

MICRO ECONOMICS - I
I SEMESTER
CORE COURSE
BA ECONOMICS

(CUCBCSS - 2014 Admission)

UNIVERSITY OF CALICUT

SCHOOL OF DISTANCE EDUCATION

**Calicut university P.O, Malappuram Kerala, India
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UNIVERSITY OF CALICUT

SCHOOL OF DISTANCE EDUCATION

STUDY MATERIAL

Core Course

BA ECONOMICS

I Semester

MICRO ECONOMICS - I

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MODULE-I

INTRODUCTION TO ECONOMICS

OBJECTIVES

The main objective of this is to present an easy and yet comprehensive approach to the students of economics at the under graduate level. After going through this Module, you will be able to:

- Understand what Microeconomics deals about?
- The theory of model building
- Positive and normative analysis
- Induction and deduction methods

Brief Outline

Welcome to the *science of economics*. Yes, economics is a social science, like chemistry is a physical science. It is true that there are no test tubes and sophisticated equipment required to study economics, but Just as physical sciences are means to understand how the real physical world around us works - our planet, the solar system or the universe - in economics, we try to understand how the economy of a particular region, a country or the global economy works. There are principles or laws of economics (parallel to laws of Chemistry or physics). With the help of these principles, we analyze how an economy works.

What is economics after all? There is no universally accepted, single, definition of it. But we can understand what it is about. Many non-economists think that it only concerns the matters of money - how to make or manage money. Not true. Economics is about making choices in the presence of scarcity. The notions "scarcity" and "choice" is very important in economics. You may not see these words in all chapters to come, but they are in the background throughout. Scarcity and choice go together if things were available in plenty (literally) then there would have been no choice problem; you can have anything you want.

Unfortunately, this may be true only In heaven, not in the real world. Even the richest person on earth would have to face scarcity and make choice. If nothing else, time is scarce. Ratan Tata, a leading Industrialist of India, between 6 p.m. and 8 p.m. in a particular evening, may have to decide whether to go to a musical concert, or just keep working in his office. Think about the length of syllabi of various subjects that you have to cover before the final exam. We do not need to convince you that time is scarce. Likewise, food, clothing, housing, clean air, drinkable water

etc. are scarce in every country in the world, except that the degree of scarcity varies. The point is that *problems of choice arise because of scarcity*. The study of such "choice problems", at the individual, social, national and international level is what economics is about.

NATURE AND SCOPE OF MICROECONOMICS

Microeconomics is the branch of economics based on the economic behaviour of small economic units: consumers, workers, savers, business managers, firms, individual industries and markets. Microeconomics, however, is not limited to small issues. Instead, many 'big issues' can best be understood using microeconomics by recognizing that they are composed of numerous smaller parts. Much of our knowledge of economics is on the study of individual behaviour.

Microeconomics studies how choices are made at the individual level under conditions of scarcity. If there was no scarcity, there would be no need to make choices. Choice must be made from among alternatives. If there are no alternatives available, then the freedom to choose has little meaning.

Microeconomics encompasses the factors that influence the decisions made by millions of individuals and the way these innumerable decisions merge to determine the workings of the entire economy. Consumers decide how much of various goods to purchase, workers decide what jobs to take, and firms decide how much output to produce.

Microeconomics examines the allocation decisions of individual consumers and firms. Consumers and firms are guided by the objective of maximization of satisfaction and profits respectively. Since markets are important in the maximization efforts of both consumers and firms, microeconomics studies the markets in detail. The understanding of individual behaviour provides the basis for understanding markets, since a market is comprised of many individual agents.

Microeconomic theory is capable of dealing with some of the most important social issues of the day. The important among them are environmental pollution, poverty and welfare programmes, monopolies and consumer wellbeing, labour unions and real wages, rising medical expenditure, discrimination in employment, energy problems, taxation and work incentives.

QUESTIONS AND ANSWERS

Multiple Choice Questions

1. Who coined the prefixes Micro and Macro into economics?
a) Marshall b) Keynes c) Frisch
- 2) Microeconomics deals with.....
a) The theory of factor pricing
b) The theory of economic welfare

- c) All the above

Very Short Answer Questions

1. What is microeconomics?

The term 'micro' is derived from the Greek word 'Mikros' which means 'small'. It was, for the first time, used in economic literature by Ragnar Frisch of Oslo University in 1933. Microeconomics as a specialized branch of economics is developed largely by the efforts of Adam Smith. Microeconomics is the branch of economics based on the economic behaviour of small economic units. The economic units studied in microeconomics are consumers, workers, savers, business managers, firms, individual industries and markets. Consumers decide how much of various goods to purchase, workers decide what jobs to take, and business people decide how many workers to hire and how much output to produce. Microeconomics encompasses the factors that influence these choices and the way these innumerable small decisions merge to determine the workings of the entire economy. Because of the important effects that prices have on these individual decisions, microeconomics is frequently called *price theory*.

2. What are the uses of Microeconomics?

The uses of microeconomics are the following:

- a) Microeconomics is useful in analyzing how prices are determined in different markets and how resources are allocated to various uses.
- b) Microeconomic theory can be used as basis for conditional predictions. For example, if the demand curve is negatively sloped and supply curve is positively sloped, then a price rise above the equilibrium price will create a surplus on the market.
- c) Microeconomic theory provides the analytical tools for economic policies affecting prices and production. The effect of government policies on prices of commodities and wages and their impact on the allocation of resources can be analyzed with the help of microeconomics.
- d) Microeconomics can be used to examine the conditions of economic welfare. Economic welfare consists of the subjective satisfactions that individuals get from consuming goods and services and from enjoying leisure. It can suggest methods to raise the level of consumption of goods and services.
- e) Microeconomics is useful in decision making in the employment of resources in government programmes. Because of the availability of the tested methods of analyzing costs and benefits of a programme, price theory can help the decision makers in achieving efficiency in the use of scarce resources.

3) Explain deductive methods

Generalizations in economics have been divided in two ways: Deductive Method and Inductive Method.

Deductive Method

The deductive method is also called abstract, analytical and a priori method and represents an abstract approach to the derivation of economic generalizations and theories. The principal steps in the process of deriving economic generalizations through deductive logic are: (a) perception of the problem to be enquired into; (b) defining precisely the technical terms and making appropriate assumptions, often called postulates or premises; (c) deducing hypotheses, that is deriving conclusions from the premises through the process of logical reasoning; and (d) testing of hypothesis deduced.

Short Essay Questions

1. Explain the scope of Microeconomics.

The term 'micro' is derived from the Greek word 'Mikros' which means 'small'. It was, for the first time, used in economic literature by Ragnar Frisch of Oslo University in 1933. Microeconomics as a specialized branch of economics is developed largely by the efforts of Adam Smith. Microeconomics is the branch of economics based on the economic behaviour of small economic units. The economic units studied in microeconomics are consumers, workers, savers, business managers, firms, individual industries and markets. Consumers decide how much of various goods to purchase, workers decide what jobs to take, and business people decide how many workers to hire and how much output to produce. Microeconomics encompasses the factors that influence these choices and the way these innumerable small decisions merge to determine the workings of the entire economy. Because of the important effects that prices have on these individual decisions, microeconomics is frequently called *price theory*.

2. Explain the importance of microeconomics.

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3. What is an economic model? Explain its types

A model is a set of relationships among economic variables. It is constructed to represent the important features of the economy. A model simplifies reality by abstracting from details and focusing attention on the essential relationships. Economic models may take the form of verbal

statements, numerical tables, graphs or mathematical equations.

Types of Economic Models

Economic models are broadly classified into microeconomic models and macroeconomic models.

Microeconomic Model

Microeconomic models are based on assumptions about the behaviour of individual persons. Microeconomic models abstract from the real world when used for analyzing an actual problem. Microeconomic models are deductive models because microeconomics is concerned primarily with deducing a set of conclusions from a set of assumptions. Microeconomic models are used to predict how different economic decision makers respond to different economic conditions."

Macroeconomic Model

The basic tool of macroeconomics is the macroeconomic model. A macro model is a simplified representation of the economy. Instead of attempting to represent a real economy, the model describes an economy that has some of the aspects of a real one. A macroeconomic model is a systematic way of representing the behaviour of households, firms, and governments.

4. Distinguish between deductive and inductive methods

The methods used to construct economic theories have been derived in two:

Deductive Method, and Inductive Method.

1. Deductive Method

The deductive method is also called abstract, analytical and a priori method and represents an abstract approach to the derivation of economic generalizations and theories. The principal steps in the process of deriving economic generalizations through deductive logic are: (a) perception of the problem to be enquired into; (b) defining precisely the technical terms and making appropriate assumptions, often called postulates or premises; (c) deducing hypotheses, that is deriving conclusions from the premises through the process of logical reasoning; and (d) testing of hypothesis deduced.

2. The Inductive Method

The inductive method which is also called empirical method derives economic generalisations on the basis of experience and observations. In this method detailed data are collected with regard to a certain economic phenomenon and effort is then made to arrive at certain generalisations which follow from the observations collected. But it is worth mentioning that the number of observations has to be large if it can yield a valid economic generalization. One should not generalize on the

basis of a very few observations.

Essay Questions

1. Explain the meaning, nature and scope of Microeconomics.

Meaning of Microeconomics

The term 'micro' is derived from the Greek word 'Mikros' which means 'small'. It was, for the first time, used in economic literature by Ragnar Frisch of Oslo University in 1933. Microeconomics as a specialized branch of economics is developed largely by the efforts of Adam Smith. Microeconomics is the branch of economics based on the economic behaviour of small economic units. The economic units studied in microeconomics are consumers, workers, savers, business managers, firms, individual industries and markets. Consumers decide how much of various goods to purchase, workers decide what jobs to take, and business people decide how many workers to hire and how much output to produce. Microeconomics encompasses the factors that influence these choices and the way these innumerable small decisions merge to determine the workings of the entire economy. Because of the important effects that prices have on these individual decisions, microeconomics is frequently called *price theory*.

Nature and Scope of Microeconomics

Microeconomics is the branch of economics based on the economic behaviour of small economic units: consumers, workers, savers, business managers, firms, individual industries and markets. Microeconomics, however, is not limited to small issues. Instead, many 'big issues' can best be understood using microeconomics by recognizing that they are composed of numerous smaller parts. Much of our knowledge of economics is on the study of individual behaviour.

Microeconomics studies how choices are made at the individual level under conditions of scarcity. If there was no scarcity, there would be no need to make choices. Choice must be made from among alternatives. If there are no alternatives available, then the freedom to choose has little meaning.

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Microeconomics examines the allocation decisions of individual consumers and firms. Consumers and firms are guided by the objective of maximization of satisfaction and profits respectively. Since markets are important in the maximization efforts of both consumers and firms, microeconomics studies the markets in detail. The understanding of individual behaviour provides the basis for understanding markets, since a market is comprised of many individual agents.

Microeconomic theory is capable of dealing with some of the most important social issues of the day. The important among them are environmental pollution, poverty and welfare programmes, monopolies and consumer wellbeing, labour unions and real wages, rising medical

expenditure, discrimination in employment, energy problems, taxation and work incentives.

Importance or Uses of Microeconomics

Microeconomics is useful in analyzing how prices are determined in different markets and how resources are allocated to various uses.

Microeconomic theory can be used as basis for conditional predictions. For example, if the demand curve is negatively sloped and supply curve is positively sloped, then a price rise above the equilibrium price will create a surplus on the market.

Microeconomic theory provides the analytical tools for economic policies affecting prices and production. The effect of government policies on prices of commodities and wages and their impact on the allocation of resources can be analyzed with the help of microeconomics.

Microeconomics can be used to examine the conditions of economic welfare. Economic welfare consists of the subjective satisfactions that individuals get from consuming goods and services and from enjoying leisure. It can suggest methods to raise the level of consumption of goods and services.

Microeconomics is useful in decision making in the employment of resources in government programmes. Because of the availability of the tested methods of analyzing costs and benefits of a programme, price theory can help the decision makers in achieving efficiency in the use of scarce resources.

Limitations of Microeconomics

- a) Microeconomic analysis is based on the assumption of full employment.
- b) Microeconomic theories are applicable to laissez-faire capitalism characterized by perfect competition. Since laissez-faire and perfect competition is nonexistent, the applicability of microeconomics is limited.
- c) Microeconomics concentrates on the working of the part of an economy. Thus it is inadequate in providing an overall picture of the functioning of an economy.
- d) Microeconomic theories are inadequate in analyzing several economic problems. This is due to the fact that what is true of an individual unit need not be necessarily true of the economy as a whole.

2. What is microeconomics? Explain its scope and importance.

Refer the Answer of Section- III, Question 1

3. Explain the meaning, nature and scope of Microeconomics. What are its limitations?

Refer the Answer of Section- III, Question 1

4. What is an economic model? Distinguish between endogenous and exogenous variables of a model. Explain its uses.

A model is a set of relationships among economic variables. It is constructed to represent the important features of the economy. A model simplifies reality by abstracting from details and focusing attention on the essential relationships. Economic models may take the form of verbal statements, numerical tables, graphs or mathematical equations.

Types of Economic Models

Economic models are broadly classified into microeconomic models and macroeconomic models.

Microeconomic Model

Microeconomic models are based on assumptions about the behaviour of individual persons. Microeconomic models abstract from the real world when used for analyzing an actual problem. Microeconomic models are deductive models because microeconomics is concerned primarily with deducing a set of conclusions from a set of assumptions. Microeconomic models are used to predict how different economic decision makers respond to different economic conditions."

Macroeconomic Model

The basic tool of macroeconomics is the macroeconomic model. A macro model is a simplified representation of the economy. Instead of attempting to represent a real economy, the model describes an economy that has some of the aspects of a real one. A macroeconomic model is a systematic way of representing the behaviour of households, firms, and governments.

Concepts in Model Building

The fundamental concepts of a model are hypothesis, assumptions, abstraction and logical deduction.

- a. Hypothesis A hypothesis is a tentative statement about a relation between two events. A hypothesis is a tentative statement usually obtained from a casual observation of the real world, which may or may not be true. A hypothesis must be formulated in such a manner that its predictions can be tested.

For instance, if the price of a commodity rises, then the quantity demanded of the commodity declines.

- b. Assumptions in any science a model is built up from assumptions. Assumptions are untested hypotheses that are accepted as ground rules for purposes of testing the main hypothesis. In economics these assumptions refer to the behaviour of individuals. Assumptions need not be exact representations of reality. For example, in the model of consumer behaviour, it is assumed that a consumer is rational. In actual life a consumer may be irrational some times.
- c. Abstraction: Models are built by economists based on abstraction. Abstraction refers to the process of selecting a few variables and relationships that appear to be important for the

problem under consideration. Thus abstraction is helpful in discovering the reality by reducing the complexity of the real world.

- d. Logical Deduction Conclusions are *derived on the basis* of logical deduction. Logical deduction is *the process of drawing inferences* or valid reasoning for establishing the cause and effect relationship between variables.

Nature of Economic Models

In order to explain the behaviour of Individual consumer, producer or industry or of the economy as a whole the economists have constructed analytical models. An economic model usually consists of a set of equations that express relationships between variables that are relevant for the problem to be investigated. Each equation attempts to explain the behaviour of one variable, that is, it seeks to establish cause and effect relationship in respect of an individual variable. It is worth mentioning that causation does not always run in one direction. There is a mutual relationship among various variables, that is, a variable influences the other variables and in turn is influenced by them. For instance, consumption depends upon income and also consumption being an important constituent of aggregate demand influences income. Therefore, in such a system values of various variables are to be determined simultaneously. Therefore, models which involve more than one equation attempt to solve these equations simultaneously.

Another noteworthy point about a model is that it does not represent the real economic world in its entirety; it only represents its main significant features. Thus, a model is an abstraction from reality. In order to build a model, one has to make some unrealistic assumptions to simplify it. Indeed, the real economic world is too complex to be represented by a model which would reflect all its features. Therefore, one has to abstract from reality to some extent so that some useful and meaningful features of reality are brought out. However, a model is not a complete abstraction from reality; it abstracts from reality in some ways in order to pinpoint those features of reality which are significant and useful for explaining the behaviour of a consumer, producer or the economic system as a whole.

Now, an important question is why economists are interested in building models. Economic models are built for purposes of (a) *analysis* and (b) *prediction*. By analysis we mean how adequately we can explain the behaviour of an economic agent that is consumer, producer or the economic system. From a set of assumptions we derive through deductive logic certain laws which describe the behaviour of economic agents (consumer, producer or the whole economy) and which have a quite general application. On the other hand, prediction implies the ability of a model to forecast the effects of changes in some magnitudes in the economy. For instance, a model of price determination through demand and supply is generally used to forecast the effect of imposition of an excise duty or sales tax on the price of a commodity.

