two consumers, they will enter into an exchange which would increase the satisfaction of both or of one without decreasing the satisfaction of the other.

This condition can be better explained with the help of the Edgeworth Box diagram. In Figure 19.3, goods X and Y, which are consumed by two individuals A and B composing a society are represented on the X and Taxes respectively. O_A and O_B are origins for A and B respectively. Ia_1 , Ia_2 , Ia_3 and Ib_1 , Ib_2 , Ib_3 are the indifference curves showing successively higher and higher satisfaction of consumers A and B respectively. CC is the contract curve passing through various tangency points Q, R, S of the indifference curves of A and B.

The marginal rates of substitution (MRS) between the two goods for individuals A and B are equal on the various points of the contract curve CC^{**}. Any point outside the contract curve does not represent the equality of MRS between the two goods for two individuals A and B of the society.

Let us consider point K where indifference curves I_{a1} and I_{b1} of individuals A and B respectively intersect each other instead of being tangential. Therefore, at point K marginal rate of substitution between two goods X and Y (MRS_{XY}) of individual A is not equal to that of B.

With the initial distribution of goods as represented by point K, it is possible to increase the satisfaction of one individual without any decrease in that of the other or to increase the satisfaction of both by redistribution of the two goods X and Y between them. A movement from K to S increases the satisfaction of A without any decrease in B^{*}s satisfaction.

Similarly, a movement from K to Q increases B"s satisfaction without any decrease in A"s satisfaction. The movement from K to R increases the satisfaction of both because both move to their higher indifference curves. Thus, movements from K to Q or to S or to any other point on the segment SQ of the contract curve will, according to Pareto criterion, increase the level of social welfare.



Fig. 19.3: Optimum Distribution of Goods

From above it follows that movement from any point away from the contract curve to a point on the relevant segment of the contract curve will mean increase in social welfare. At any point away from the contract curve in the Edgeworth box, the indifference curves of the two individuals will intersect which will mean that MRS_{xy} of two individuals is not the same.

And, as explained above, this indicates that through exchange of some units of goods between them, they can move to some point on the contract curve where the social welfare (that is, welfare of two individuals taken together) will be higher.

Since the slope of an indifference curve represents the marginal rate of substitution (MRS_{XY}) at any point of the contract curve, which represents tangency points of the indifference curves, MRS_{XY} of the two individuals are equal. Therefore, points on the contact curve represent the maximum social welfare.

However, a movement along the contract curve in either direction will make one individual better off and the other worse off since it will put one individual on his successively higher indifference curves and the other on his successively lower indifference curves. Thus, every point on the contract curve denotes maximum social welfare in the Paretian sense but we cannot say anything about the best of them with the help of Pareto criterion.

2. The Optimum Allocation of Factors: Pareto Efficiency in Production:
The second condition for Pareto optimum requires that the available factors of production should be utilised in the production of products in such a manner that it is impossible to increase the output of open firm without a decrease in the output of another or to increase the output of both the goods by any re-allocation of factors of production.

This situation would be achieved if the marginal technical rate of substitution between any pair of factors must be the same for any two firms producing two different products and using both the factors to produce the products.

This condition too can be explained with the help of Edgeworth Box diagram relating to production. This is depicted in Fig. 39.4. Let us assume two firms A and B producing the same product by using two factors labour and capital. The available quantities of labour and capital are represented on X and Faxes respectively. O_A and O_B are the origins for firms A and B respectively.



Fig. 19.4: Optimum Allocation of Factors

Isoquants I_{a1} , I_{a2} , I_{a3} and I_{b1} , I_{b2} , I_{b3} of firms A and B respectively represent successively higher and higher quantities of output which they can produce by different combinations of labour and capital. The slope of the isoquants, which are convex to the origin, represents the marginal rate of technical substitution (MRTS) between two factors.

MRTS of one factor for another is the amount of one factor necessary to compensate for the loss of the marginal unit of another so that the level of output remains the same. So long as the MRTS

between two factors for two firms is not equal, total output of a product can be increased by transfer of factors from one firm to another.

In terms of the above diagram any movement from K to S or to Q raises the output of one firm without any decrease in the output of the other. The total output of the two firm's increases when through redistribution of factors between the two firms, a movement is made from the point K to the point Q or S on the contract curve.

A glance at Figure 19.4 will reveal that movement from point K outside the contract curve to the point R on the contract curve will raise the output of both the firms individually as well as collectively. Therefore, it follows that corresponding to a point outside the contract curve there will be some points on the contract curve production at which will ensure greater total output of the two firms.

As the contract curve is the locus of the tangency points of the isoquants of two firms, the marginal rate of substitution of the two firms is the same at every point of the contract curve CC. It therefore, follows that on the contract curve at every point of which MRTS between the two factors of two firms is the sum, the allocation of factors between the two firms is optimum.

When the allocation of factors between the two firms is such that they are producing at a point on the contract curve, then no re-allocation of factors will increase the total output of the two firms taken together.

But it is worth mentioning that there are several points on the contract curve and each of them represents the optimum allocation of labour and capital as between the two firms. But which one of them is best cannot be said on the basis of Pareto criterion because movement along the contract curve in either direction represents such factor reallocation which increases the output of one and reduces the output of another firm.

3. Optimum Direction of Production: Efficiency in Product Mix:

This condition relates to the pattern of production. The fulfillment of this condition determines the optimum quantities of different commodities to be produced with the given factor endowments. This condition states that "the marginal rate of substitution between any pair of products for any person consuming both must be the same as the marginal rate of transformation (for the community) between them." According to this condition, for the attainment of maximum social welfare goods should be produced in accordance with consumer"s preferences. Let us explain this with the help of Fig. 19.5.



Fig. 19.5: Optimum Direction of Production: Optimum Product Mix

In Fig. 19.5 commodities X and Y have been represented on the X and Y axes respectively. AB is a community's transformation curve between any pair of goods X and Y. This curve represents the maximum amount of X that can be produced for any quantity of Y, given the amounts of other goods that are produced and fixed supplies of available resources.

 IC_1 and IC_2 are the indifference curves of a consumer the slope of which at a point represents the marginal rate of substitution between the two goods of the consumer. The MRT^{**} of the community and MRS of the consumer are equal to each other at point R at which the community^{**}s transformation curve is tangent to the indifference curve IC_2 of a representative consumers, Point R represents optimum composition of production in which commodities X and Y are being produced and consumed in OM and ON quantities.