The validity of a model may be judged on the basis of either its explanatory or predictive power, or the realism of its assumptions, or the extent of its applicability (*Le.* its generality). Economists differ as to what is more important attribute of a valid model. According to Milton Friedman, the most important attribute of a model is its predictive power, that is, to what extent it can correctly predict the behaviour of an economic unit. If the model has a good predictive

power, then, according to his view, it is immaterial whether its assumptions are realistic or not. On the contrary Paul Samuelson is of the view that realism of assumptions and the analytical power of the model to explain the behaviour of consumers, producers or the economic system, are the essential attributes of a valid and satisfactory model. It may be noted that the general view among economists is that the most important attribute of a model depends on its purpose that is whether the model builder wants to use it for predicting the effect of a change in some variable or for analyzing and explaining the particular behaviour of an economic agent (consumer, producer or economic system). Realism of assumptions and explanatory power are important features of a good model if the purpose of the model is the explanation of why a system behaves as it does.

5. Explain briefly the deductive and inductive methods. What are its merits and demerits?

Economic generalizations describe the laws or statements of tendencies in various branches of economics such as production, consumption, exchange and distribution of income. In the view of Robbins, economic generalizations and laws are statements of uniformities which describe human behaviour in the allocation of scarce resources between alternative ends. The generalizations of economics, like the laws of other sciences, state a relationship between variables and describe those economic hypotheses which have been found consistent with facts or, in other words, have been found to be true by empirical evidence. But a distinction may be drawn between a generalization (law) and a theory. A generalization just describes the relationship between variables; it does not provide any explanation of the described relation. On the other hand, a theory provides an explanation of the stated relation between the variables, that is, it brings out the logical basis of the generalization. An economic theory or a model derives a generalization through process of logical reasoning and explains the conditions under which the stated generalization will hold true.

Generalizations in economics have been derived in two ways:

- (1) Deductive Method, and (2) Inductive Method.

1. Deductive Method

The deductive method is also called abstract, analytical and a priori method and represents an abstract approach to the derivation of economic generalizations and theories. The principal steps in the process of deriving economic generalizations through deductive logic are: (a) perception of the problem to be enquired into; (b) defining precisely the technical terms and making appropriate assumptions, often called postulates or premises; (c) deducing hypotheses, that is deriving conclusions from the premises through the process of logical reasoning; and (d) testing of hypothesis deduced.

- (a) Perception of the Problem. In any scientific enquiry, the analyst or theorist must have a clear idea of the problem to be enquired into. He must know the significant variables regarding whose behaviour and interrelationship he wants to derive generalizations. The perception of the problem is by no means an easy task.

b. Definition of Technical Terms and Making of Assumption. The next step in the process of deriving generalisations is to define precisely and unambiguously the various technical terms to be used in the analysis as well as to state clearly the assumptions or postulates he makes to derive generalisations. As mentioned above, assumptions may be behavioural pertaining to the behaviour of the economic variables or they may be technological relating to the state of technology and the factor endowments. The crucial assumptions are made on the basis of observations or introspection. A crucial assumption that has been made in economics is that consumers try to maximize their satisfaction and producers try to maximize their profits. Likewise, it is assumed that investors try to minimize their risk and maximize the expected rate of their profits. Some of the assumptions are made merely to simplify the analysis and may not be quite realistic. The actual economic world is quite complex and full of details in which numerous factors play a part and act and interact on each other. The introduction of simplifying assumptions is quite necessary in order to bring out the importance of really significant factors having a bearing on the problem under investigation. According to Prof. Boulding, economic theory represents just a 'map' of real world phenomenon and not a perfect picture of it. To quote him, "Just as we do not expect a map to show every tree, every blade of grass in a landscape, so we should not expect economic analysis to take into account every detail and quirk of real economic behaviour."¹

It, therefore, follows that each and every assumption made by a theory may not be realistic. The crucial factor in building up a valid theory is whether its predictions are corroborated by the facts in the world. A correct scientific theory or generalization must be expressed in form of a hypothesis that is inconceivably refutable. As mentioned above, Professor Friedman in his now well-known article "The Methodology of Positive Economics" has expressed the view that undue importance should not be given to the 'realism' of assumptions. What matters most from the viewpoint of scientific theory, according to him is whether it enables us to predict accurately.

C. Deducing Hypotheses through Logical Deduction. The next step in deriving generalisations through deductive logic is deducing hypotheses from the assumptions or premises taken. A hypothesis describes relationship between factors affecting a phenomenon; it establishes cause and effect relationship between the variables having a bearing on the phenomenon. Then through logical process, hypothesis is deduced from the assumptions made. This logical reasoning may be carried out verbally or it may be conducted in symbolic terms using the language of what is known as symbolic logic. The geometric or graphic technique is also usually employed to deduce the hypotheses about the relationship between factors besides, the process of logical deduction may be done with the help of more formal mathematics. Nowadays in almost all branches of modern economics, the mathematics as a tool of analysis for deriving economic theories and generalisations is being increasingly used. The use of mathematics in economic analysis proves extremely useful where geometrical methods make the analysis more complicated to comprehend. Besides, the use of mathematical method makes the derivation of economic hypotheses more rigorous and exact.

It is worthwhile to note that in deriving analytically sound hypotheses, one should guard against committing logical fallacy in the process of logical deduction. For instance, it is inappropriate to

conclude that A must be the cause of B if A happens to precede B. Further, it is logically fallacious to argue that since there exist a high degree of correlation between the two factors, say between the supply of money and the general price level, the former must be the cause of the latter, unless the causation must be logically developed.

d. Testing or Verification of Hypotheses. Hypotheses obtained above have to be verified before they are established as generalisations or principles of economics. For the verification of hypotheses, economists cannot make controlled experiments, because they have to discern uniformities in behaviour patterns of man. As we cannot make experiments with man under controlled conditions, such as in laboratories as physical scientists make experiments with inanimate objects of nature and biologists make these with animals and plants. Therefore, economists have to rely on correct, this prediction does not enable us to forecast accurately next year output (still less the harvest in the more distant future), which in the event will be affected by many factors besides changes in price."

Testing of Economic Hypotheses through Econometrics In recent years a very useful method to test economic hypothesis has been developed. This is the *statistical method* or what is now popularly called econometric method. The statistical or econometric method to verify and establish the theoretical generalisations occupy an important place because, there is limited applicability of controlled experimentation in economics. The various statistical methods such as regression analysis have been developed to empirically test the economic hypotheses on the basis of collected economic data. The merit of econometrics is that the degree of functional relationship between relevant economic variables in precise quantitative terms is obtained by it and also the level of significance of the results can also be estimated. Recently, econometric method has been used to establish the precise relationships between money supply and the price level, quantity of money and the national income, consumption and income, capital accumulation and rate of economic growth and so forth.

It may, however, be pointed out that statistical analysis or econometrics alone cannot be used to derive and establish economic principles and theories. Economic hypotheses or theories must be developed logically before we can meaningfully use statistical analysis to test and verify them. Indeed, theory or hypothesis is needed before the selection of the relevant facts and data regarding relevant variables which can be subjected to empirical testing through the methods of econometrics. Prof. Myrdal is quite right, when he says, "Theory, therefore, must always be *a priori* to the empirical observation of facts. Facts come to mean something only as ascertained and organized in the frame of a theory. Indeed, facts as part of scientific knowledge have no existence outside such a frame. Questions must be arranged logically, to make sense and it helps to understand social reality.

Merits and Demerits of Deductive Method

The deductive approach to establish economic generalisations was extensively used by Classical and Neo-Classical economists such as Ricardo, Malthus, Senior, J. S. Mill, Marx, Marshall and Pigou. It still remains popular with modern economists as it has several merits.

- First, useful mathematical techniques can be employed to derive generalisations of economics. With the aid of rigorous mathematical logic, economic theories can be developed through the process of deduction which can successfully explain economic phenomena.
- Secondly, through deductive logic useful economic theorems can be derived without the tenuous and detailed collection and analysis of data which are required under the alternative inductive method. Thus, as compared to inductive method, method of deduction is less time consuming and less expensive.
- Thirdly, in view of the limited scope for controlled experimentation in economics, the method of deduction is an extremely useful method of deriving generalisations. This is because multiplicity of forces acts simultaneously on an economic phenomenon and it is not possible to eliminate some of these by means of a controlled experiment. This indicates the crucial importance of deductive logic for building up economic principles or generalisations. Fourthly, the use of sophisticated mathematical methods in the deductive approach enables the economists to introduce accuracy and exactness in economic principles and theories.

In spite of the above-mentioned merits, shortcomings of the deductive approach should not be overlooked.

- The use of deductive method in deriving economic generalisations requires the use of a high-level competence in logic and theoretical abstraction. A good deal of care and objectivity is needed to avoid bad logic or faulty economic reasoning.
- Further, a great demerit of deductive approach is that with it highly sophisticated theoretical models based on highly unrealistic assumptions may be developed which do not have any operational significance. Indeed, such highly irrelevant analytical models with little empirical content and incapable of being used for policy formulation have in fact been developed by economists. Such models are no more than mere "intellectual toys". If economics is to serve as an instrument of social betterment, building of such theoretical models having no operational use should be avoided.
- Lastly, in the derivation of economic hypotheses and conclusions through deductive logic, assumptions play a crucial role. If the assumptions made are such that when on removing them, economic hypothesis based on them is refuted, then making of these assumptions is not valid. Thus, one who uses deductive approach should always keep in mind to what extent the validity of generalisations derived depends on the assumptions made. For instance, the Keynesian macro-analysis is based upon the assumption of a depression-ridden capitalist economy with a lot of excess productive capacity. Therefore, a positive harm has been done in applying the Keynesian theories in the context of developing countries such as ours where the assumptions made by Keynes do not hold good. Hence, mere "deductive arm-chair analysis" should be avoided, if the scientific character of

economics is to be maintained.

The Inductive Method

The inductive method which is also called empirical method derives economic generalisations on the basis of experience and observations. In this method detailed data are collected with regard to a certain economic phenomenon and effort is then made to arrive at certain generalisations which follow from the observations collected. But it is worth mentioning that the number of observations has to be large if it can yield a valid economic generalization. One should not generalize on the basis of a very few observations.

Conclusion: Integration of Two Methods

Now, the controversy which existed among the earlier economists as to whether deductive or inductive approach is more appropriate in developing economic theories and principles has been resolved. The modern viewpoint in this regard is that both are needed for the proper development of scientific economic theories. Indeed, the two are complementary rather than competitive. The modern economists first derive economic hypotheses through the process of logical deduction and then empirically test them through statistical or econometric methods. Marshall rightly pointed out, "induction and deduction are both needed for scientific thought as the right and left foot are both needed for walking."¹

Empirical studies made through statistical or inductive method without a theoretical hypothesis to serve as a guide for the selection of data are quite useless. The derivation of economic generalisations through the approach of deductive logic without empirically testing them through inductive method is also not quite proper. Empirical studies made in inductive approach also bring to light significant economic facts or phenomena which require analytical explanation through deductive logic. For instance, *Farm Management Studies* in India in the mid fifties led to the discovery of a fact that output per acre on the small-sized farms is higher than that on large farms. This led to the various theoretical explanations of the phenomenon observed in the empirical studies. On the other hand, a theory or hypothesis is first developed through deductive logic from some assumptions and then predictions based on the hypothesis are tested through inductive or statistical method. If the predictions are found to be consistent with facts, the hypothesis or theory stands proved and if the predictions of the theory are found to be inconsistent with facts, it stands rejected.

6. Explain briefly about positive and normative analysis.

Often, economists are asked to explain the causes of economic event. Why? For example, is unemployment higher for teenagers than for older workers? Sometimes economists are asked to recommend policies to improve economic outcomes. What, for instance, should the government do to improve the economic well-being of teenagers? When economists are trying to explain the world, they are scientists. When they are trying to help improve it, they are policy advisers.

To help clarify the two roles that economists play, we begin by examining the use of language. Because scientists and policy advisers have different goals, they use language in different ways.

For example, suppose that two people are discussing minimum-wage laws. Here are two statements you might hear:

POLLY: Minimum-wage laws cause unemployment.

NORMA: The government should raise the minimum wage.

Ignoring for now whether you agree with these statements, notice that Polly and Norma differ in what they are trying to do. Polly is speaking like a scientist: She is making a claim about how the world works. Norma is speaking like a policy adviser: She is making a claim about how she would like to change the world. In general, statements about the world are of two types. One type, such as Polly's, is positive. Positive statements are descriptive. They make a claim about how the world is. A second type of statement, such as Norma's, is normative. Normative statements are prescriptive. They make a claim about how the world ought to be. A key difference between positive and normative statements is how we judge their validity. We can, in principle, confirm or refute positive statements by examining evidence. An economist might evaluate Polly's statement by analyzing data on changes in minimum wages and changes in unemployment over time. By contrast, evaluating normative statements involves values as well as facts. Norma's statement cannot be judged using data alone. Deciding what is good or bad policy is not merely a matter of science. It also involves our views on ethics, religion, and political philosophy.

Positive and normative statements are fundamentally different, but they are often closely intertwined in a person's set of beliefs. In particular, positive views about how the world works affect normative views about what policies are desirable. Polly's claim that the minimum wage causes unemployment, if true, might lead her to reject Norma's conclusion that the government should raise the minimum wage. Yet normative conclusions cannot come from positive analysis alone; they involve value judgments as well.

As you study economics, keep in mind the distinction between positive and normative statements because it will help you stay focused on the task at hand. Much of economics is positive: It just tries to explain how the economy works. Yet those who use economics often have goals that are normative: They want to learn how to improve the economy. When you hear economists making normative statements, you know they are speaking not as scientists but as policy advisers.

MODULE-II

DEMAND AND SUPPLY ANALYSIS

OBJECTIVES

As a beginner, a degree student in economics is expected to understand from this module the behaviour economic agent, namely, consumer, a producer, a factor owner and price determination in the market. After going through this Module, you will be able to:

- Understand how consumer takes decision regarding how much to buy and at what price?
- What are the factors affecting the decision to buy?
- Concept of '*ceteris paribus*'
- What is supply and what are the factors affecting how much to offer for sale and what price to be charged?
- Responsiveness of economic agents to a change in price and its classification.
- Categorization goods

Demand and supply are the two forces through which market economy functions. In a market economy what goods are produced and in what quantities are determined by demand for and supply of various goods. In a competitive market, prices of goods and services are determined through interaction of demand for and supply of them. The prices in turn influence demand for and supply of goods and play an important role in allocation of scarce resources in a market economy. Demand and supply describe how buyers of goods (that is, households) and producers or sellers of goods (i.e. firms) behave in response to changes in prices of goods and other factors. In this chapter we will explain the concepts of demand and supply and the factors which determine them. We will also explain how relative prices of goods are determined through interaction of demand for and supply of them.

The concepts of demand and supply that have been evolved refer to the markets where competition prevails both among the buyers of goods and sellers of goods. A market, as understood in economics, is not a particular place where buyers and sellers meet each other to buy and sell goods or services. A market is an arrangement by which buyers and sellers contact each other to make any transaction. This contact may be through personal meeting but more often in modern times it is through telephone, fax, e-mail etc. In the concepts of demand and supply it is generally assumed that there is a competitive market for goods and services. A competitive market is one in which there is a large number of buyers and sellers so that no one can affect the market price of a good or service. Each producer or seller produces or offers for sale only a little amount of a same or similar product. Therefore, if he charges a more than the prevailing market price, the buyers will buy the product from other

producers or sellers. In this competitive market, a seller has no incentive to charge less as he can sell all the amount of the product he can produce at the going price. Similarly, in this competitive market no buyer can affect the prevailing price in the market as he buys only a small quantity of the product

People demand goods because they satisfy their wants. The utility means the amount of satisfaction which a person derives from consuming a commodity. Utility is a subjective entity and resides in the minds of men. Being subjective it varies with different persons, that is, different persons derive different amounts of utility from a given good. People know utility of goods by means of introspection. The desire for a commodity by a person depends upon the utility he expects to obtain from it. The greater the utility he expects from a commodity, the greater his desire for that commodity. It should be noted that no question of ethics or morality is involved in the use of the word 'utility' in economics. The commodity may not be useful in the ordinary sense of the term; even then it may provide utility to some people. For instance, alcohol may actually harm a person but it possesses utility for a person whose want it satisfies. Thus, the desire for alcohol may be considered immoral by some people but no such meaning is conveyed in the economic sense of the term.

QUESTIONS AND ANSWERS

Essay Questions

- 7. What is demand? Why does the demand curve slopes downwards? What are the factors affecting demand?**

The Meaning of Demand

It is useful to know what economists mean by the demand for the goods by consumers. The demand for a commodity is essentially consumers' attitude towards a commodity. This consumers' attitude gives rise to actions in purchasing units of a commodity at various given prices. Precisely stated, the demand for a commodity is the amount of it that a consumer will purchase or will be ready to take off from the market at various given prices in a period of time such as a day, week, month or a year. Thus, demand in economics implies both the desire to purchase and the ability to pay for a good. It is noteworthy that mere desire for commodity does not constitute demand for it, if it is not backed by the ability to pay. For example, if a poor man who hardly makes both ends meet, wishes to have a car, his wish or desire for a car will not constitute the demand for the car because he cannot afford to pay for it, that is, he has no purchasing power to make his wish or desire effective in the market. Thus, in economics unless demand is backed by purchasing power or ability to pay it does not constitute demand.