This is because of all the points on the community's transformation curve, point R lies at the highest possible indifference curve IC_2 of the consumer. For instance, if a combination of goods X and Y represented by S is being produced and consumed, the consumer would be at a lower level of welfare because S lies on his lower indifference curve IC_1 which intersects the community's transformation curve instead of being tangential to it.

As a result, at point S, MRS_{XY} of the consumer is not equal to the MRT_{XY} of the community. With the situation at S there is a possibility of moving the consumers to a higher indifference curve by changing the direction (i.e. composition) of production i.e. by increasing the production of X and reducing the production of Y. Thus, the optimum direction of production is established at point R where community"s transformation curve is tangent to the indifference curve of a consumer in the society.

19.3.2 The Second-Order and Total Conditions of Pareto Optimality

The marginal or the first order conditions explained above are "necessary" but not sufficient for the attainment of maximum social welfare because the marginal conditions by themselves do not guarantee maximum welfare.

The marginal conditions can be fulfilled even at the level of minimum welfare. To attain the maximum social welfare position second-order conditions together with the marginal conditions must be satisfied. The second order conditions require that all indifference curves must be convex to the origin and all transformation curves concave to it in the neighbourhood of any portion where marginal conditions are satisfied.

But even the satisfaction of both (first and second order conditions) does not ensure the largest maximum welfare because even when marginal conditions (first and second order) are fulfilled, it may still be possible to move to a position where social welfare is greater. To attain the maximum social welfare, another set of conditions which are called by J.R. Hicks as the "total conditions" must also be satisfied.

The total conditions state, "That if welfare is to be a maximum, it must be impossible to increase welfare by producing a product not otherwise produced or by using a factor not otherwise used." If it is possible to increase welfare by such activities the optimum position is not determined by marginal conditions alone.

Therefore, welfare will be really maximum if the marginal as well as total conditions are satisfied. But such a social optimum too is Hot a unique one. It is one of a large number of optima. The whole analysis of conditions of Pareto optimality assumes a given distribution of income.

With a change in the distribution of income Pareto optimality will be achieved with different output-mix of various products and different allocation of various factors among products. Thus, a new optimum will emerge due to redistribution of income and there are no criteria to judge whether the new optimum is better or worse than the previous social optimum. This can be known only with the help of some value judgements regarding income distribution which has been ruled out by the Pareto criterion.

19.3.3 A Critical Evaluation of Pareto Criterion and Pareto Optimality

Pareto criterion and the concept of Pareto optimality and maximum social welfare based on it occupy a significant place in welfare economics. To judge the efficiency of an economic system, the notion of Pareto optimality has been used.

It has also been used to bring out the gains of trading or exchange of goods between individuals. But even Pareto criterion which rules out comparing those changes in policies which make some worse off has been a subject of controversy and has been criticised on several grounds.

First, it has been alleged that Pareto criterion is not completely free from value judgements. The supporters of Pareto criterion claim that it provides us with an "objective" criterion of efficiency. However, this has been contested.

Against Pareto criterion it has been said that to say that a policy change which makes some better off without others being worse off increases social welfare is itself a value judgement. This is because we recommend such changes which pass Pareto criterion.

The implication of this assertion will become obvious when the persons who gain as a result 257of policy change are the rich and those who remain where they were before are poor. Therefore, to say on the basis of Pareto criterion that whenever any policy change which, without harming anyone, benefits some people regardless of whoever they may be, increases social welfare is a value judgement which may not be accepted by all.

Second, an important limitation of Pareto criterion is that it cannot be applied to judge the social desirability of those policy proposals which benefit some and harm others. Such policy changes are quite rare which do not harm at least some individuals in the society.

Thus, Pareto criterion is of limited applicability as it cannot be used to pronounce judgements on a majority of policy proposals which involve a conflict of preferences of two individuals. Thus, according to Prasanta K. Patnaik, "Pareto criterion fails seriously when it comes to comparing alternatives. Whenever there is conflict of preferences of two individuals with respect to two alternatives, the criterion fails to rank those two alternatives no matter what the preferences of the rest of individuals in the society might be".

To evaluate social desirability of those policy changes which benefit some and harm others, we need to make interpersonal comparison of utility which Pareto criterion refuses to do. Thus, "Pareto criterion works by sidestepping the crucial issue of inter-personal comparison and income distribution, that is, by dealing only with cases where no one is harmed so that the problem does not arise".

Another shortcoming of Pareto criterion and notion of maximum social welfare based on it is that it leaves a considerable amount of indeterminacy in the welfare analysis since every point on the contract curve is Pareto-optimal.

For instance, in Fig. 19.1, every point such as P, Q, R, S on the contract curve is Pareto-superior to any point such as K and H which lies outside the contract curve. Movement from one point on the contract curve to another as a result of change in economic policy, that is, through reallocation of resources that makes one individual better off and the other worse off, that is, one gains at the expense of the other.

This means that on the basis of Pareto criterion, social alternatives lying on the contract curve cannot be compared since with any movement on the contract curve one individual gains and the other loses, that is, it involves redistribution of income or welfare.

Therefore, to compare various alternatives lying on the contract curve and to choose between them, inter-personal comparison and value judgements regarding proper distribution of income need to be made. However, Pareto refused to make value judgements and sought to put forward a value-free or objective criterion of welfare.

It, therefore, follows that on the basis of Pareto criterion where the change from an alternative lying outside the contract curve to an alternative on the contract curve is judged to increase social welfare but this cannot be said of the change from one position on the contract curve to another on it. But as there are infinite numbers of points on the contract curve all of which are Pareto optimal, no choice can be made out of them on the basis of Pareto criterion.

To remove this indeterminacy and to choose among the alternatives lying on the contract curve one need to make some additional value judgements beyond what is implied in the Pareto criterion. Henderson and Quandt hold a similar view when they assert, "The analysis of welfare in terms of Pareto optimality leaves a considerable amount of indeterminacy in the solution there are infinite number of points which are Pareto optimal." They further remark that.

The indeterminacy is the consequence of considering an increase in welfare to be unambiguously defined only if an improvement in one individual"s position is not accompanied by a deterioration of the position of another. The indeterminacy can only be removed by further value judgements."

Above all, a chief drawback of Pareto-optimality analysis is that it accepts the prevailing income distribution and no attempt is made to find an optimal distribution of income, since it is thought

that there does not exist any objective, value-free and scientific way of finding optimal distribution of income.

Thus, Pareto optimality analysis remains either silent or biased in favour of status quo on the issue of income distribution. Further, Pareto optimality analysis may lead to recommend the prevailing income distribution where a majority of the population lives on the subsistence level or below the poverty line while a few live a life of affluence. Thus, "Ultimately, the Paretian approach can be considered the welfare economists" instrument par excellence for the circumvention of the issue of income distribution."

It may also be mentioned that for any initial distribution of income (that is, for any given distribution of goods) between the individuals, there will be several Pareto optimal positions. Consider Figure 19.1. Corresponding to point, K, the points on the segment RS on the contract curve CC" will all represent Pareto optimal positions.

Likewise, corresponding to a given distribution of income (i.e. distribution of goods) as represented by point H, the points on the segment PQ of the contract curve CC" will be Pareto-optimal. Thus corresponding to a different distribution of income, there will be different Pareto optima. In the Paretian analysis there is no way of evaluating whether one pattern of income distribution is better than the other.

19.3.4 Prof. Amartya Sen's Critique of Pareto Optimality:

Further, criticising Pareto criterion Prof. Amartya Sen has pointed out that the success that the criterion of Pareto optimality has achieved in judging the desirability of a social state or a policy change is very limited. To quote him, "A Social state is described as Pareto optimal if and only if no- one"s utility can be raised without reducing the utility of someone else. This is a very limited kind of success and in itself may or may not guarantee much. A state can be Pareto optimal with some people in extreme misery and others rolling in luxury, so long as the miserable cannot be made better off without cutting into the luxury of the rich." So, according to him, this is not a good and adequate criterion for juding social welfare.

Further, Prof. Sen has criticised Pareto optimality on the basis that it identifies well-being with utility and captures the efficiency aspects only of utility-based accounting. It may be noted that utility is interpreted in two ways, Firstly, it is said to mean "happiness". Secondly, it is interpreted in the sense of "desire-fulfillment".

He is of the view that utility does not always reflect well-being. To quote him, "To judge the well-being of a person exclusively in metric of happiness or desire- fulfillment has some obvious

limitations. These limitations are particularly damaging in the context of interpersonal comparison of well-being. Since the extent of happiness reflects what one would expect and how the social "deal seems in comparison with that."

He is of the view that people living a life of great misfortune with little hope and opportunities may get more utility or happiness even from small gains. But that should not be interpreted that there is a significant improvement in their well-being.

The measure of utility in the sense of happiness may not reveal the true picture about the state of his deprivation. He thus writes The hopeless beggar, precarious landless labourers, the dominated housewife, the hardened unemployed or the over-exhausted coolie may all take pleasure in small mercies, and manage to suppress intense suffering for the necessity of continued survival, but it would be ethically deeply mistaken to attach correspondingly small value to the loss of their well-being because of their survival strategy.

According to Prof. Sen, even in case of desire-fulfillment, the same problem arises, because "the hopelessly deprived lack the courage to desire much, and their deprivations are muted and deadened in scale of desire-fulfillment." The sum and subsistence of Sen"s criticism is that the concept of utility used in for adjudging Pareto optimality whether it is interpreted in terms of happiness or desire-fulfillment is seriously inadequate and insufficient for judging a person"s well-being. To quote him, well-being is ultimately a matter of valuation, and while happiness and fulfillment of desire may well be valuable for the person"s well being, they cannot on their own or even together adequately reflect the value of well-being."

It is thus clear that welfare or well-being of individuals depends on a wide range of variables that those associated with utility which is derived from the consumption of goods and services and amount of leisure enjoyed. Welfare or well-being also depends on such variables as political and environmental factors, personal and political freedom individuals enjoy, disposition of their neighbours.

For an adequate measure of well-being these variables cannot be ignored. "In comparing different economic systems or comparing different ways of organising a given economy, the possibility that some of these variables might be affected cannot be ignored. Thus, a reorganisation that gives everyone more income and leisure might not improve the welfare of the community if at the same time it limits individual freedoms or requires the abandonment of cherished cultural traditions."

In the end, it may be pointed out that Pareto criterion is not altogether unless. It is useful in the sense that, "by throwing out the Pareto in optimal alternatives, it reduces the range within which socially best alternatives are to be looked for, and therefore does serve as a useful first step.

The trouble arises if one gets so fascinated with this first step that one does not try to go any further, but that can hardly be called a defect of Pareto criterion." Moreover, as has been pointed out above, Pareto analysis has been used to bring out the gains from trading or exchange of goods between the two individuals.

19.3.5 Perfectly Competitive Equilibrium and Pareto Optimality:

In our above analysis we have explained the various marginal conditions of attaining Pareto optimality or, in other words, optimum allocation of resources. It has been claimed by several economists that perfect competition is an ideal market form which ensures the attainment of Pareto optimality or maximum social welfare as it fulfills all the marginal conditions required for the purpose.

In what follows we shall show how perfectly competitive equilibrium satisfies all the marginal conditions required for the achievement of Pareto optimum. We shall further explain what are the major obstacles in the way of maximising social welfare or achieving Pareto optimality.

1. Perfect Competition and Optimal Distribution of Goods or Efficiency in Exchange:

The condition for Pareto optimality with regard to the distribution of goods among consumers requires that the marginal rate of substitution (MRS) between any two goods, say X and Y, must be the same for any pair of consumers. Let A and B be the two consumers between whom two goods X and Y are to be distributed.

Under perfect competition prices of all goods are given and same for every consumer. It is also assumed that consumers try to maximise their satisfaction subject to their budget constraint.

Now, given the prices of two goods, consumer A will maximise his satisfaction when he is buying the two goods X and Y in such amounts that:

 $MRS^{A}_{XY} = P_X / P_Y \dots (i)$

Likewise, the consumer B will also be in equilibrium (maximise his satisfaction) when he is purchasing and consuming the two goods X and Y in such amounts that:

 $MRS^{B}_{XY} = P_X/P_Y...$ (ii)

Since this is essential condition of perfect competition that prices of goods are the same or uniform for all consumers, the price ratio of the two goods (P_X/P_Y) in equations (i) and (ii) above will be the same for consumers A and B. It, therefore, follows from equations (i) and (ii) above that under conditions of perfect competition marginal rate of substitution between two goods X and Y will be equal for the two consumers. That is,

 $MRS^{A}_{XY} = MRS^{B}_{XY}$

This result will hold good between any pair of goods for any pair of consumers.