Demand for a good is determined by several factors such as tastes and desires of the consumer for a commodity, income of the consumer, the prices of related goods, substitutes or complements. When there is a change in any of these factors, demand of the consumer for a good changes. Individual consumer's demand and market demand for a good may be distinguished. Market demand for a good is the total sum of the demands of all individual consumers who purchase the

commodity at various prices in the market in a period. We shall discuss in detail later in this chapter the various factors which determine demand for a commodity. The demand for a commodity and quantity demanded are two different concepts. Whereas, demand refers to the quantities of a commodity which consumers plan to buy at various prices of a good during a period of time, the quantity demanded is the amount of a good or service which consumers plan to buy at a particular price. It is worth mentioning that quantity demanded is not necessarily the amount actually bought by the consumers. Sometimes, the quantity demanded is greater than the quantity of the good available so that quantity of the good actually bought is less than the quantity demanded of it. The second thing worth mentioning about quantity demanded is that it is a flow concept. This means that quantity demanded is measured as an amount that consumers wish to buy per unit of time, which may be a day, a week, a month or a year. Thus if you consume 5 cups of tea in a day, then the your quantity demanded of tea is expressed as 5 cups per day or 35 cups per week or 150 cups per month and so on. Without specifying the time period, it is not possible to say whether the quantity demanded is large or small.

The Law of Demand

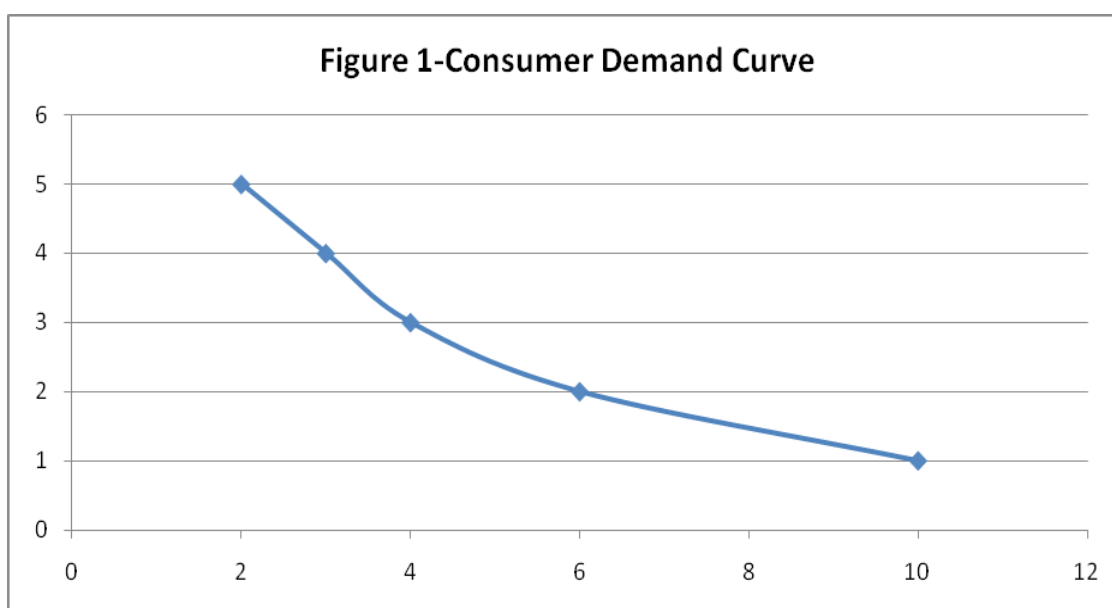
An important generalization about demand is described by the law of demand. The law of demand expresses the functional relationship between price and quantity demanded. The law of demand or functional relationship between price and quantity demanded is one of the best known and most important laws of economic theory. According to the law of demand, other things being equal, if price of a commodity falls, the quantity demanded of it will rise, and if price of the commodity rises, its quantity demanded will decline. Thus, according to the law of demand, there is inverse relationship between price and quantity demanded, other things remaining the same. These other things which are assumed to be constant are the tastes or preferences of the consumer, the income of the consumer, and the prices of related goods. If these other factors which determine demand also undergo a change, then the inverse price-demand relationship may not hold good. Thus, the constancy of these other things is an important qualification or assumption of the law of demand.

Demand Schedule and Demand Curve

The law of demand can be illustrated through a demand schedule and a demand curve. A demand schedule is presented in Table 1. It will be seen from this demand schedule that when price of a commodity is Rs. 5 per unit, consumer purchases 2 units of the commodity. When price of the commodity falls to Rs. 4, he purchases 3 units of the commodity. Similarly, when price further falls, quantity demanded by him goes on rising until at price Rs 1, the quantity demanded by him rises to 9 units. We can convert this demand schedule into a demand curve by graphically plotting the various price-quantity combinations, and this has been done in Figure 1, where along the X-axis, quantity demanded is measured and along the Y-axis, price of the commodity is measured. By plotting 2 units of the commodity at price Rs. 5, we get point *A* in Figure 1. Likewise, by plotting 3 units of the commodity demanded at price Rs. 4 we plot point *B* in Figure 1. Similarly, points *C*, *E*, and *F* are plotted, representing other combinations of price and quantity demanded presented in Table 1. By joining these various points, *A*, *B*, *C*, *E* and *F*, we get a curve *DD*. which is known as the demand curve. Thus, the *demand curve is a graphic statement or presentation of quantities of a good demanded by the consumer at various possible prices in a period of time.*

Table 5.1 Demand Schedule of an Individual Consumer

<i>Price (Rs)</i>	<i>Quantity Demanded (units)</i>
5	2
4	3
3	4
2	6
1	10



It should be noted that a demand schedule or a demand curve does not tell us what the price is; it only tells us how much quantity of the good would be purchased by the consumer at various possible prices. Further, it will be seen both from the demand schedule and the demand curve that as price of a commodity falls, more quantity of it is purchased or demanded. Since more is demanded at a lower price and less is demanded at a higher price, the demand curve slopes downward to the right. Thus, the downward-sloping demand curve is in accordance with the law of demand which, as stated above, describes inverse price-demand relationship. It is important to note here that behind this demand curve or price-demand relationship always lie the tastes and preferences of the consumer, his income, the prices of substitutes and complementary goods, all of which are assumed to be constant in describing price-demand relationship. If any change occurs in any of these other factors, the whole demand schedule or demand curve will change and a new demand schedule or demand curve will have to be drawn. In drawing a demand curve, we assume that the buyer or consumer does not exercise any influence over the price of a commodity, that is, he takes the price of the commodity as given and constant for him.

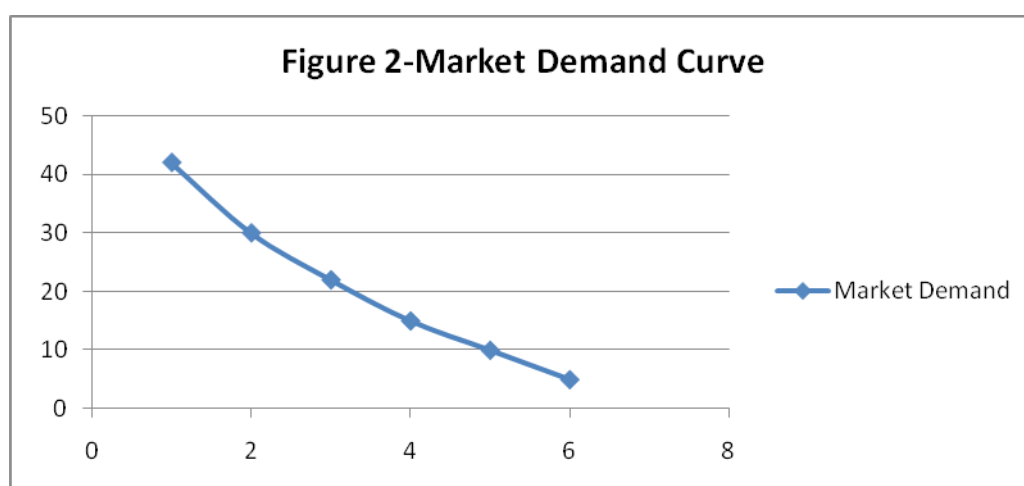
Market Demand

The market demand is the sum total of demands of all consumers in the market for a commodity at various prices. Therefore, we can derive market demand for a commodity by adding up the quantities demanded of the commodity at various prices by all the consumers that buy the commodity in period of time. Let there be three consumers, Rekha, Swati, and Kareena of a commodity whose demand schedules are given in the Table 1 By adding up the quantities demanded of the commodity by three consumers at various prices we get the market demand schedule in the last column of the Table 1

Table 1- Obtaining Market Demand

Price	Quantity by Rekha	Quantity by Swathi	Quantity by Kareena	Market Demand
1	16	11	15	42
2	11	7	12	30
3	7	5	10	22
4	4	4	7	15
5	2	3	5	10
6	1	2	2	5

We now plot the market demand obtained in the last column at various given prices. By plotting the quantities demanded of all the three consumers taken together at various prices we get the market demand curve *DD* in Fig. 2



Reasons for the Law of Demand: Why does Demand Curve Slope Downward?

We have explained above that when price falls, the quantity demanded of a commodity rises and vice versa, other things remaining the same. It is due to this law of demand that demand curve slopes downward to the right. Now, the important question is why the demand curve slopes downward or in other words, why the law of demand describing inverse price-demand relationship is valid. We can explain this with marginal utility analysis and also with the indifference curve analysis which we will do in the next chapters. There are two reasons which account for law of demand.

Income Effect: When price of a commodity falls, the consumer can buy more quantity of the commodity with his given income. Or, if he chooses to buy the same amount of the commodity as before, some money will be left with him because he has to spend less on the commodity due to its lower price. In other words, as a result of fall in price of the commodity, consumer's real income or purchasing power increases. This increase in real income induces the consumer to buy more of that commodity. This is called income effect of the change in price of the commodity. This is one reason why a consumer buys more of a commodity whose price falls.

Substitution Effect: The other important reason why the quantity demanded of a commodity rises as its price falls, is the substitution effect. When the price of a commodity falls, it becomes relatively cheaper than other commodities. This induces the consumer to substitute the commodity whose price has fallen for other commodities which have now become relatively dearer. As a result of this substitution effect, the quantity demanded of the commodity, whose price has fallen, rises. This substitution effect is more important than the income effect. Marshall explains the downward-sloping demand curve with the aid of this substitution effect alone, since he ignored the income effect of the price change. But in some cases even the income effect is very significant and cannot be ignored. As will be discussed in later chapter, Hicks and Allen who put forward indifference curve analysis of consumer's behaviour explain this downward-sloping demand curve with both the income and substitution effects.

We have explained above the reasons for the downward-sloping *demand curve of individual consumer*. There is an additional reason why the *market demand curve* for a commodity slopes downward. When the price of a commodity is relatively high, only few consumers can afford to buy it. And when the price of a commodity falls, more consumers would start buying it because some of those who previously could not afford to buy it may now afford to buy it. This increased number of consumers of a commodity at a lower price. Thus, when price of a commodity falls, the number of its consumer's increases and this also tends to raise the quantity demanded of the commodity in the market.

Exceptions to the Law of Demand

Law of demand is generally believed to be valid in most of the situations. However, some exceptions to the law of demand have been pointed out.

Goods having Prestige Value: Veblen Effect. One exception to the law of demand is associated with the name of the economist Thorstein Veblen who propounded the doctrine of *conspicuous consumption*. According to Veblen, some consumers measure the utility of a commodity entirely by its price *i.e.* for them, the greater the price of a commodity, the greater its utility. For example,

diamonds are considered as prestige good in the society and for the upper strata of the society, the higher the price of diamonds, the higher the prestige value of them and therefore the greater utility or desirability of them. In this case, some consumers will buy less of the diamonds at a lower price because with the fall in price its prestige value goes down. On the other hand, when price of diamonds goes up, their prestige value goes up and therefore their utility and desirability. As result, at a higher price the quantity demanded of diamonds by a consumer will rise. This is called *Veblen effect*. Besides diamonds, other goods such mink coats, luxury cars have prestige value ad Veblen effet works in their case too.

Giffen Goods:

Another exception to the law of demand was pointed out by Sir Robert Giffen who observed that when the price of bread increased, the low-paid British workers in the early 19th century purchased more bread and not less of it and this is contrary to the law of demand described above. The reason given for this is that these British workers consumed a diet of mainly bread and when the price of bread went up they were compelled to spend more on given quantity of bread. Therefore, they could not afford to purchase as much meat as before. Thus, they substituted even bread for meat in order to maintain their intake of food. After the name of Robert Giffen, such goods in whose case there is a direct price-demand relationship are called *Giffen goods*. It is important to note that when with the rise in the price of a Giffen good, its quantity demand increases and with the fall in its price its quantity demanded decreases, the demand curve will slope upward to the right and not downward.

Factors Determining Demand

Demand schedule and law of demand state the relationship between price and quantity demanded by assuming *ceteris paribus* that is, "other things remaining the same when there is a change in these other tangs, the whole demand schedule or demand curve undergoes a change. In other words, these other things determine the position and level of the demand curve. If these other things or the determinant of demand change, the whole demand schedule or the demand curve will change. As a result of the changes in these factors or determinants, a demand curve will shift above or below as the case may be. The following arc the factors which determine demand for goods:

1. Tastes and Preferences of the Consumers:

An important factor which determines demand for a good is the tastes and preferences of the consumers for it. A good for which consumers' tastes and preferences are greater, its demand would be large and its demand curve will lie at a higher level. People's tastes and preferences for various goods often change and as a result there is change in demand for them. The changes in demand for various goods occur due to the changes in fashion and also due to the pressure of advertisements by the manufacturers and sellers of different products. For example, when in early nineteen sixties Coca Cola plant was established in New Delhi demand for it was very small. But now people's taste for Coca Cola has undergone a change and become favorable to it because of large advertisement and publicity done for it. The result of this is that the demand for Coca-Cola has increased very much. In economics we would say that the demand curve for Coca Cola has shifted upward. On the contrary when any good goes out of fashion or people's tastes and

preferences no longer remain favorable to it the demand for it decreases. In economics we say that the demand curve for these goods will shift downward.

2. **Incomes of the People**

The demand for goods also depends upon incomes of the people. The greater the incomes of the people the greater will be their demand for goods. In drawing a demand schedule or a demand curve for a good we take incomes of the people as given and constant. When as a result of the rise in incomes of the people, the demand increases, (the whole of the demand curve shifts upward and *vice versa*). The greater income means the greater purchasing power. Therefore, when incomes of the people increase, they can afford to buy more. It is because of this reason that the increase in income usually has a positive effect on the demand for a good. When the incomes of the people fall they would demand less of the goods and as a result the demand curve will shift below. For instance, during the planning period in India the incomes of the people have greatly increased owing to the large investment expenditure on the development schemes by the Government and the private sector. As a result of this increase in incomes, demand for food grains has greatly increased which has resulted in rightward shift in the demand curve for them. Likewise, when because of drought in a year the agricultural production greatly falls, incomes of the farmers decline. As a result of the decline in incomes of the farmers, they demand less of cotton cloth and other manufactured products.

3. **Changes in the Prices of the Related Goods:** The demand for a good is also affected by the prices of other goods, especially those which are related to it as substitutes or complements. When we draw a demand schedule or a demand curve for a good we take the prices of the related goods as remaining constant. Therefore, when the price of the related goods, substitutes or complements, change the whole demand curve would change its position; it will shift upward or downward as the case may be. When the rise in price of a good causes increase in demand for another good, the two goods are called substitute goods. For example, when price of the tea as well as the incomes of the people remain the same but price of the coffee rises, the consumers would demand more of tea than before. Tea and coffee are very close substitutes, therefore when coffee becomes more expensive. The consumers substitute tea for coffee and as a result the demand for tea increases. As a result, more of tea will be demanded at each given price.

5. **Consumers' Expectations:** Another factor which influences the demand for goods is consumers' expectation about the future. If a person expects a significant increase in his income next month or next year he would be willing to spend more out of his current income. This will cause a rightward shift in the demand curve. Usually, when people plan to buy a durable-use good such as a car or a house, they take it account not only their current income but also what income they expect to earn in future. This is because these durable use goods are generally purchased by borrowing a part of the funds spent on purchasing them. They have to pay back the loan taken.

Besides, expectations about future prices also affect the present demand for goods. If due to some reason, consumers expect that in the near future prices of the goods would rise, then in the present they would demand greater quantities of the goods so that in the future they should not have to pay higher prices.