2. Perfect Competition and Optimal Allocation of Factors:

The second marginal condition for Pareto optimality relates to the optimal allocation of factors in the production of various goods. This condition requires that for the optimal allocation of factors marginal rate of technical substitution (MRTS) between any two factors, say labour and capital, must be the same in the production of any pair of products.

This condition is also satisfied by perfect competition. For a producer working under perfect competition prices of factors he employs are given and constant and he is in equilibrium (that is, minimises his cost for a given level of output) at the combination of factors where the given isoquant is tangent to an iso-cost line.

As is well known, the slope of the isoquant represents marginal rate of technical substitution between the two factors and the slope of the iso-cost line measures the ratio of the prices of two factors. Thus, under perfect competition, a cost-minimising producer producing goods will equate MRTS between labour and capital with the price ratio of these two factors.

Thus under perfect competition:

$$MRSA^{X}_{LK} = P_L/P_K...(i)$$

Where P_L and P_K are the prices of labour and capital respectively and MRTS^X_{LK} is the marginal rate of technical substitution between labour and capital in the production of good X. Similarly, producer B producing good T and working under perfect competition will also equate his marginal rate of technical substitution between the two factors with their price ratios. Thus

$$MRS^{Y}_{LK} = P_L/P_K... (ii)$$

Since, under perfect competition, prices of factors are the same for all the producers, each producer will adjust the use of factors in such a way that his marginal rate of technical

substitution (MRTS) between labour and capital in the production of goods is equal to the same factor price ratio.

In other words, (P_L/P_K) will be the same for all of them and to this $MRTS_{LK}$ of the producers will be made equal.

It, therefore, follows from (i) and (ii) above that under perfect competition:

 $MRS_{LK}^{X} = MRS_{LK}^{Y}$

We thus see that perfect competition ensures optimal allocation of resources as between different firms using these resources for production of commodities.

3. Perfect Competition and Optimum Direction (i.e. Composition) of Production: Allocative Economic Efficiency:

The most important condition for the attainment of Pareto optimum is one which refers to the optimum direction or composition of production. In other words, this condition requires how much amounts of different goods should be produced and resources allocated accordingly.

This refers to the general condition for optimum allocation of resources which has also been called the condition for General Economic Efficiency and General Pareto Optimum. This condition states that marginal rate of substitution between any two commodities for any consumer should be the same as the marginal rate of transformation for the community between these two commodities.

Under conditions of perfect competition, each firm to be in equilibrium produces so much output of a commodity that its marginal cost is equal to the price of the commodity. Thus, for firms in perfect competition, $MC_X = P_X$, $MC_Y = P_Y$, where MC_Z and MC_Y are marginal costs of production of commodities X and Y respectively and P_X and P_Y are prices of commodities X and Y. Therefore, it follows that firms working in perfect competition will be in equilibrium when they are producing commodities in such quantities that

$MC_X/MC_Y = P_X/P_Y$

The ratio of marginal costs of two commodities represents the marginal rate of transformation between them.

Therefore, for firms producing under perfect competition:

 $MRT_{XY} = MC_X / MC_Y = P_X / P_Y$

When there prevails perfect competition on the buying side, each consumer maximises his satisfaction and is in equilibrium at the point where the given budget line is tangent to his indifference curve.

In other words, each consumer is in equilibrium when:

 $MRS_{XY} = P_X/P_Y$

Since, under perfect competition, the ratio of prices of two commodities (P_X/P_Y) consumers and producers it follows from (i) and (ii) above that

$MRS_{XY} = MRT_{XY}$

Likewise, this will hold good for any other pair of commodities. Thus, perfect competition satisfies the marginal condition required for the Pareto optimal composition or direction of production. We thus see that all first order marginal conditions required for the attainment of Pareto-optimality or maximum social welfare are fulfilled under perfect competition. It is in this sense that perfect competition represents economic optimum from the viewpoint of social welfare.

Self Check Exercise-2

- Q1. Discuss Marginal Conditions of Pareto Optimality.
- Q2. Discuss the Second- Order and Total Conditions of Pareto Optimality.
- Q.3 Give a Critical Evaluation of Pareto Criterion and Pareto Optimality.

19.4 Summary

Pareto efficiency, or Pareto optimality, is an economic state where resources cannot be reallocated to make one individual better off without making at least one individual worse off. Pareto efficiency implies that resources are <u>allocated</u> in the most <u>economically efficient</u> manner, but does not imply equality or fairness. An economy is said to be in a Pareto optimum state when no economic changes can make one individual better off without making at least one other individual worse off.Prof. Pareto gave some marginal conditions to attain maximum social welfare which are applicable in perfect competition. But, in the present-day capitalist economies, it is monopolies, oligopolies and monopolistic competition which largely prevail and these market forms serve as a great obstacle for the achievement of Pareto-optimality or optimum allocation of resources.

19.5 Glossary

• Perfect Competition: the situation prevailing in a market in which buyers and sellers are

so numerous and well informed that all elements of monopoly are absent and the market price of a commodity is beyond the control of individual buyers and sellers.

- Utility Possibility Curve: refers to the graph showing the highest amount of utility a person can attain given each utility levels of other persons in the society. It is an upper frontier of a set of various utility possibilities of economic agents for the given amount of production.
- **Marginal Rate of Substitution**: In economics, the marginal rate of substitution is the rate at which a consumer can give up some amount of one good in exchange for another good while maintaining the same level of utility.
- Marginal Rate of Technical Substitution: In microeconomic theory, the marginal rate of technical substitution —or technical rate of substitution —is the amount by which the quantity of one input has to be reduced when one extra unit of another input is used, so that output remains constant.

19.6 Answers to Self-Check Exercises

Self Check exercise -1 Ans.1. Refer to Section 19.3 Self Check exercise -2 Ans.1. Refer to Section 19.3.1 Ans.2. Refer to Section 19.3.2 Ans.3. Refer to Section 19.3.3

19.7 References/ Suggested Readings

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- W.J. Baumol. (1977). Economic Theory and Operations Analysis, Prentice Hall.
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19.8 Terminal Questions

1. Write in details on the marginal conditions of Pareto"s optimality with the help of suitable diagrams.

New Welfare Economics

Structure

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- 20.2 Learning Objectives
- 20.3 Kaldor-Hicks Welfare Criterion or Compensation Principle
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20.1 Introduction

Pareto laid the foundation of the modern welfare economics by formulating the concept of social optimum which is based on the concept of ordinal utility and is free from inter-personal comparisons of utilities and value judgements. He aimed at formulating a value-free objective criterion designed to test whether a proposed policy change increases social welfare or not.

Pareto criterion states simply that an economic change which harms no one and makes someone better off indicates an increase in social welfare. Thus, this criterion does not apply to those economic changes which harm some and benefit others. In terms of Edgeworth box diagram, Pareto criterion fails to say as to whether or not social welfare increases as movement is made in either direction along the contract curve because it rejects the notion of inter-personal comparison of utility.

There is thus no any unique optimum position. This criterion does not tell us about changes in the level of social welfare if one move on the contract curve from one tangency point to another because such movement harms one and benefits the other. Thus, the analysis of welfare in terms of Pareto optimality leaves a considerable amount of indeterminacy, for there are numerous Pareto optimum points on the contract curve.

20.2 Learning Objectives

After reading this chapter, you will be able to explain:

- the meaning of Welfare Economics
- the Compensation Principle of Welfare Economics
- the Scitovsky"s Double Criterion of Welfare
- Bergson Social Welfare Criterion

20.3 Kaldor-Hicks Welfare Criterion or Compensation Principle

Economists like Kaldor, Hicks and Scitovsky have made efforts to evaluate the changes in social welfare resulting from any economic re-organisation which harms somebody and benefits the others. These economists have sought to remove indeterminacy in the analysis of Pareto optimality. They have put forward a criterion known as the "compensation principle" on the basis of which they claim to evaluate those changes in economic policy or organisation which makes some individual better off and others worse off. The "compensation principle" is based on the following assumptions.

20.3.1 Assumptions of Compensation Principle

1. The satisfaction of an individual is independent of the others and he is the best judge of his welfare.

2. There exist no externalities of consumption and production.

3. The tastes of the individuals remain constant.

4. The problems of production and exchange can be separated from the problems of distribution. Compensation principle accepts the level of social welfare to be a function of the level of production. Thus it ignores the effects of a change in distribution on social welfare.

5. Utility can be measured ordinally and interpersonal comparisons of utilities are not possible.

Given the above assumptions, a criterion of compensation principle can be discussed. Kaldor, Hicks and Scitovsky have claimed to formulate a value-free objective criterion of measuring the

changes in social welfare with the help of the concept of "compensating payments".Nicholas Kaldor was the first economist to give a welfare criterion based on compensating payments. Kaldor"s criterion helps us to measure the welfare implications of a movement in either direction on the contract curve in terms of Edgeworth box diagram.

According to Kaldor"s welfare criterion, if a certain change in economic organisation or policy makes some people better off and others worse off, then a change will increase social welfare if those who gain from the change could compensate the losers and still be better off than before. In the words of Prof. Baumol, "Kaldor"s criterion states that a change is an improvement if those who gain evaluate their gains at a higher figure than the value which the losers set upon their losses."

Thus, if any policy change benefits any one section of the society (gainers) to such an extent that it is better off even after the payment of compensation to the other sections of the society (losers) out of the benefits received, then that change leads to increase in social welfare. In Kaldor's own words, "In all cases.... where a certain policy leads to an increase in physical productivity and thus of aggregate real income... it is possible to make everybody better off without making anybody worse off. It is quite sufficient.... to show that even if all those who suffer as a result are fully compensated for their loss, the rest of the community will still be better off than before."

Prof. J.R. Hicks supported Kaldor for employing compensation principle to evaluate the change in social welfare resulting from any economic reorganisation that benefits some people and harms the others. This criterion states that, "If A is made so much better by the change that he could compensate B for his loss and still have something left over, and then the reorganisation is unequivocal improvement."

In other words, a change is an improvement if the losers in the changed situation cannot profitably bribe the gainers not to change from the original situation. Hicks have given his criterion from the losers" point of view, while Kaldor had formulated his criterion from gainers" point of view. Thus the two criteria are really the same though they are clothed in different words. That is why they are generally called by a single name "Kaldor-Hicks criterion".

Kaldor-Hicks criterion can be explained with the help of the utility possibility curve. In Fig. 20.1 ordinal utility of two individuals A and B is shown on X and Y axis respectively. DE is the utility possibility curve which represents the various combinations of utilities obtained by individuals A and B. As we move downward on the curve DE, utility of A increases while that of B falls. On the other hand, if we move up on the utility curve ED, utility of B increases while that of A falls.



Fig. 20.1: Kaldor-Hicks Criterion

Suppose the utilities obtained by A and B from the distribution of income or output between them is represented by point Q inside the utility possibility curve DE. Let us assume that as a result of some change in economic policy, the two individuals move from point Q to point T on the utility possibility curve DE.As a result of this movement, utility of individual B has increased while the utility of A has declined, that is, B has been become better off and A has become worse off than before. Therefore, this movement from point Q to point T cannot be evaluated by means of Pareto criterion. Of course, points such as R, G, S or any other point on the segment RS of utility-possibility curve DE are socially preferable to point Q on the basis of Pareto criterion.

However, the compensation principle propounded by Kaldor-Hicks enables us to say whether or not social welfare has increased as a result of movement from Q to T. According to Kaldor-Hicks criterion, we have to see whether the individual A who gains with the movement from position Q to position T could compensate the individual A who is loser and still be better off than before.Now, it will be seen from Figure that utility possibility curve DE passes through points R, G and S. This means that by mere redistribution of income between the two individuals, that is, if individual B gives some compensation to individual A for the loss suffered, they can move from position T to the position R.

It is evident from the figure that at position R individual A is as well off as at the position Q but individual B is still better off as compared to the position Q. It means due to a policy change and consequent movement from position Q to position T, the gainer (individual B) could compensate the loser (individual A) and is still better off than at Q.Therefore, according to Kaldor-Hicks criterion, social welfare increases with the movement from position Q to position T, because from T they could move to the position R through mere redistribution of income (i.e. compensation).