- 6. Income Distribution:** Distribution of income in a society also affects the demand for goods. If distribution of income is more equal, then the propensity to consume of the society as a whole will be relatively high which means greater demand for goods. On the other hand, if distribution of income is more unequal, then propensity to consume of the society will be relatively less, for the propensity to consume of the rich people is less than that of the poor people. Consequently, with more unequal distribution of income, the demand for consumer goods will be comparatively less. This is the effect of the income distribution on the propensity to consume and demand for goods. But the change in the distribution of income in the society would affect the demand for various goods differently. If progressive taxes are levied on the rich people and the money so collected is spent on providing employment to the poor people, the distribution of income would become more equal and with this there would be a transfer of purchasing power from the rich to the poor. As a result of this, the demand for those goods will increase which are generally purchased by the poor because the purchasing power of the poor people has increased and, on the other hand, the demand for those goods will decline which are usually consumed by the rich on whom progressive taxes have been levied.

QUESTIONS AND ANSWERS

Short Answer Questions.

1. What do you mean by the assumption 'other things remaining constant'?
2. What do you mean by the assumption 'ceteris paribus'?

It is important to know that when drawing a demand curve showing relation between price and quantity demanded, economists make an important assumption of *ceteris paribus*. *Ceteris paribus* literally means 'other things being equal'. In the context of demand curve when relation between price and quantity demanded of a good is being studied, *ceteris paribus* implies that factors other than price which influence demand remain constant. The demand curve of a commodity slopes downward because, *ceteris paribus*, the fall in price causes increase in quantity demanded. Although the assumption of *ceteris paribus* refers to hypothetical situation in which some factors are held constant, in the real world many variables change at the same time. Therefore, when we are using the concept of demand for a commodity (and also for that matter supply of commodity) to analyse certain economic policies and events, we must remember what factors are being held constant and what are not.

3. Briefly explain individual demand curve
4. Explain individual demand schedule.

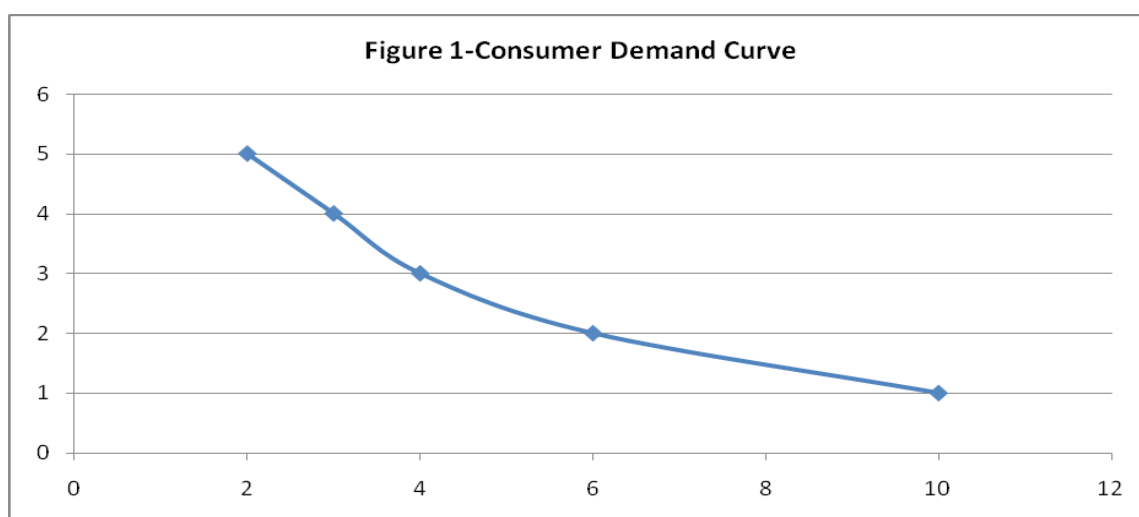
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Table 5.1

Demand Schedule of an Individual Consumer

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downward to the right. Thus, the downward-sloping demand curve is in accordance with the law of demand which, as stated above, describes inverse price-demand relationship. It is important to note here that behind this demand curve or price-demand relationship always lie the tastes and preferences of the consumer, his income, the prices of substitutes and complementary goods, all of which are assumed to be constant in describing price-demand relationship. If any change occurs in any of these other factors, the whole demand schedule or demand curve will change and a new demand schedule or demand curve will have to be drawn in drawing a demand curve, we assume that the buyer or consumer does not exercise any influence over the price of a commodity, that is, he takes the price of the commodity as given and constant for him.

5. Explain the concept market demand curve

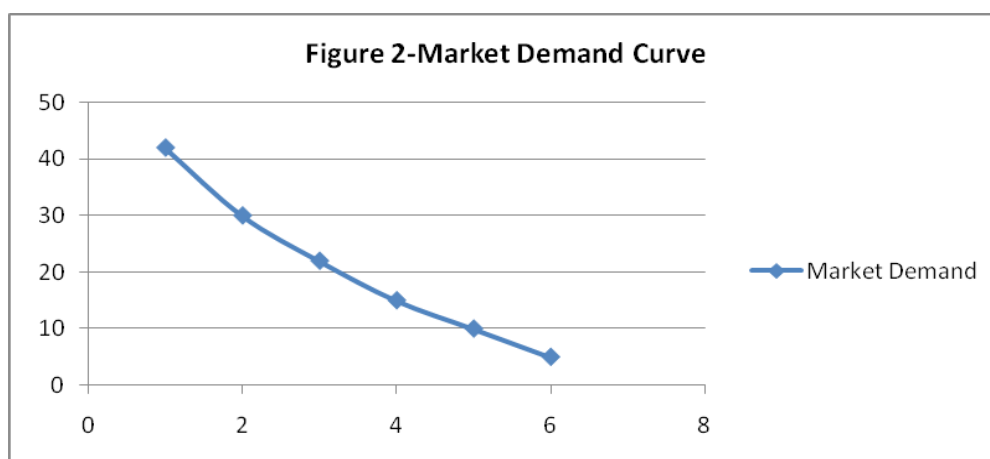
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We now plot the market demand obtained in the last column at various given prices. By plotting the quantities demanded of all the three consumers taken together at various prices we get the market demand curve *DD* in Fig. 2



7. Explain the law of demand

8. Explain the inverse relationship between price and quantity demanded.

9. Why does Demand Curve Slope Downward?

There are two reasons which account for law of demand.

Income Effect: When price of a commodity falls, the consumer can buy more quantity of the commodity with his given income. Or, if he chooses to buy the same amount of the commodity as before, some money will be left with him because he has to spend less on the commodity due to its lower price. In other words, as a result of fall in price of the commodity, consumer's real income or purchasing power increases. This increase in real income induces the consumer to buy more of that commodity. This is called income effect of the change in price of the commodity. This is one reason why a consumer buys more of a commodity whose price falls.

Substitution Effect: The other important reason why the quantity demanded of a commodity rises as its price falls, is the substitution effect. When the price of a commodity falls, it becomes relatively cheaper than other commodities. This induces the consumer to substitute the commodity whose price has fallen for other commodities which have now become relatively dearer. As a result of this substitution effect, the quantity demanded of the commodity, whose price has fallen, rises. This substitution effect is more important than the income effect. Marshall explains the downward-sloping demand curve with the aid of this substitution effect alone, since he ignored the income effect of the price change. But in some cases even the income effect is very significant and cannot be ignored. As will be discussed in later chapter, Hicks and Allen who put forward indifference curve analysis of consumer's behaviour explain this downward-sloping demand curve with both the income and substitution effects.

We have explained above the reasons for the downward-sloping *demand curve of individual consumer*. There is an additional reason why the *market demand curve* for a commodity slopes downward. When the price of a commodity is relatively high, only few consumers can afford to buy it. And when the price of a commodity falls, more consumers would start buying it because some of those who previously could not afford to buy it may now afford to buy it. This increased

number of consumers of a commodity at a lower price. Thus, when price of a commodity falls, the number of its consumer's increases and this also tends to raise the quantity demanded of the commodity in the market.

10. What are the exceptions to the law of demand

11. Explain the situations where law of demand will not operate.

Some exceptions to the law of demand have been pointed out.

1. Goods having Prestige Value:

Veblen Effect. One exception to the law of demand is associated with the name of the economist Thorstein Veblen who propounded the doctrine of *conspicuous consumption*. According to Veblen, some consumers measure the utility of a commodity entirely by its price *i.e.* for them, the greater the price of a commodity, the greater its utility. For example, diamonds are considered as prestige good in the society and for the upper strata of the society, the higher the price of diamonds, the higher the prestige value of them and therefore the greater utility or desirability of them. In this case, some consumers will buy less of the diamonds at a lower price because with the fall in price its prestige value goes down. On the other hand, when price of diamonds goes up, their prestige value goes up and therefore their utility and desirability. As result, at a higher price the quantity demanded of diamonds by a consumer will rise. This is called *Veblen effect*. Besides diamonds, other goods such mink coats, luxury cars have prestige value ad Veblen effect works in their case too.

2.Giffen Goods:

Another exception to the law of demand was pointed out by Sir Robert Giffen who observed that when the price of bread increased, the low-paid British workers in the early 19th century purchased more bread and not less of it and this is contrary to the law of demand described above. The reason given for this is that these British workers consumed a diet of mainly bread and when the price of bread went up they were compelled to spend more on given quantity of bread. Therefore, they could not afford to purchase as much meat as before. Thus, they substituted even bread for meat in order to maintain their intake of food. After the name of Robert Giffen, such goods in whose case there is a direct price-demand relationship are called *Giffen goods*. It is important to note that when with the rise in the price of a Giffen good, its quantity demand increases and with the fall in its price its quantity demanded decreases, the demand curve will slope upward to the right and not downward.

12. Distinguish between movement along a demand curve and shifts in demand

13. Graphically illustrate the change in demand due to change in price and change in demand due to changes in factors other than price.

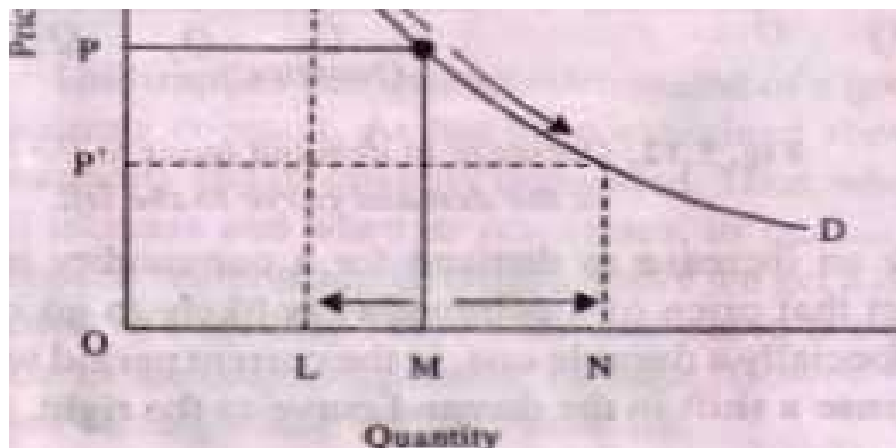
Movement along a Demand Curve and Shifts in Demand

Movement along a Demand Curve: Extension and Contraction in Demand.

We have studied above the demand schedule, demand curve and law of demand. All these show that when price of a good falls, quantity demanded of it rises, and when its price rises, its quantity

demand falls, other things remaining the same. When as a result of changes in price, the quantity demanded rises or falls, extension or contraction in demand is said to have taken place. Therefore, in economics, the extension and contraction in demand are used when the quantity demanded rises or falls as a result of changes in price and we move along a given demand curve. When the quantity demanded of a good rises due to the fall in price, it is called extension of demand and when the quantity demanded falls due to the rise in price, it is called contraction of demand. For instance, suppose the price of bananas in the market at any given time is Rs.12 per dozen and a consumer buys one dozen of them at that price. Now, if other things such as tastes of the consumer, his income, prices of other goods remain the same and price of bananas falls to Rs. 8 per dozen and the consumer now buys 2 dozen bananas, then extension in demand is said to have occurred. On the contrary, if the price of bananas rises to Rs. 15 per dozen and consequently the consumer now buys half a dozen of bananas, then contraction in demand is said to have occurred.

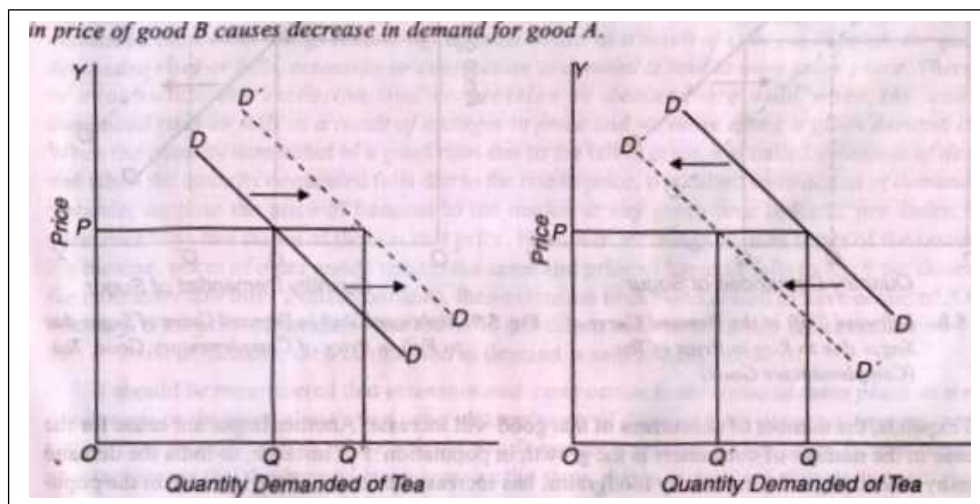
It should be remembered that extension and contraction in the demand takes place as a result of changes in the price alone when other determinants of demand such as tastes, income, propensity to consume and prices of the related goods remain constant. These other factors remaining constant means that the demand curve remains the same, that is, it does not change its position; only the consumer moves downward or upward on it. The extension and contraction in demand is illustrated in the figure below.



Assuming other things such as income, tastes and fashion, prices of related goods remaining constant, a demand curve DD has been drawn. It will be seen in this figure that when the price of the good is OP , the quantity demanded of the good is OM . Now, if the price of the good falls to OP' the quantity demanded of the good rises to ON . Thus, there is extension in demand by the amount MN . On the other hand, if price of the good rises from OP to OP'' the quantity demanded of the good falls to OL . Thus, there is contraction in demand by ML . We thus see that as a result of changes in price of a good the consumers move along the given demand curve; the demand curve remains the same and does not change its position.

Shifts in Demand: Increase and Decrease in Demand

When demand changes due to the factors other than price, there is shift in the whole demand curve. As mentioned above, apart from price, demand for a commodity is determined by incomes of the consumers, their tastes and preferences, prices of related goods. Thus, when there is any change in these factors, it will cause a shift in demand curve. For example, if incomes of the consumers increase, say due to the hike in their wages and salaries or due to the grant of dearness allowance, they will demand more of a good, say cloth, at each price. This will cause a shift in the demand curve to the right as is shown in Figure below. To begin with, DD is the demand curve. With the increase in income, the demand curve shifts to the right to D'D' which implies that at each price such as P₁, P₂, P₃ the consumers demand more of the commodity than before. Similarly, if preferences of the people for a commodity, say colour TV, become greater, their demand for colour TVs will increase, that is, the demand curve will shift to the right and, therefore, at each price demand for colour TVs will increase



The other important factor which can cause an increase in demand for a commodity is the expectations about future prices. If people expect that price of a commodity is likely to go up in future, they will try to purchase the commodity, especially a durable one, in the current period which will boost the current demand for the good and cause a shift in the demand curve to the right. The price of related commodities such as substitutes and complements can also change the demand for a commodity. For example, if price of coffee raises, other factors remaining the constant, this will cause the demand for tea, a substitute for coffee, to increase and its demand curve to shift to the right.

Decrease in Demand and Shift in the demand curve. If there are adverse changes in the factors influencing demand; it will lead to the decrease in demand causing a shift in the demand curve to the left as shown in figure. For example, if due to inadequate rainfall agricultural production in a year declines; this will cause a fall in the incomes of the farmers. This fall in incomes of the farmers will cause a decrease in the demand for industrial products, say cloth, and will result in a shift in the demand curve to the left as shown in figure. It will be seen from figure that as a result of decrease in demand, demand curve shifts to the left to D''D'' and at each price such as P₁, P₂, P₃ the farmers demand less of cloth than before. Similarly, change in preferences for commodities can also affect the demand. For example, when colour TVs came to India people's greater preference

for them led to the decrease in demand for black and white TVs causing leftward shift in demand curve for these black and white TVs.

Conclusion

From the above analysis it is clear that in case of extension and contraction in demand, a consumer moves along the same demand curve. He goes up and down on it due to the changes in price of the good alone. On the other hand, in the case of increase and decrease in demand the whole demand curve changes or shifts; in case of increase in demand it shifts to the right, and in case of decrease in demand it shifts to the left.

14. Explain the meaning of supply.

15. What do you mean by the concept supply.

16. Define supply

The Meaning of Supply

As demand is defined as a schedule of the quantities of good that will be purchased at various prices, similarly the supply refers to the schedule of the quantities of a good that the firms are able and willing to offer for sale at various prices. How much of a commodity the firms are able to produce depends on the resources available to them and the technology they employ for producing a commodity. How much of a commodity the firms will be willing to offer for sale depends on the profits they expect to make on producing and selling the commodity. Profits in turn depend on the price of the commodity on the one hand and unit cost of production on the other.