It is noteworthy that, according to Kaldor-Hicks criterion, compensation may not be actually paid to judge whether or not social welfare has increased. It is enough to know whether the gainer could compensate the loser for the loss of welfare and still be better off. Whether redistribution of income (that is, payment of compensation) should be actually made following the change in policy is left for the Government to decide. If it is possible for the gainer to compensate the loser and still be better off, the economists can say that social welfare has increased.

It may be noted that gainer can compensate the losers and still be better off only when the change in economic policy leads to the increase in output or real income. That is why Kaldor and Hicks claim that they have been able to distinguish between changes in output from change in distribution.When their criterion is satisfied by a change in the situation, it means that the economy has moved to a potentially more efficient position and as a result social welfare can be said to have increased. Now, whether redistribution of income is actually made through payment of compensation by the gainers to the losers, according to them, is a different matter.

Now, the implications of Kaldor-Hicks criterion become more clear if through redistribution the position of the two individual changes from T to G. It is quite manifest that at position G both the individuals A and B are better off than at the position Q. Thus, the position T to which the two individuals moved as result of a certain change in economic policy is superior to the initial position Q from the viewpoint of social welfare, since from position T movement can be made merely through redistribution of income to position G where both are better off as compared to the position Q.

It may be noted that in the situation depicted in Figure, the change in economic policy brings about a movement from a position inside the utility possibility curve to a point on it. Now let us see what happens to social welfare if as a result of the adoption of a certain economic policy the utility possibility curve moves outward and the two individuals move from a point on a lower utility possibility curve to a point on a higher utility possibility curve.

It can be shown that, according to Kaldor-Hicks criterion, such a movement causes an improvement in social welfare. Consider Figure 20.2. UV is the original utility possibility curve and Q represents the position at which the two individuals are initially placed.



Fig. 20.2: Kaldor-Hicks Welfare Criterion

Now, suppose utility possibility curve shifts outward to the new position, U"V, and the two individuals are placed at point R on it.In movement from Q on the utility possibility curve UV to point R on the utility possibility curve U "V" the utility of A has increased and that of B has declined. But position R denotes greater social welfare on the basis-of Kaldor"s criterion when compared to the position Q on the original utility possibility curve UV because with UV as the utility possibility curve it is possible to move through mere redistribution of income from position R to position S where the individual B has been fully compensated for his loss of utility, the individual A is still better off as compared to position Q. To conclude, any change in the economy that moves the individuals from a position on a lower utility possibility curve to a position on a higher utility possibility curve increases social welfare.

20.3.2 Scitovsky Paradox

Scitovsky pointed out an important limitation of Kaldor-Hicks criterion that it might lead to contradictory results. He showed that, if in some situation, position B is shown to be an improvement over position A on Kaldor-Hicks criterion, it may be possible that position A is also shown to be an improvement over B on the basis of the same criterion.

For getting consistent results when position B has been revealed to be preferred to position A on the basis of a welfare criterion, then position A must not be preferred to position B on the same criterion. According to Scitovsky,Kaldor-Hicks criterion involves such contradictory and inconsistent results. Since Scitovsky was the first to point out this paradoxical result in Kaldor-Hicks criterion, it is known as "Scitovsky Paradox".

How Kaldor-Hicks criterion may lead to contradictory results in some situation is depicted in Figure 20.3. In this figure JK and GH are the two utility possibility curves which intersect each other. Now suppose that the initial position is at point C on JK.



Fig. 20.3 : Scitvosky Paradox

Further suppose that due to a certain policy change, utility possibility curve changes and takes the position GH and the two individuals find themselves at position D. Position D is superior to position C on the basis of Kaldor-Hicks criterion because from position D movement can be made through mere redistribution to position F at which individual B has been fully compensated but individual A is still better off as compared to the original position C. Thus movement from position C to position D satisfies Kaldor-Hicks criterion.

But, as has been pointed out by Scitovsky, reverse movement from position D on the new utility possibility curve GH to the position C on the old utility possibility curve JK also represents an improvement on Kaldor- Hicks criterion, that is, C is socially better than D on the basis of Kaldor- Hicks criterion. This is because from position C movement can be made by mere redistribution of income to position E on the utility possibility curve JK on which position C lies and which also passes through the position E. And, as will be observed from Fig. 20.3, that at position E while A is as well of as at position D, the individual B is still better off than at D.

We thus see that the movement from position C to the position D due to a policy change is passed by the Kaldor-Hicks criterion and also the movement back from position D to position C is also passed by the Kaldor-Hicks criterion. This implies that D is socially better than C on this criterion and C is also socially better than D on the same criterion. So Kaldor-Hicks criterion leads us to contradictory and inconsistent results.

It is mention worthy that these contradictory results are obtained by Kaldor-Hicks criterion when following a policy change new utility possibility curve intersects the former utility possibility curve. After bringing out the possibility of contradictory results in Kaldor-Hicks criterion

Scitovsky formulated his own criterion which is generally known as Scitovsky's Double Criterion.

20.3.3 Scitovsky's Double Criterion of Welfare:

To rule out the possibility of contradictory results in Kaldor-Hicks criterion Scitovsky formulated a double criterion which requires the fulfillment of Kaldor-Hicks criterion and also the fulfillment of the reversal test. It means that a change is an improvement if the gainers in the changed situation are able to persuade the losers to accept the change and simultaneously losers are not able to persuade the gainers to remain in the original situation.

Scitovsky"s double criterion can also be explained with the help of utility possibility curve. In Figure 41.4, CD and EF are the two utility possibility curves which do not intersect each other at any point. Suppose there is a change from position Q on the utility possibility curve CD to the position G on the utility possibility curve EF as a result of the adoption of a new economic policy.

Such a movement is an improvement on Kaldor-Hicks criterion because G lies on the utility possibility curve EF passing through point R. From the position G, movement can be made to the position R simply by redistributing income between the two individuals. And R is better than Q because the utility of both the individuals is greater at R as compared to the position Q. Thus the Kaldor-Hicks criterion is satisfied and therefore change from Q to G will increase social welfare.



Fig. 20.4 Scitovosky's Double Criterion

Now, let us see, what happens to the reversal test. It must also be satisfied, if the Scitovsky double test is to be fulfilled. That is, a movement from the position G back to the original position Q must not be passed by Kaldor-Hicks criterion if Scitovsky"s reversal test is to be satisfied. It is evident from Figure 20.4 that from position R we cannot move to any position on

the utility possibility curve CD merely through redistribution of income which is socially better than G (that is, which raises utility of either A or B, the utility of the other remaining constant or which raises the utility of both).