Supply should be distinguished from the quantity supplied. Whereas supply of a commodity is the entire schedule of the quantities of a commodity that would be offered for sale at all possible prices during a period of time entre for example, a day, a week, a month and so on, the quantity supplied refers to the quantity of a commodity which the firms are able and willing to sell at a particular price of the commodity. Thus the term supply refers to the entire relationship between the price of a commodity and the quantity supplied at various possible prices and is illustrated by the entire supply curve or supply schedule as given in Figure 5.13 and Table 5.3, where the term quantity supplied refers to a point on a given supply curve, that is, quantity supplied at a particular price.

Two things are worth mentioning about the concept of supply. First, supply is a flow concept, that is, it refers to the amount of a commodity that the firms produce and offer for sale in the market per period of time, say a week, a month or a year. Without specifying the time period, supply of a commodity has a little meaning. Second, the quantity supplied at a commodity which the producers plan to produce and sell at a price is not necessarily the same as the quantity actually sold. Sometimes the quantity which the firms are willing to produce and sell at a price is greater than the quantity demanded, so the quantity actually bought and sold is less than the quantity supplied.

17. Explain briefly the concept of supply function

The quantity of a commodity that firms will be able and willing to offer for sale in the market depends on several factors. The important factors determining supply of a commodity are:

1. The price of the commodity
2. The prices of inputs (i.e. resources) used for the production of the commodity
3. The state of technology
4. The number of firms producing and selling the commodity
5. The prices of related goods produced
6. Future expectations regarding prices.

18. Why does the supply curve slopes upwards?

19. Explain the positive relationship between price and quantity supplies

20. What is law of supply?

Supply of a commodity is functionally related to its price. The law of supply relates to this functional relationship between price of a commodity and its quantity supplied. In contrast to the inverse relationship between the quantity demanded and the changes in price, the *quantity supplied of a commodity generally varies directly with price*. That is, the higher the price, the larger is the quantity supplied of a commodity.

The supply schedule and the upward-sloping supply curve reflect the law of supply. According to the law of supply, *when the price of a commodity rises, the quantity supplied of it in the market increases, and when the price of a commodity falls, its quantity demanded decreases, other factors determining supply remaining the same*. Thus, according to the law of supply, the quantity supplied of a commodity is directly or positively related to price.

Explanation of the Law of Supply: Why does Supply Curve Generally Slope Upward?

It has been observed from the experiences in the real world that price of a product and quantity supplied of it by firms producing it is positively related to each other, that is, at a higher price more is supplied and vice versa, other things remaining the same. This positive relationship between price and quantity supplied is an important law of economics. How do we explain it? It should be remembered that firms are driven by profit motive. The higher price of a product, given the cost per unit of output, makes it profitable to expand output and offer more quantity of the product for sale. Thus, higher price serves as an incentive for the producer to produce more of it. The higher the price, the greater the incentive for the firm to produce and supply of a commodity in the market, other things remaining the same. The basic reason behind the law of supply (i.e. positive relationship between price and quantity supplied) is the way cost changes as output is expanded to offer more for sale.

To produce more of a product, firms have to devote more resources to its production. When production of a product is expanded by using more resources, diminishing returns to variable

factors occur. Due to the diminishing returns average and marginal costs of production increase. Therefore, at higher additional cost of producing more units of output; it is profitable to produce more units of output only at a higher price so as to cover the rise in additional cost per unit.

It is due to this positive relationship between price of a commodity and its quantity supplied that the supply curve of a commodity slopes upward to *right* as seen from supply curve *ss* in Figure. When price of wheat rises from Rs. 520 to Rs. 530 per quintal the quantity supplied of wheat in the market increases from 200 quintals to 225 quintals per period.

21. What is supply schedule?

22. What is supply curve?

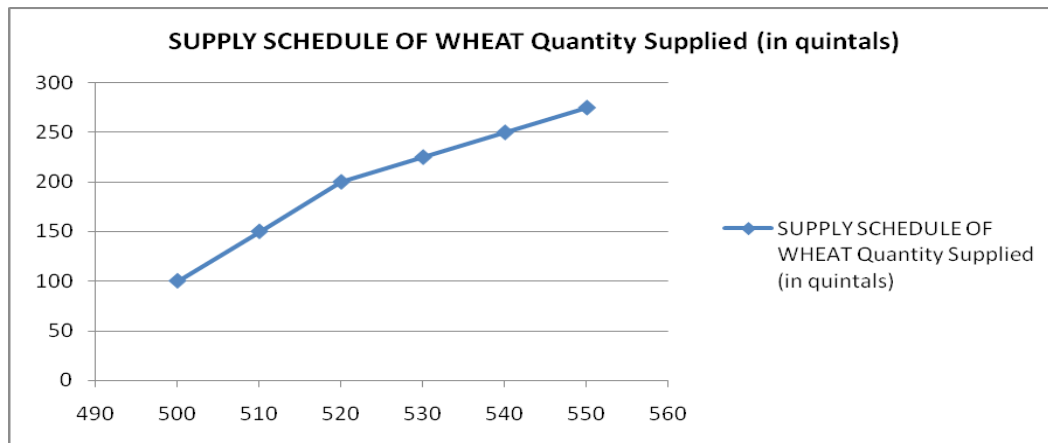
23. Explain graphically the positive relationship between price and quantity supplies.

Supply of a commodity is functionally related to its price. The law of supply relates to this functional relationship between price of a commodity and its quantity supplied. In contrast to the inverse relationship between the quantity demanded and the changes in price, the *quantity supplied of a commodity generally varies directly with price*. That is, the higher the price, the larger is the quantity supplied of a commodity.

The supply schedule and the upward-sloping supply curve reflect the law of supply. According to the law of supply, *when the price of a commodity rises, the quantity supplied of it in the market increases, and when the price of a commodity falls, its quantity demanded decreases, other factors determining supply remaining the same*. Thus, according to the law of supply, the quantity supplied of a commodity is directly or positively related to price.

SUPPLY SCHEDULE OF WHEAT

Price Per Quintal	Quantity Supplied (in quintals)
500	100
510	150
520	200
530	225
540	250
550	275



Similar to the demand schedule already explained, we can construct an individual's supply schedule. Also by totaling up the quantity supplied at various prices by all the sellers in a market, we can obtain the supply schedule of the market. Supply schedule represents the relation between prices and the quantities that the firms are able and willing to produce and sell at various prices. We have given in Table 5.3 a supply schedule of wheat per day in a market.

It will be seen from the above table that when price of wheat is Rs. 500 per quintal, the 100 quintals of wheat are supplied in the market. When price of wheat rises to Rs. 510 per quintal, 150 quintals of wheat are supplied. When price of wheat goes up to Rs. 550 per quintals its quantity supplied in the market rises to 275 quintal. By plotting the above supply schedule of wheat on a graph paper we have obtained supply curve 55 in the figure. In the figure, the quantity supplied has been measured along the A'-axis and price of wheat has been measured along the K-axis. It will be seen from this figure that supply curve slopes upward from left to right, which indicates that as the price of wheat rises, quantity supplied increases and vice versa. This is in a sharp contrast to the demand curve of a commodity which slopes downward from left to right.

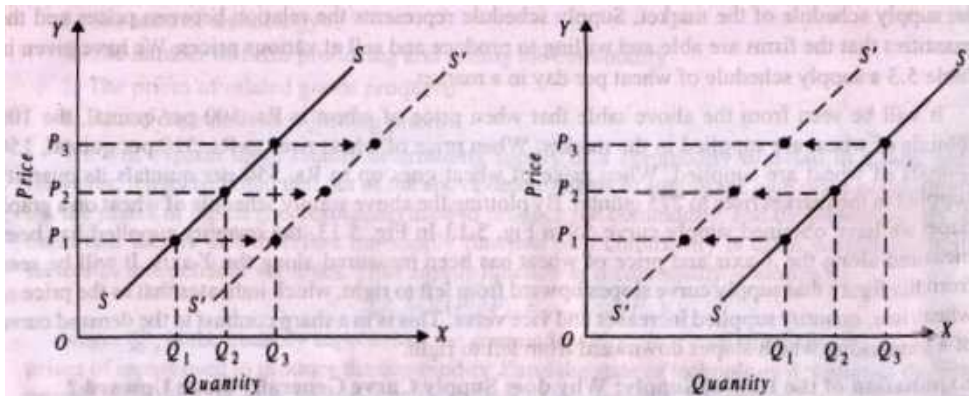
24. Explain briefly the concept of increase and decrease in supply

25. What do you mean by shift in supply

Shifts in Supply: Increase and Decrease in Supply

As stated above, the supply of a commodity in economics means the entire schedule or curve depicting the relationship between price and quantity supplied of the commodity, given the other factors influencing supply. These other factors are the state of technology, prices of inputs (resources), prices of other related commodities, etc. which are assumed constant when the relationship between price and quantity supplied of a commodity is examined. It is the change in

these factors other than price that cause a shift in the supply curve. For example, when prices of inputs such as labour and raw materials used for the production of a commodity decline, this will result in lowering the cost of production which will induce the producers to produce and make available a greater quantity of the commodity in the market at each price.



This increase in supply of a commodity due to the reduction in prices of inputs will cause the entire supply to shift to the right as shown in the above Figure where the supply curve shifts from SS to $S'S'$. As shown above, at price P_1 , P_2 and P_3 , quantity supplied increases when supply increases causing a rightward shift in the supply curve. Similarly, progress in technology used for production of a commodity which increases productivity and reduces cost per unit will also cause the supply curve to shift to the right.

On the other hand, decrease in supply means the reduction in quantity supplied at each price of the commodity as shown in the figure where as a result of decrease in supply the supply curve shifts to the left from SS to $S''S''$. As shown by the arrow marks, at each price such as P_1 , P_2 , P_3 the quantity supplied on the supply curve $S''S''$ has declined as compared to the supply curve SS . The decrease in supply occurs when the rise in prices of factors (inputs) used for the production of a commodity produced leads to higher cost per unit of output which causes a reduction in quantity supplied at each price. Similarly, the imposition of an excise duty or sales tax on a commodity means that each quantity will now be supplied at a higher price than before so as to cover the excise duty sales tax per unit. This implies that quantity supplied of the commodity at each price will decrease as shown by the shift of the supply curve to the left.

Another important factor causing a decrease in supply of a commodity is the *rise in prices of other commodities* using the same factors. For example if the price of wheat rises sharply, it will become more profitable for the farmers to grow it. This will induce the farmers to reduce the cultivated area under other crops, say sugarcane, and devote it to the production of wheat. This will lead to the decrease in supply of sugarcane whose supply curve will shift to the left.

Further, agricultural production in India greatly depends on the rainfall due to Monsoons. If Monsoons comes in time and rainfall is adequate, there are bumper crops, the supply of agricultural products increases. However, in a year when Monsoons are untimely or highly inadequate, there is a sharp drop in agricultural output which causes a shift in the supply curve of agricultural output to the left. We thus see that there are several factors other than price which determine the supply of a commodity and any change in these other factors will cause a shift in

the entire supply curve.

26. What are the factors affecting supply of a commodity?

27. Explain the determinants of supply.

Factors Determining Supply

The factors other than price which determine supply are the following

(a.) **Production Technology**-The change in technology significantly affects the supply function by altering the cost of production. If there occurs an improvement in production technology used by the firm, its production efficiency increases which reduce the unit cost of production and consequently the firms would supply more than before at the given price. That is, the supply would increase implying thereby that the entire supply curve would shift to the right.

7. Price of Inputs - Changes in prices of factors or inputs used in production also cause a change in cost of production and consequently bring about a change in supply. For example, if either wages of labour increase or prices of raw materials and fuel go up, the unit cost of production will rise. With higher unit cost of production, it will be profitable to produce less and therefore less would be supplied or offered for sale than before at various given prices. This implies that supply curve would shift to the left

It should be noted that in the last few decades, rise in oil prices worldwide by OPEC caused the increase in cost of production of several commodities leading to the shift in the supply curves of several commodities to the left.

8. Prices of Related Products-When we draw a supply curve we assume that the prices of other products remain unchanged. Now, any change in the prices of other products would influence the supply of a product by causing substitution of one product for another. For example, if the market price of wheat rises, it will lead to the reduction in the production and supply of gram by the farmers as the farmers would withdraw land and other resources from the production of gram and devote them to the production of wheat. This will cause decrease in the supply of gram and a leftward shift in the supply curve of gram.

Thus, rise in prices of wheat affect the supply of pulses such as gram.

(d) **Number of Producers (or firms)**-If the number of firms producing a product increases, the market supply of the product will increase causing a rightward shift in the supply curve. When, in the short run, firms in an industry are making large profits, the new firms enter the industry in the long run and consequently the total production and supply of the product of the industry increases. On the other hand, due to losses in the short run if some firms leave the industry in the long run, the supply of its product will decline.

(e) **Future Price Expectations** The supply of a commodity in the market at any time is also determined by sellers' expectations of future prices. If, as happens during inflationary periods, sellers expect the prices to rise in future, they would reduce current supply of a product in the market and would instead hoard the commodity. The hoarding of huge quantities of goods by traders is an important factor in reducing their supplies in the market and thus causing further rise in their prices.

(f) Taxes and Subsidies- Taxes and subsidies also influence the supply of a product. If an excise duty or sales tax is levied on a product, the firms will supply the same amount of it at a higher price or less quantity of it at the same price. This is because excise duty on a commodity is included in price by the sellers and passes it on the buyers.

MODULE-III

THEORY OF CONSUMER BEHAVIOUR

OBJECTIVES

1. To develop basic understanding of the behaviour of individual Consumer
2. To develop capacity to appreciate various approaches to consumer equilibrium
3. To develop capacity to assess various practical situations of consumer behaviour under theoretical framework

Terms and concepts discussed:

- **Consumer Equilibrium** : Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure
- **Utility**: The power of a commodity to satisfy the wants of consumer is termed as utility. The concept was first introduced by Jeremy Bentham. It is the want satisfying power of a commodity or service. It is measured in the units of 'Utils'. It is purely a subjective concept and there for it varies from person to person and from situation to situation.
- **Cardinal utility** It is based on the assumption of cardinal measurability of utility. It means that utility or want satisfying power of a commodity can be measured using cardinal numbers like 1,2,3,4 etc.
- **Ordinal utility** : Ordinal Approach to consumer equilibrium was developed by Hicks and Allen. It is also called Indifference curve analysis. It is based on the assumption that utility (want satisfying power of a commodity or service) cannot be measured but can be compared and ranked such as Ist, IInd, IIIRD.....etc.
- **Marginal utility** : Marginal utility is the additional utility obtains from an additional unit of any commodity consumed or acquired. In other words it is the satisfaction derived from the last unit of consumption. It is measured the difference between the utility of the total units of stock of consumption of a given commodity and that of consuming one unit less in the stock considered. Symbolically $MU_x = T_{ux} - T_{U_{x-1}}$.
- **Total utility** Total utility is the entire utility derived when consuming all the units of a commodity by the consumer. Suppose if a consumer is consuming 5 units of apple, all the utility consumer realized by consuming all the 5 apples are termed as total utility. It is the

sum of Marginal utilities. Classical economic theory suggests that all consumers want to get the highest possible level of total utility for the money they spend.

- **Consumer equilibrium under cardinal utility** : Consumer equilibrium under Cardinal utility analysis covers two theories
 - The law of diminishing Marginal utility : MARSHALL “The additional benefit which a person derives from a given increase of his stock of a thing diminishes with every increase in the stock that he already has.” (free good: MU=0 and Economic Good MU=Price)
 - The law of Equi marginal utility : "A person can get maximum utility with his given income when it is spent on different commodities in such a way that the marginal utility of money spent on each item is equal".

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \frac{MU_z}{P_z} = \dots \dots MUM$$

- **Indifference curve** : “An Indifference curves show different combination of two goods which give consumers the same level of satisfaction”. In other words, consumers will be indifferent to the different combination of goods because they give same satisfaction.
- **Indifference Map** : A number of indifference curves in same diagram showing various levels of satisfaction.
- **MRS**: that the marginal rate of substitution of X for Y is defined as the amount of Y the consumer is just willing to give up to get one more unit of X and maintains the same level of satisfaction
- **Equilibrium of the consumer under ordinal utility**: Introduced by Hicks and Allen. Consumer equilibrium is attained when the slopes of income price line and indifference curves are equal.
- **Budget line** : Budget line or Income Price Line is the graphical representation of all possible combination of two commodities that can be purchased by the consumer by using his given income.
- **Income effect**: Income effect is the change in consumption of a commodity when income of the consumer is changed. When income of the consumer is changed, the maximum quantity of both the products that can be purchased by the consumer will be increased
- **Positive income effect**: When with the increase in income, there is increase in consumption, that is known as Positive Income Effect. Income effect is positive to normal commodities.
- **Negative Income Effect**: when with the increase in income there is decrease in consumption, that is known as Negative Income Effect. The negative income effect is

applicable in case of inferior goods. Inferior goods are those goods, which are purchased less as one's income rises.

- **Income consumption curve:** Income consumption curve is the locus of different equilibrium points when income of the consumer is changed.
- **Engel curve :** Engel curve is named after a 19th century German statistician Christian Lorenz Ernst Engel, who developed it for the first time. Income consumption can be used to derive this curve. Engel curve indicates the relationship between the income level and the quantity of the commodity purchased by the consumer
- **Normal good :** those goods whose income effect is positive. Since substitution effect is positive, price effect is also positive. Such a case, the law of demand will be operating.
- **Inferior good :** Inferior goods are those goods whose income effect is negative. It may be ordinary inferior good or giffen good.
- **giffen good :** Giffen goods are special type of inferior goods whose negative income effect is greater than positive substitution effect. So price effect will be negative and therefore Price consumption curve will be backward bending. Here the law of demand will not operate. So when price falls demand also decreases
- **Price effect :** Price effect is the change in quantity demanded of a commodity due to change in price of the same commodity. Price effect is the combination of income effect and substitution effect. OR

$$\text{Price Effect} = \text{Substitution Effect} + \text{Income Effect}$$

- **Decomposition of Price effect into income effect and substitution effect :** Theoretically it is possible to decompose price effect into income and substitution effects. Price effect can be easily identified from the price consumption curve. To separate price effect into income effect and substitution effect, one of these effects are to be eliminated. There are two methods to do this. One method is developed by Hicks and another method is developed by Slutsky
- **Compensating variation in income:** In Hicksian decomposing of price effect, compensating variation in income is the process of eliminating income effect of a price change by taking away a portion of money income, when price of the product is decreased.
- **Cost difference :** The term cost difference is associated with Slutsky method of decomposing price effect. In this method, to eliminate income effect, a portion of money income is taken away from the consumer. Slutsky called this process as '**cost difference**'. Here the consumer can just afford the original combination of the commodities. In other words we are holding purchasing power of the consumer constant. Here consumer is able to purchase the same old combination of the products.
- **Theory of Revealed Preference :** Prof. Samuelson's theory of demand is based on the revealed preference axiom or Revealed preference hypothesis. **It states that choice reveals**

preference. A consumer buys a combination of two goods either because he likes this combination in relation to others or this is cheaper than others.

- **Preference axiom :** “Any good (simple or composite) that is known always to increase in demand when money income alone rises must definitely shrink in demand when its price alone rises.” It means that when income elasticity of demand is positive, price elasticity of demand is negative.
- **Consumer surplus :** Consumer’s surplus is the excess of what we are prepared to pay over what we actually pay for a commodity. It is the difference between what we are prepared to pay and what we actually pay.

Ref: 1. Koutsoyiannis . A Modern Micro Economics
2. Divedi. Principles of micro economics

QUESTIONS AND ANSWERS

Essay questions (12 marks):

1. **What is consumer equilibrium? Explain how consumer equilibrium is attained using cardinal utility analysis?**

INTRODUCTION

Consumer’s Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure.

A rational consumer aims to balance his expenditure in such a manner, so that he gets maximum satisfaction with minimum expenditure. When he does so, he is said to be in equilibrium.

There are mainly three approaches to consumer equilibrium analysis. They are:

- a) Introspective cardinalist Approach: Cardinal Utility Approach
- b) Introspective Ordinalist Approach Or Ordinal Utility approach
- c) Behaviouristic approach Or Revealed Preference theory

CARDINAL UTILITY ANALYSIS

The cardinal utility analysis was initially developed by Economist like Willams, Gosson, Jevons ect. Later Marshall modified it and connected the term utility to consumer equilibrium. There for it is termed as “Marshallian cardinal utility analysis”. It is based on the assumption of cardinal measurability of utility. It means that utility or want satisfying power of a commodity can be measured using cardinal numbers like 1,2,3,4 etc.

Consumer Equilibrium under cardinal utility

Assumptions of cardinal utility analysis are as follows

- The utility is measurable cardinally and a person can express the utility such as 2 units, 4 units etc.
- A rational consumer aims at the maximization of his utility.
- A commodity is being taken continuously and the units are homogenous
- The taste of the consumer remains same .
- Income of the consumer remains constant .
- It is assumed that the commodity is divisible.
- There should be no change in fashion, taste and preference of the consumer
- It is assumed that the prices of the substitutes do not change.

Consumer equilibrium under Cardinal utility analysis covers two theories

The law of diminishing Marginal utility

The law of Equi marginal utility

The law of diminishing Marginal utility

An important principle of cardinal utility analysis is related with the basic behavior of Marginal utility. This basic behavior is explained as the law of diminishing marginal utility.

The marginal utility which a person derives from the additional consumption of a product goes on diminishing. In other words, ‘ if a consumer is consuming more and more units of a commodity, the extra utility which a person derives from the extra unit of a good goes on diminishing’. The utility from second unit of consumption will always be less than that of the first unit. The law of diminishing marginal utility imply that the total utility increases at a decreasing rate. According to **MARSHALL** “**The additional benefit which a person derives from a given increase of his stock of a thing diminishes with every increase in the stock that he already has.**”

TABLE: 1 Diminishing Marginal Utility

Units Consumed	Marginal Utility	Total Utility
1	12	12
2	10	22
3	8	30
4	5	35
5	3	38

6	1	39
7	0	39
8	-1	38

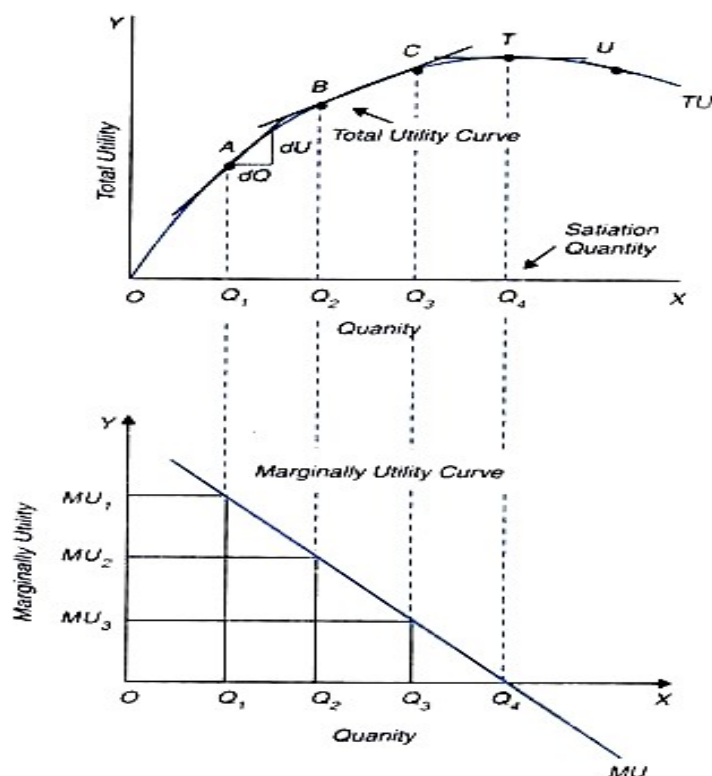


Fig. 7.1. . Total Utility and Marginal Utility

From the table and from the figure we can derive the following facts related with Marginal utility and total utility

FEATURES OF MARGIANL UTILITY

1. Marginal utility is the utility derived from the last unit of consumption
2. As consumption increases Marginal utility goes on diminishing
3. At a level of consumption marginal utility becomes zero.
4. After zero level marginal utility becomes negative

FEATURES OF TOTAL UTILITY

1. Total utility is the Sum total of marginal utilities.
2. Total utility increases at a diminishing range
3. It reaches maximum at a point
4. After that total utility decreases
5. Total utility is maximum when marginal utility is zero

Since consumer equilibrium is the point of attaining maximum satisfaction, two cases of consumer equilibrium can be explained by using the law of DMU

Consumer Equilibrium with a free good

Consumer equilibrium with a single economic good

Consumer Equilibrium with a free good: A free good is a good which has abundant in supply. A consumer need not pay money to consume the commodity. In such a case consumer will be in equilibrium when he is fully satisfied with the product. Thus the condition of equilibrium is the point of maximum utility i.e., TU is maximum or MU is equal to zero.

Consumer equilibrium with a single economic good: An economic good is one with scarcity. A consumer need to pay money for consuming such a product. In such a case consumer will be in equilibrium when the price he is paying is equal to the marginal utility. Thus the condition of equilibrium is the point of equality between price and MU i.e., MU= Price. It is the point of equality between utility foregone and utility gained. Such a situation is shown in the figure below.

Importance of the Law of Diminishing Marginal Utility:

- In the field of public finance, this law has a practical application, imposing a heavier burden on the rich people.
- This law is the base of some other economic laws such as law of demand, elasticity of demand, consumer surplus and the law of substitution etc.
- The value of commodity falls by increasing the supply of a commodity. It forms a basis of the theory of value. In this way prices are determined

Law of Equi-Marginal Utility:

The **law of equi-marginal utility** was presented in 19th century by an Australian economists H. H. Gossen. It is also known as law of maximum satisfaction or law of substitution or Gossen's second law. A consumer has number of wants. He tries to spend limited income on different things in such a way that marginal utility of all things is equal. When he buys several things with given money income he equalizes marginal utilities of all such things. The law of equi marginal utility is an extension of the [law of diminishing marginal utility](#). The consumer can get maximum utility by allocating income among commodities in such a way that last dollar spent on each item provides the same marginal utility.

Definition:

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

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

Symbolically

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \frac{MU_z}{P_z} = \dots\dots MUM$$

Where MU_x , MU_y , MU_z denotes Marginal utilities of various commodities P_x, P_y, P_z ect denotes prices of respective products. So at the point of equilibrium the ratio of marginal utility and price of one commodity should be equal to the same ratios of other commodities.

Explanation with Schedule and Diagram:

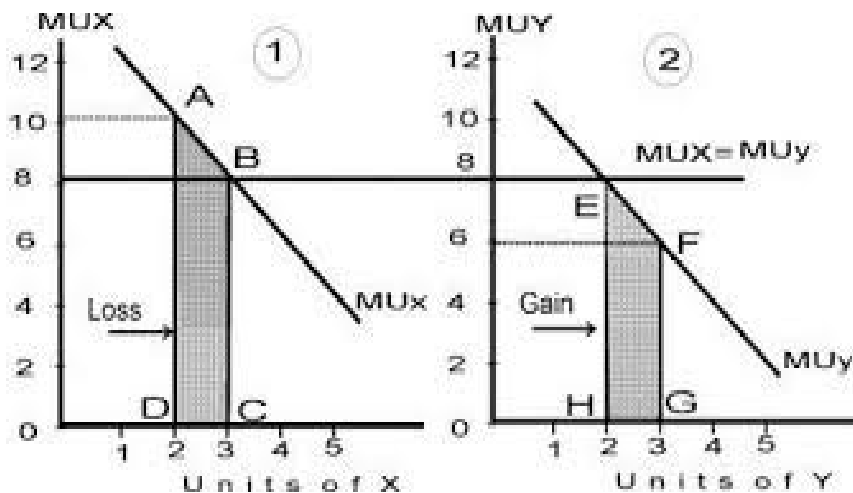
The law of substitution can be explained with the help of an example. Suppose consumer has a fixed amount of money that he wants to spend on product X and product Y in order to obtain maximum total utility. The following table with an imaginary utility schedule shows marginal utility (MU) of spending additional dollars of income on X and Y.

UNITS OF CONSUMPTION	1	2	3	4	5
MU of X	18	15	12	9	7
MU of Y	16	13	9	6	4

Here the consumer equilibrium is attained when he consumes 4X + 3Y. By consuming this much quantity, the income of the consumer is finished. In order to increase one unit X he will have to decrease one unit Y from his consumption. So all other possible combinations provides the consumer lower satisfaction than the current situation.

Possible Combinations	4X + 3Y	3X + 4Y	5X + 2Y
Total Utility	54+38 = 92	45+44 = 89	61+29 = 90

The theory is illustrated in the following figure:



Here, consumer is in equilibrium When he consumes OC of commodity X and OH of commodity Y. A change in this combination leads to more loss in utility than the gain in utility. So as per the law of Equi marginal utility, in case of two commodities, a consumer realises maximum satisfaction when marginal utilities of different directions of expenditures are equal.

Exceptions or Limitations of cardinal analysis:

- The law of DMU does not hold well in the rare collections such as ancient coins, stamps Historical things
- The law is not fully applicable to money. The marginal utility of money declines but never falls to zero.
- It does not apply to the knowledge, art and innovations.
- The law is not applicable for precious goods.
- Law does not operate if consumer behaves in irrational manner. (For example, drunkard)
- The utility increases due to demonstration.

2. What is consumer equilibrium? Explain how consumer equilibrium is attained using indifference curve analysis?

Consumer behavior under ordinal utility or Ordinal Utility Approach:

The ordinal utility approach was introduced by J R Hicks and R J D Allen. The basic idea behind **ordinal utility approach** utility is not measured but can be compared using ordinal numbers. Besides, this approach tells us that a consumer keeps number of pairs of two commodities in his mind which give him equal level of satisfaction. This means that the utility can be ranked qualitatively.

The ordinal utility approach differs from the [cardinal utility approach](#) in the sense that the satisfaction derived from various commodities cannot be measured objectively.

Ordinal theory is also known as neo-classical theory of consumer equilibrium, Hicksian theory of consumer behavior, indifference curve theory, optimal choice theory.

Assumptions

The ordinal utility approach is based on the following assumptions:

- A consumer substitutes commodities rationally in order to maximize his level of satisfaction.
- A consumer can rank his preferences according to the satisfaction of each basket of goods.
- The consumer is consistent in his choices.
- It is assumed that each of the good is divisible.
- It is assumed that the consumer has full knowledge of prices in the market.
- The consumer's scale of preferences is so complete that consumer is indifferent between them.
- Two commodities are used by the consumer. It is also known as two commodities model.
- Two commodities X and Y are substitutes of each other. These commodities can be easily substituted in various pairs.

Indifference curve

There are various combinations of two commodities available to the consumer. The consumer is grouping certain combinations as a set such that all the combinations from same group will provide him same level of satisfaction. Consider the following sets of combinations

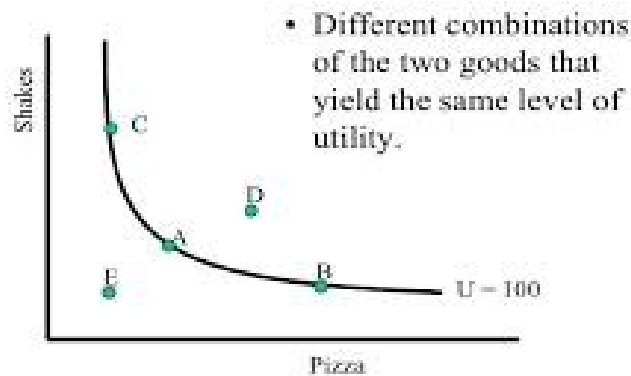
Set I	Set II
a= $1x+5y$	d= $2x+6y$
b= $2x+3y$	e= $3x+4y$
c= $3x+4y$	f= $4x+3y$

In set I combinations as the consumer moves from combination 'a' to combination 'b' and then to 'c', the consumption of x increases and consumption of y decreases. Here all the points provides the consumer same level of satisfaction. It can be plotted in a diagram and by joining points a, b and c, it is possible to derive a curve which is known as indifference curve.

Thus "an Indifference curves show different combination of two goods which give consumers the same level of satisfaction". In other words, consumers will be indifferent to the different

combination of goods because they give same satisfaction. The following picture depicts nature of an indifference curve.

Indifference Curves



Indifference Map: theoretically it is possible to represent various indifference curves on same diagram and it is called indifference map. It is shown below.

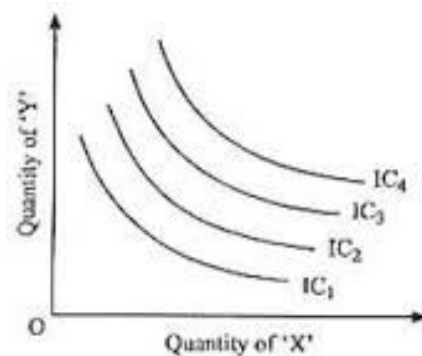


Fig. 5.2: Indifference Map

The following points can be derived from an indifference map.

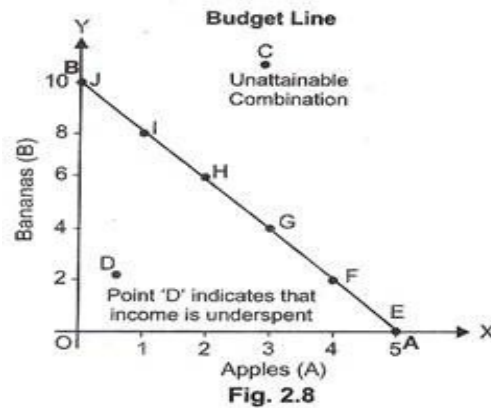
1. An indifference curve represent a particular level of satisfaction
2. All the points on one indifference curve represent same level of satisfaction.
3. Higher the IC, Higher will be the level of satisfaction and lower the IC lower will be the level of satisfaction.
4. Since a consumer is rational, he always prefer higher IC than lower IC.