We thus see that while movement from position Q to G is passed by Kaldor-Hicks criterion, reverse movement from position G to position Q is not passed by Kaldor-Hicks criterion. Hence, in Figure 20.4 the movement from the position Q to G satisfies Scitovsky''s criterion. Thus when the two utility possibility curves are non-intersecting and change involves movement from a position on a lower utility possibility curve to a position on a higher utility possibility curve, the change raises social welfare on the basis of Kaldor-Hicks-Scitovsky criterion. This happens only when a change brings about increase in aggregate output or real income.

20.3.4 Critique of the Compensation Principle

The compensation principle as developed by Kaldor, Hicks and Scitovsky, has been a topic of much discussion in welfare economics since 1939. Prof. Kaldor was the first to give a criterion to judge the changes in social welfare when an economic change benefits some people and harms the others.

Later Hicks also supported this criterion in 1940, though he put it in different words. Scitovsky tried to improve the Kaldor-Hicks criterion by formulating his own double criterion. These welfare economists have claimed that they have succeeded in developing a welfare criterion based on ordinal concept of utility and also which is free from any value judgements. But compensation principle has been bitterly criticised by the various welfare economists on the following grounds:

1. Ignores income distribution:

The Kaldor-Hicks compensation principle, according to Dr. Little, is merely a definition and not a "test" of increase in welfare because it ignores income distribution. In fact, the problem of distribution cannot be ignored where the problem of productive efficiency is involved. To say that one "bundle of goods" is greater than the other is meaningless without reference to income distribution. For any comparison between two bundles of goods involves their money values at their market prices.

2. Measures only potential welfare:

In trying to separate production from distribution, this criterion confuses potential welfare with actual welfare. It simply measures potential welfare changes associated with changes in any particular bundle of goods. The actual welfare depends not only on the production of goods and services but also on their distribution. The compensation principle errs in neglecting the distributional aspect. It measures only the potential welfare which does not serve any practical purpose.

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3. No common standard of value:

Prof. Baumol opines that when more than two commodities are involved, optimum production is not possible unless there is a common standard of value for measuring different commodities. But such a standard depends on income distribution which the compensation principle neglects. In such a situation, says Prof. Baumol, one has to use a standard that "bends and stretches and falls to pieces in our hands."

4. Not free form Interpersonal Comparisons:

Kaldor, Hicks and their followers failed in their efforts to find out a value-free criterion. The Kaldor-Hicks criterion is based on the assumption that the "social value of money" is the same in the hands of both the rich and the poor. Moreover, money is not actually transferred but remains with the better off. Thus this criterion has a utilitarian scheme of ethics and involves interpersonal comparisons of utility. In fact, as pointed out by Dr. Nath, the attempts of Kaldor and others who followed him were foredoomed as "no prescriptions can be derived without starting from some ethical premises."

5. Based on Long-Run Welfare Adjustments:

Little and Scitovsky have criticised Hicks for suggesting long-run welfare adjustments which would have insignificant real income distribution effects. Moreover, the effects would be random so that they cancel out in the long-run. Scitovsky agrees with Little that some of the changes which might pass the Kaldor-Hicks criterion will have quite sufficient real income distribution effects, so that it would be, at best, wishful thinking to suppose that they would cancel out with the effects of other changes. If, however, the time period is long enough, even the people who are better off would be dead and this criterion then becomes meaningless.

6. Does not Involve Actual Compensation:

This criterion does not take into consideration the payment of actual compensation. It recognises only potential compensation with which actual increase in welfare cannot be measured. Therefore, actual compensation is necessary so that no individual remains a loser. But the payment of actual compensation involves many administrative problems which render this criterion impracticable.

7. No Universal Validity:

Scitovsky has criticised Kaldor for the view that the state is fully responsible for maintaining an equitable distribution of income. If there is unequal income distribution in a community, it is corrected as a matter of course by the state through a system of compensations. According to Scitovsky, "This is likely to be the case in a socialist economy." But in a free enterprise economy, the effects of a certain economic reorganization on efficiency and equity cannot be

separated because compensation payments are not feasible politically. Thus the Kaldor-Hicks criterion has no universal validity, according to Scitovsky.

Self Check Exercise-1

- Q1. Discuss Kaldor-Hicks Welfare Criterion or Compensation Principle.
- Q.2 Discuss Scitovsky Paradox.
- Q.3 Discuss Scitovsky's Double Criterion of Welfare.
- Q.4 Give Criticism of the Compensation Principle

20.4 Bergson Social Welfare Criterion:

The concept of social welfare function was first introduced by Prof. Bergson and later on developed by Samuelson, Tintner and Arrow. They are of the view that no meaningful propositions can be made in welfare economics without introducing value judgments. The concept of social welfare is an attempt at providing a scientifically normative study of welfare economics.

A social welfare function shows the factors which the welfare of a society is supposed to depend. Bergson defines it "as a function either of the welfare of each member of the community or of the quantities of products consumed and services rendered by each member of the community."In its original form the Bergson social welfare function is formulated in a completely general manner. It is a function which establishes a relation between social welfare and all possible variables which affect each individual"s welfare, such as a services and consumption of each individual. It is an ordinal index of society"s welfare and is a function of individual utilities. It is expressed as

 $\mathbf{W} = \mathbf{F} \left(\mathbf{U}_1, \mathbf{U}_2, \dots, \mathbf{U}_n \right)$

where W is the social economic welfare,

F is for function, and

W is an increasing function of these utilities.

The general properties of the social welfare function are similar to those of an individual utility function. In particular, the value of the welfare index increases whenever the utility level of one individual is increased without lowering that of the other individual. Thus the social welfare function is consistent with the Pareto optimality criterion, but it goes much further, since it assigns a value to every economic state, including those which according to the Pareto criterion are regarded as non-comparable. The existence of a social welfare function, therefore, implies a comparison of the welfare position of the individual members of society.

20.4.1 Assumptions of Social Welfare Function

The Bergson"s social welfare function is based on certain assumptions:

(a) It assumes that social welfare depends on each individual"s wealth and income and each individual"s welfare depends, in turn, on his wealth and income and on the distribution of welfare among the members of the society.

(h) It assumes the presence of external economies and diseconomies with their consequent effects.

(c) It is based on ordinal ranking of combinations of those variables which influence individual welfare.