Budget constraints or Budget line

Before moving to consumer equilibrium, it is necessary to assess how much of commodities can be purchased by the consumer. It depends upon the income level of the consumer and the prices of respective commodities. This is the budget constraint.

Budget line or Income Price Line is the graphical representation of all possible combination of two commodities that can be purchased by the consumer by using his given income.

Consider the following illustration:



In the picture

- OA = Maximum Quantity of apples that can be purchased by the consumer along with zero Banana consumption.
- OB = Maximum Quantity of Bananas that can be purchased by the consumer along with zero apples consumption
- Points J, I, H, G, F, E = Possible consumption points.
- Point D = Inferior point (Entire income is not spent)
- Point C = Un attainable or beyond the reach of the income of the consumer.

So a rational consumer always wants to consume maximum and therefore he will consume a point on the income price line. Thus Budget line or Income Price Line is the graphical representation of all possible combination of two commodities that can be purchased by the consumer by using his given income. Slope of budget line is the price ratios of two commodities.

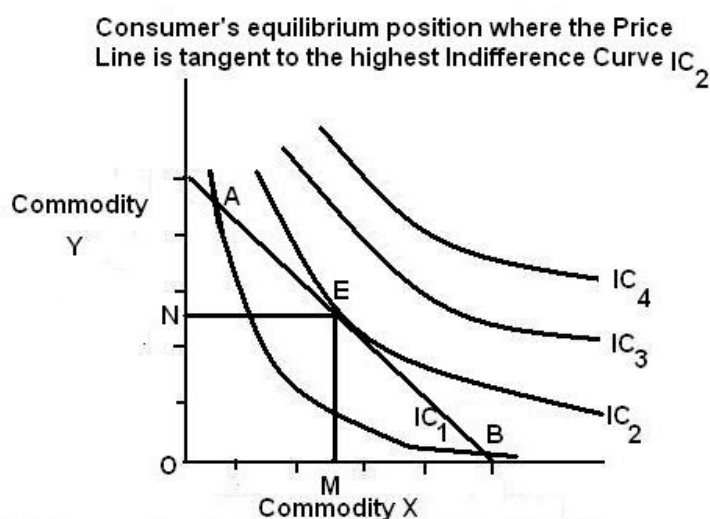
When income of the consumer is changed, there will be a parallel shift of income price line either upward or downward. Income increase will be represented by an upward shift of budget line and vice versa.

When price of a product is changed, the maximum quantity of a product that can be purchased will be altered. A price increase will decrease the amount that can be purchased and it makes the budget line steeper and vice versa.

Equilibrium of the consumer under ordinal utility

Consumer equilibrium using ordinal utility analysis is attained by incorporating income price line and indifference in same diagram. At equilibrium point, the slopes of income price line and

indifference curve are equal. It is the point of tangency between both. This is illustrated in the following figure.



All other possible combinations represent either lower satisfaction or an unattainable point. Thus consumer equilibrium as per indifference analysis is the point of tangency between income price line and indifference curve.

3. How far indifference curve analysis is superior to Marshallian cardinal utility analysis?

The indifference curve technique, as developed by Professor Allen and Hicks, is regarded as an improvement over the Marshallian utility analysis because it is based on fewer and more realistic assumptions.

- It dispenses with Cardinal Measurement of Utility and utility is measured ordinally. The ordinal method and the assumption of transitivity make this technique more realistic.
- It studies Combinations of two Goods instead of one Good: Marshall avoided the discussion of substitutes and complementary goods by grouping them together as one commodity. Indifference curve technique is a two-commodity model which discusses consumer behavior in the case of substitutes, complementaries and unrelated goods. It is, thus, superior to the utility analysis.
- It provides a Better Classification of Goods into Substitutes and Complements: The earlier economists explained substitutes and complements in terms of cross elasticity of demand.
- It explains the Law of Diminishing Marginal Utility without the Unrealistic assumptions of the Utility Analysis: In the preference theory, this law has been replaced by the principle of diminishing marginal rate of substitution. The application of this principle in the fields of consumption, production and distribution has made economics more realistic.

- It is Free from the Assumption of Constant Marginal Utility of Money: Indifference analysis consider money as a commodity and not as a measurement of utility.
- This Analysis explains the Dual Effect of the Price Effect: The indifference curve technique is definitely superior to the utility analysis because it discusses the income effect when the consumer's income changes; the price effect when the price of a particular good changes and its dual effect in the form of the income and substitution effects. It also studies the cross effect when with change in the consumer's income, the price of the other good also changes.
- It rehabilitates the Concept of Consumer's Surplus: The doctrine of consumer's surplus is no longer a 'mathematical puzzle' and has been freed from the introspective cardinalism of the utility theory.
- It explains the Law of Demand more realistically: It explained demand theory by using price consumption curve and classified goods into normal, inferior and Giffen commodities.

Marshall failed to explain these cases. This makes the indifference curve technique definitely superior to the Marshallian introspective cardinalism.

4. Prove that price effect is a combination of income effect and substitution effects.

Decomposition of Price effect into income effect and substitution Effect - Hicksian method

According to the law of demand, there is inverse relationship between prices of commodities and its demand. This law of demand operates because of the working of income effect and substitution effect.

Price effect: Price effect is the change in quantity demanded of a commodity due to change in price of the same commodity. Price effect is the combination of income effect and substitution effect. OR

$$\text{Price Effect} = \text{Substitution Effect} + \text{Income Effect}$$

Income effect or Income effect of a price change: When price of a commodity is decreased, it creates an effect of increase in the money income of the consumer. It means that consumer require only less amount of money to purchase the same old quantity. The effect of this increased money income is termed as 'income effect of a price change' or income effect. Income effect may be positive or negative. Income effect is positive in case of normal goods and Income effect is negative in case of inferior goods.

Substitution effect: When price of the commodity is decreased, that product will become cheaper as compared to the high priced substitutes. So consumer will have a tendency to use more of this low priced product. This effect is termed as Substitution effect. Substitution effect is always positive.

Theoretically price effect is a combination of income effect and substitution effect. It can be illustrated in the following table.

EFFECT OF FALL IN PRICE OF A PRODUCT

Income effect (direction of change)	Substitution effect (direction of change)	Price effect (direction of change)	Nature of the product	Final remarks
Positive (increase in Qty Demanded)	Positive (increase in Qty Demanded)	Positive (increase in Qty Demanded)	Normal	Law of demand is operated
Negative (Decrease in Qty Demanded weaker than Sub Effect)	Positive (increase in Qty Demanded)	Positive (increase in Qty Demanded)	Inferior	Law of demand is operated
Negative (Decrease in Qty Demanded- Stronger than Substitution Effect)	Positive (increase in Qty Demanded)	Negative (Decrease in Qty Demanded)	Giffen	Law of demand is not operated

From the table it can be concluded that all Inferior goods with negative income effect may not be giffen goods. But all giffen goods will be inferior goods with stronger negative income effect.

Decomposition of Price effect into income effect and substitution Effect

Theoretically it is possible to de compose price effect into income and substitution effects. Price effect can be easily identified from the price consumption curve. To separate price effect into income effect and substitution effect, one of these effects are to be eliminated. There are two methods to do this. One method is developed by Hicks and another method is developed by Slutsky.

Hicksian method:

Hicksian approach uses two methods of splitting the price effect, namely:

- Compensating variation in income
- Equivalent variation in income.

Compensating variation in income: The decomposition of price effect into income effect and substitution effect through compensating variation method for a normal commodity can be explained with the following illustration.

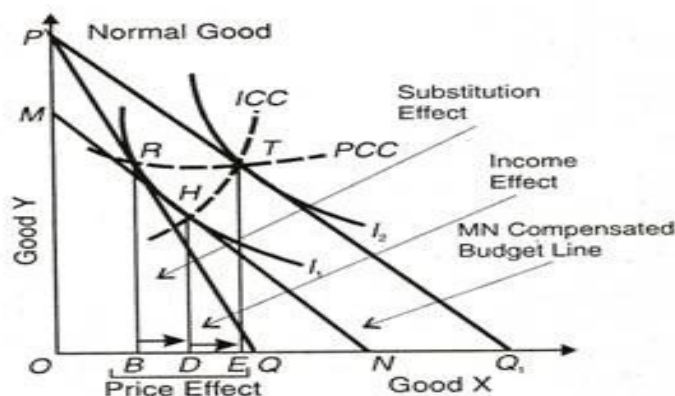


Fig. 12.19

The process of decomposing can explained in three stages

Stage 1: Measurement of Price effect. In the figure, PQ is the original income price line with an equilibrium point R on indifference curve I_1 . When price of the commodity is decreased, new income price line is PQ_1 with equilibrium point T on indifference curve I_2 . Thus price effect is the movement from R to T with an increase in consumption from OB to OE on x axis. Thus **PRICE EFFECT = BE**

Stage 2: Measurement of Substitution effect. To calculate substitution effect, income effect is to be eliminated from price effect. For this a portion of money income is to be taken away from the consumer. This is done by keeping the consumer at the same old level of satisfaction. Hicks calls this process as "**Compensating Variation in Income**". Thus compensating variation in income is the process of eliminating income effect of a price change when price of the product is decreased.

In the figure PM is the amount of money taken away from the consumer. After this compensating variation in income, the new income price line is MN with an equilibrium point H on the original indifference curve I_1 . Here budget line MN is parallel to PQ_1 . Now the income effect is eliminated and the movement of equilibrium point from R to H is due to substitution effect. This increases the consumption of the product from OB to OD. Thus **SUBSTITUTION EFFECT = BD**

Stage 3: Measurement of Income effect: To calculate income effect, the amount of money which was taken away from the consumer is given back to him. This leads to the shift of budget line from MN to PQ_1 with equilibrium point T on indifference curve I_2 . This movement of equilibrium from H to T is due to Income effect. Income effect increases the quantity of consumption from OD to OE. Thus **INCOME EFFECT = DE**

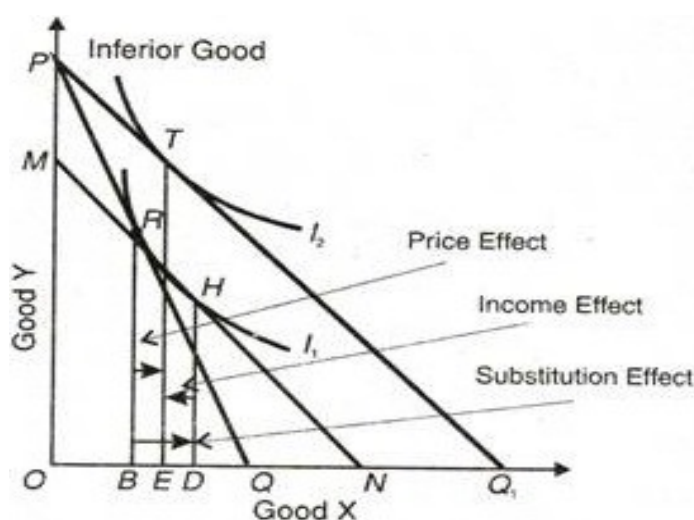
Thus

Price effect	BE (Positive)
Substitution effect	BD (Positive)
Income effect	BE – BD = DE (Positive)

Thus it is proved that price effect is a combination of Income effect and Substitution effect.

Decomposition of Price effect: Inferior Commodity (with negative Income effect)

The decomposition of price effect into income effect and substitution effect in case of an inferior good is demonstrated in the figure below.



In the figure:

Original income price line: PQ (with equilibrium point R)

Budget line after decrease in price of X: PQ1 (with equilibrium point T)

Budget line after compensating variation in income : MN (with equilibrium point H)

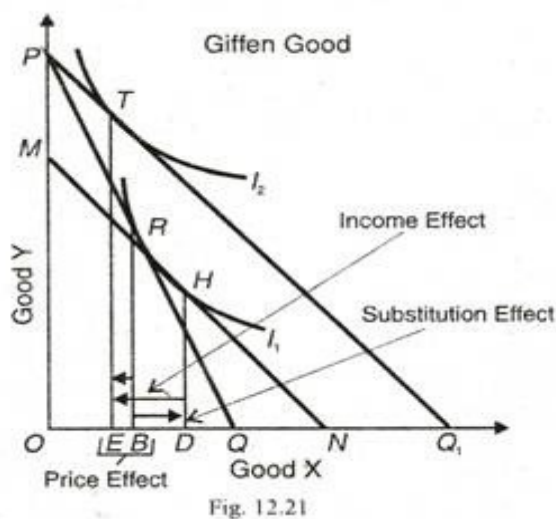
In the case of an inferior good, the negative income effect is weaker than the positive substitution effect so that the total price effect is positive. Thus

Price effect	BE (Positive)
Substitution effect	BD (Positive)
Income effect	BE - BD = DE (Negative)

Thus commodity X is an ordinary inferior good.

Decomposition of Price effect: Giffen Commodity (with negative Income effect and Negative price effect)

The decomposition of price effect into income effect and substitution effect in case of an Giffen good is demonstrated in the figure below.



In the figure:

Original income price line: PQ (with equilibrium point R)

Budget line after decrease in price of X: PQ1 (with equilibrium point T)

Budget line after compensating variation in income : MN (with equilibrium point H)

In the case of an Giffen good, the negative income effect is greater than the positive substitution effect so that the total price effect is Negative. Thus

Price effect	BE (Positive)
Substitution effect	BD (Positive)
Income effect	BE – BD = DE (Negative and greater than BD)

Thus commodity X is a Giffen good.

To conclude, Hicks used compensating variation in income to decompose price effect into income effect and substitution effect. This process can be applied to identify the nature of the product, such as normal, inferior, and Giffen ect

According to Hicks, a Giffen good must satisfy the following conditions:

- the consumer must spend a large part of his income on it
- it must be an inferior good with strong negative income effect
- the substitution effect must be weak

But Giffen goods are very rare which may satisfy these conditions.

5. Compare Hicksian and Slutsky methods of de composing price effect into income effect and substitution effects?

According to the law of demand, there is inverse relationship between prices of commodities and its demand. This law of demand operates because of the working of income effect and substitution effect.

Price effect: Price effect is the change in quantity demanded of a commodity due to change in price of the same commodity. Price effect is the combination of income effect and substitution effect. OR

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Theoretically price effect is a combination of income effect and substitution effect. It can be illustrated in the following table.

Decomposition of Price effect into income effect and substitution Effect

Theoretically it is possible to de compose price effect into income and substitution effects. Price effect can be easily identified from the price consumption curve. To separate price effect into income effect and substitution effect, one of these effects are to be eliminated. There are two methods to do this. One method is developed by Hicks and another method is developed by Slutsky.

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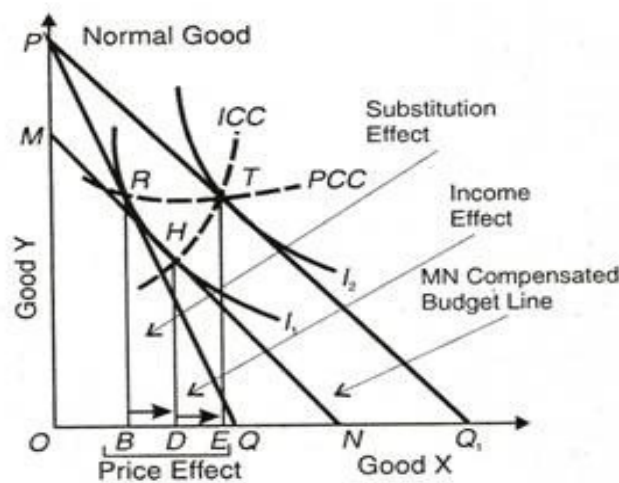


Fig. 12.19

The process of decomposing can explained in three stages

Stage 1: Measurement of Price effect. In the figure, PQ is the original income price line with an equilibrium point R on indifference curve I_1 . When price of the commodity is decreased, new income price line is PQ_1 with equilibrium point T on indifference curve I_2 . Thus price effect is the movement from R to T with an increase in consumption from OB to OE on x axis. Thus **PRICE EFFECT = BE**

Stage 2: Measurement of Substitution effect. To calculate substitution effect, income effect is to be eliminated from price effect. For this a portion of money income is to be taken away from the consumer. This is done by keeping the consumer at the same old level of satisfaction. Hicks calls this process as “**Compensating Variation in Income**”. Thus compensating variation in income is the process of eliminating income effect of a price change when price of the product is decreased.