(d) Interpersonal comparisons of utility involving value judgments are freely permissible.

Given these assumptions, it is possible to depict the social welfare function on a diagram by drawing a series of "well-behaved social indifference curves" with commodities measured along the two axes. Each indifference curve shows various distributions of utility among individuals which have the same level of social welfare. Such curves help the policy maker to find out whether a particular policy brings an improvement or not. If a change moves individuals to a higher indifference curve, social welfare is said to have increased.

The social welfare function is explained diagrammatically in terms of Figure 20.5. FF_1 is the utility frontier which represents the boundary of all utility combinations possible with the given resources of the economy. It is an envelope of a number of overlapping utility possibility curves. W, W_1 and W_2 form the family of curves representing the social welfare function. Each welfare curve shows a locus of welfare combinations of the utilities of two individuals A and B who are indifferent.



Each welfare curve represents a level of social welfare. The welfare curve W_1 depicts a higher level of social welfare than curve W and W_2 higher level than W_1 . The point of maximum social welfare or optimum position is one where the utility frontier curve FF, is tangent to the welfare curve. In the figure, point E clearly represents the situation of maximum social welfare or the bliss point.

Within the constraints of given technology and fixed quantities of inputs, of all the welfare combinations open to society, E has the highest social value. Point i is on a lower welfare curve W and represents a lower level of social welfare, whereas point C on the W_2 curve is beyond the utility frontier FF, of the society. Thus point E represents maximum social welfare.

20.4.2 Criticism of Social Welfare Function

The assumptions of the Bergson criterion have tended to make the social welfare function "as broad and empty as language itself —and as necessary," according to Samuelson. Others have hailed it "as a major contribution to welfare economics", while for Dr. Little, it completes the formal mathematical system of welfare economics. Scitovsky regards it as "completely general".

Baumol judges it as "right, not very helpful," while to Robertson it is a "vast partly coloured mathematical balloon". Paul Streeten praises it as "a device which is supposed to purify economic investigation of all vestiges of unscientific matter". In the intermingling of these approvals and half- approvals are to be found the following limitations of these criterions.

(1) Not Applicable either to a Totalitarian State or a Democratic One:

The social welfare function is analogous to the individual consumer"s utility function which provides a ranking-,,from the point of view of a benevolent despot, or a complete egoist, or all men of goodwill"— of alternative utility levels enjoyed by different individuals. But Little regards it as inapplicable in a totalitarian state and more so in a democratic one "where there would be as many (vague) welfare functions as there are individuals. It can be regarded only as ,,a formal device necessary to a perfectly general abstract system of welfare," which bears no relation to practical policy."

(2) Construction of Welfare Function Difficult:

Another difficulty arises with regard to the construction and shape of the welfare function. The social welfare function is constructed by aggregating each individual"s preferences. But the problem is whether individual preferences should be given equal or different weights. This makes the construction of the social welfare function a difficult task.

(3) Arbitrary and Imaginary:

The representation of the social welfare function in terms of either equations or social an indifference curve does not help solve the problem because individual welfare functions cannot be known. Therefore, all equations and curves representing the social welfare function are arbitrary and imaginary.

(4) The Concept of "Maximum ' without any Empirical Significance:

According to Little, "The maximum is a concept without any possible empirical significance, and therefore it seems preferable not to use it. It is more meaningful to derive the "optimum" conditions as sufficient conditions for an improvement with- out attempting to define a maximum position."

(5) Contradictory Results:

Prof. Arrow points out that the construction of a social welfare function on the basis of ordinal preferences leads to contradictory results if individuals are required to make choices from among more than two alternatives.

(6) Not Helpful in Solving Problems:

According to Prof. Baumol, "The social welfare function does not come equipped with a kit and a set of instructions for collecting the welfare judgments which it requires." Thus it is not of much help in solving the main problems of welfare economics.

Self Check Exercise-2

- Q1. Discuss Bergson Social Welfare Criterion.
- Q.2 Give Criticism of Social Welfare Function

20.5 Summary

The modern economists like Kaldor, Hicks and Scitovsky have made efforts to evaluate the changes in social welfare resulting from any economic re-organisation which harms somebody and benefits the others. These economists have sought to remove indeterminacy in the analysis of Pareto optimality. They have put forward a criterion known as the "compensation principle" which states that if a change makes some people better off and the others worse off, then that change will increase the social welfare if those who gain from the change could compensate the losers and still be better off. A social welfare function shows the factors which the welfare of a society is supposed to depend. Bergson defines it "as a function either of the welfare of each member of the community or of the quantities of products consumed and services rendered by each member of the community."

20.6 Glossary

- **Hicks' Criterion**: An activity will contribute to Pareto optimality if the maximum amount the losers are prepared to offer to the gainers in order to prevent the change is less than the minimum amount the gainers are prepared to accept as a bribe to forgo the change.
- **Kaldor Criterion**: An activity will contribute to Pareto optimality if the maximum amount the gainers are prepared to pay is greater than the minimum amount that the losers are prepared to accept.
- Social Welfare Function: A function that measures the material welfare of a society using a number of economic variables.

- Value Judgment: Ethical beliefs of people about what is good or bad, not based on scientific logic or law.
- **Contract Curve:** is the set of points representing final allocations of two goods between two people that could occur as a result of mutually beneficial trading between those people given their initial allocations of the goods.

20.7 Answers to Self-Check Exercises

Self Check exercise -1

Ans.1. Refer to Section 20.3

Ans.2. Refer to Section 20.3.2

Ans.3. Refer to Section 20.3.3

Ans.4. Refer to Section 20.3.4

Self Check exercise -2

Ans.1. Refer to Section 20.4

Ans.2. Refer to Section 20.4.2

20.8 References/ Suggested Readings

- H. L. Ahuja. (1997). Advanced Economic Theory, New Delhi. S.C.Chand& Company Ltd.
- Paul A. Samuelson. (1947). Foundations of Economic Analysis. 1983 edition, Cambridge, Mass: Haward University Press.
- S. K. Nath. (1969). A Re-appraisal of Welfare Economics, London: Routledge and Kegan Paul Ltd.

20.9 Terminal Questions

- 1. Critically evaluate compensation criteria. Do they serve any purpose in welfare analysis? Explain.
- 2. Discuss the Bergson"s Social Welfare Criterion in detail. Also write its criticism.