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Stage 3: Measurement of Income effect: To calculate income effect, the amount of money which was taken away from the consumer is given back to him. This leads to the shift of budget line from

MN to PQ1 with equilibrium point T on indifference curve I2. This movement of equilibrium from H to T is due to Income effect. Income effect increases the quantity of consumption from OD to OE. Thus **INCOME EFFECT = DE**

Thus

Price effect	BE (Positive)
Substitution effect	BD (Positive)
Income effect	BE – BD = DE (Positive)

Thus it is proved that price effect is a combination of Income effect and Substitution effect.

Decomposition of Price effect into income effect and substitution Effect : Slutsky’s methods Normal product

Theoretically Hicksian method and Slutsky methods are the same except in one condition. Hicks used the term ‘compensating variation in income’. But the same process is applied by hicks and it is termed as ‘cost difference’. In Hicksian method, we have kept the satisfaction level of the consumer constant by keeping him on the same indifference curve. But in Slutsky method to isolate the substitution effect we adjust the consumer’s money income through cost difference so that the consumer can just afford the original combination of the commodities. In other words we are holding purchasing power of the consumer constant. Here consumer is able to purchase the same old combination of the products.

The decomposition of price effect into income effect and substitution effect through cost difference method for a normal commodity can be explained with the following illustration:

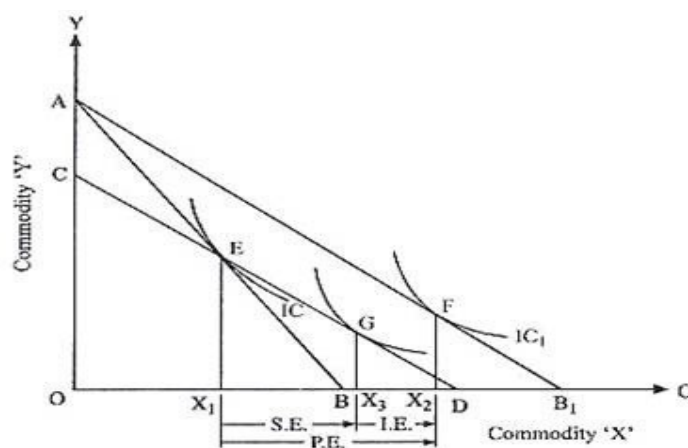


Fig. 5.49: Break up of Price Effect into Substitution Effect and Income Effect (Slutsky Approach)

In the figure:

Original income price line: AB (with equilibrium point E)

Budget line after a rise in price of X: AB1 (with equilibrium point F)

Amount of money Taken away from the consumer : AD

Budget line after cost difference: CD (with equilibrium point G)

The budget line after cost difference is passing through the original equilibrium point E. This help the consumer to purchase the initial quantity of commodity X. Here,

Price effect	X_1X_2 (Positive)
Substitution effect	X_1X_3 (Positive)
Income effect	$X_1X_2 - X_1X_3 = X_3X_2$ (Positive)

Thus commodity X is a normal good.

6. Explain revealed preference theory? OR Explain Samuelsson’s theory of consumer behavior?

Theory of Revealed Preference – Revealed Preference axiom

Professor Samuelson’s Revealed Preference Theory is a behaviourist ordinal utility analysis as distinct from the introspective ordinal utility theory of Hicks and Allen. It is ‘the third root of the logical theory of demand’, and has been called by Hicks as the Direct Consistency Test under strong ordering. This theory analyses consumer’s preference for a combination of goods on the basis of observed consumer behaviour in the market.

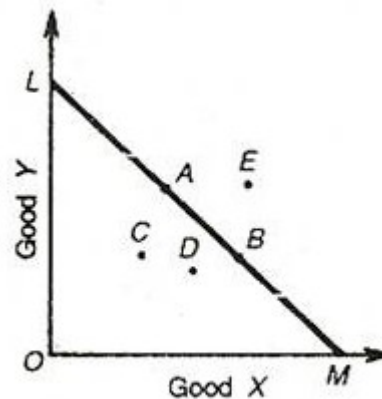
Choice Reveals Preference:

Prof. Samuelson’s theory of demand is based on the revealed preference axiom or Revealed preference hypothesis. **It states that choice reveals preference.** A consumer buys a combination of two goods either because he likes this combination in relation to others or this is cheaper than others. Suppose the consumer buys combination A rather than combination B, C or D. It means that he reveals his preference for combination A.

A consumer can do this for two reasons.

- Combination A may be cheaper than the other combinations such as B, C, D.
- Combination A may be dearer than others and even then he likes it more than other combinations.

In such a situation, it can be said that A is revealed preferred to B, C, D or B, C, D are revealed inferior to A. This is explained in the following figure.



Given the income and prices of the two goods X and Y the following things can be derived .

- LM is the income price line or budget line of the consumer.
- The triangle OLM is the area of choice for the consumer. In other words, the consumer can choose any combination like A and B on the line.
- If he chooses A, it is revealed preferred to B.
- Combinations C and D are revealed inferior to A because they are below the price-income line LM.
- Combination E is beyond the reach of the consumer because it lies above his price-income line LM. Therefore, A is revealed preferred to other combinations within and on the triangle OLM.

The Law of Demand:

Prof. Samuelson establishes the law of demand directly on the basis of his revealed preference hypothesis without the use of indifference curves and the restrictive assumptions associated with them.

Samuelson's law of demand is based on the following assumptions:

- The consumer's tastes do not change.
- His choice for a combination reveals his preference for that.
- The consumer chooses only one combination at a given price-income line.
- He prefers a combination of more goods to less in any situation.
- The consumer's choice is based on strong ordering. Strong ordering is the absence of indifference.
- It assumes consistency of consumer behaviour. If A is preferred to B in one situation, B cannot be preferred to A in the other situation.

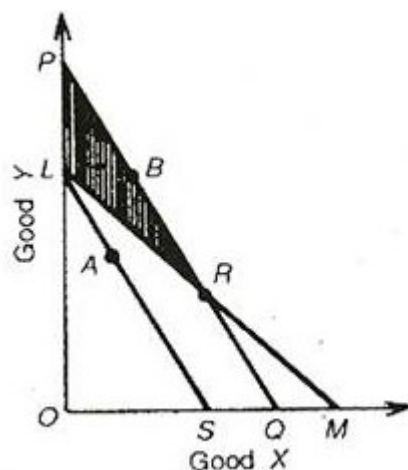
- This theory is based on the assumption of transitivity. Transitivity here refers to three-term consistency. If A is preferred to B, and B to C, then the consumer must prefer A to C.
- Income elasticity of demand is positive i.e., more commodity is demanded when income increases, and less when income falls.

Fundamental Theorem or Demand Theorem:

Given these assumptions, Samuelson states his “Fundamental Theorem of Consumption Theory,” also known as demand theorem, thus: “Any good (simple or composite) that is known always to increase in demand when money income alone rises must definitely shrink in demand when its price alone rises.” It means that when income elasticity of demand is positive, price elasticity of demand is negative. This can be shown both in the case of a rise and a fall in the price of a good.

Rise in Price:

To prove this Fundamental Theorem, let us divide it into two stages. Consider the following figure:



Firstly, take a consumer who spends his entire income on two goods X and Y.

- LM is his original income-price line
- The consumer is observed to have chosen the combination represented by R
- The triangle OLM is the consumer’s area of choice for the different combinations of V and Y.
- By choosing only the combination R, the consumer is revealed to have preferred this combination to all others in or on the triangle OLM.
- Suppose the price of X rises, the price of Y remaining constant so that the new price-income line is LS.
- Now he chooses a new point A which shows that the consumer will buy less of X than before as the price of X” has risen.

- In order to compensate the consumer for the loss in his real income as a result of rise in the price of X, let us give him LP amount of money. As a result, PQ becomes his new price-income line which is parallel to the LS line and passes through point R. Prof. Samuelson calls it **Over Compensation Effect**. Now the triangle OPQ becomes his area of choice.
- Since R was revealed preferred to any other point on the original price-income line LM, all points lying below R on the RQ segment of PO line will be inconsistent with consumer behaviour.
- This is because he cannot have more of X when its price has risen. The consumer will, therefore, reject all combinations below R and choose either combination R or any other combination in the shaded area LRP on the segment PR of the price-income line PQ.
- If he chooses the combination R, he will buy the same quantities of X and Y which he was buying before the rise in the price of X. On the other hand, if he chooses the combination B, he will buy less of X and more of Y than before.

In the second stage, if the packet of extra money LP given to the consumer is taken back, he will be to the left of R at point A on the price-income line LS where he will buy less of X, if the income elasticity of demand for X is positive. Since with the rise in the price of X, its demand has fallen (when the consumer is at point A), it is proved when income elasticity is positive, price elasticity is negative. Thus the law of demand is proved. With the rise in the price of X, the consumer buys less of X.

It is to be noted that Samuelson's explanation of the substitution effect is different from that of the indifference curve analysis. Since indifference curves are not assumed in RPT, the substitution effect is a movement along the price-income line arising from changing relative prices.

Short Essay (paragraph) type questions (5 marks):

1. **Distinguish between marginal utility and total utility (See Essay questions)**
2. **Explain the law of diminishing marginal utility? (See Essay questions)**
3. **Explain the law of equi-marginal utility? (See Essay questions)**
4. **What are the assumptions of cardinal utility analysis? (See Essay questions)**
5. **What are the properties of indifference curves?**
6. **Explain a budget line.(See Essay questions)**
7. **Explain the law of diminishing marginal rate of substitution?**

Marginal rate of substitution is a tool of indifference curve analysis. A consumer can maintain his satisfaction at the same level, by sacrificing some units of the commodity on the vertical axis. A consumer can get one unit of commodity X by giving up five units of commodity Y and maintains his satisfaction at the same level. Rate of substitution is the rate at

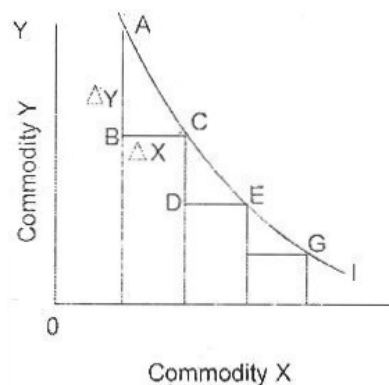
which one commodity is to be substituted against how much of another. To use a particular quantity of one product, how much of another product is to be sacrificed by keeping the consumer in same satisfaction level is explained in Rate of Substitution. In fact marginal rate of substitution is the rate of exchange between some units of goods X and Y that are equally preferred. The marginal rate of substitution of X for Y is the amount of Y that will be given up for obtaining each additional unit of X. Professor BILAS says that the marginal rate of substitution of X for Y is defined as the amount of Y the consumer is just willing to give up to get one more unit of X and maintains the same level of satisfaction.

In the following sets of combinations $a=1x+5y$, $b=2x+3y$, $c= 3x+4y$, as consumer move from a to b, one unit x is added and 2 units of y are eliminated without affecting the total satisfaction. Movement from b to c also increases the amount of x by one unit, but the amount sacrificed for it is only 1 y. This is the law of Diminishing Marginal Rate of Substitution (DMRS).

In other words DMRS explains that by keeping the total satisfaction level constant, the amount of one commodity removed for increasing the quantity of another commodity goes on diminishing. This is the reason for the convexity of indifference curves. The marginal rate of substitution diminishes because

- (1) each particular want is satiable and
- (2) goods are not perfect substitutes of one another.

The following figure illustrates this.



It is clear from the figure that as consumer increases more and more equal quantities ($BC=DE$) of commodity X, less and less of Commodity Y are removed ($AB>CD$).

8. What is income consumption curve? Explain it with a diagram?

Income effect - and Income consumption curve.

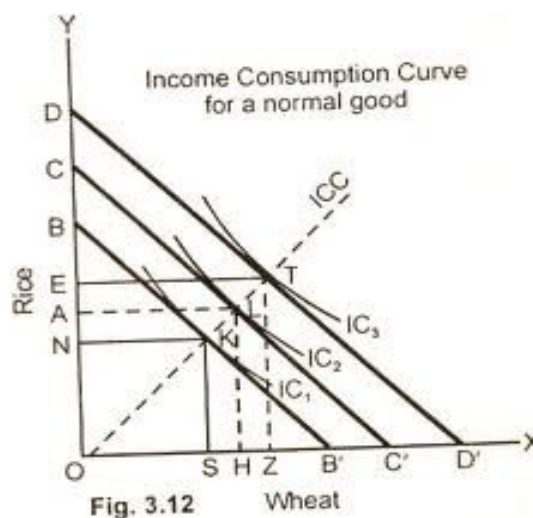
Income effect is the change in consumption of a commodity when income of the consumer is changed. When income of the consumer is changed, the maximum quantity of both the products that can be purchased by the consumer will be altered and thus there will be a parallel shift of

income price line either upward or downward. Income increase will be represented by an upward shift of budget line and vice versa.

Types of Income Effect: There are two types of income effect.

- **Positive income effect:** When with the increase in income, there is increase in consumption, that is known as Positive Income Effect. Income effect is positive to normal commodities.
- **Negative Income Effect:** when with the increase in income there is decrease in consumption, that is known as Negative Income Effect. The negative income effect is applicable in case of inferior goods. Inferior goods are those goods, which are purchased less as one's income rises.

When income price line is changed, the equilibrium point will be shifted of to a new position where the new income price line is tangent to another indifference curve. Such equilibrium points can be connected and that line is known as income consumption curve. ICC is positively sloped in case of a normal commodity. It is explained in the following diagram



Income increase results in a parallel shift of budget line from BB' to CC' and then to DD' and thus equilibrium points also shifts from K to L and then to T. By connecting K, L and T, we can derive income consumption curve.

Thus income consumption curve is the locus of different equilibrium points when income of the consumer is changed.

9. What is income consumption curve? Explain the case of an inferior commodity?

Income consumption curve of an inferior good

Inferior goods are those goods whose income effect is negative. In such a case when income of the consumer is increased, the quantity consumed of the product under consideration will be decreased. So ICC will be backward bending. This is illustrated in the following figure.

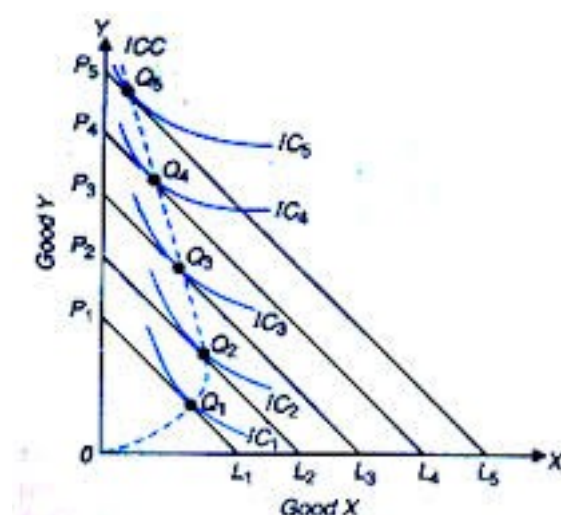


Fig. 8.29. Income Consumption Curve in Case of Good X being Inferior Good

In the figure above, as income of the consumer is increased, the income price line shifts from P1L1 to P2L2, P3L3 ect to P5L5. As a result the equilibrium points also shifts from Q1,Q2.....Q5. by connecting these equilibrium points, the ICC is derived (dotted line in the figure) and it is backward bending.

10. What is consumers surplus? What is the difference between Marshallian and Hicksian consumers surplus?

Consumer surplus - Marshall and Hicks.

Then concept of consumers' surplus is originally introduced by a French engineer, Arsene Julis. Dupuit in 1844. Then it is propounded by Alfred Marshall and Prof J.R. Hicks.

According to marshall, Consumer's surplus is the excess of what we are prepared to pay over what we actually pay for a commodity. It is the difference between what we are prepared to pay and what we actually pay.

Thus, Consumer's surplus = what one is prepared to pay minus what one actually pays.

We can put it in the form of an equation thus:

Consumer's Surplus = Total Utility – Total Amount Spent.

We can illustrate the concept of consumer's surplus with the help of the table given below:

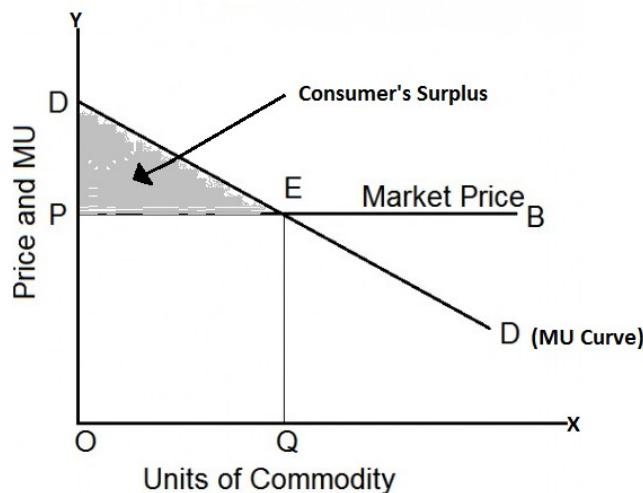
Units consumed	Marginal utility	Price per unit	Consumers surplus
1	20	8	12
2	15	8	7
3	12	8	4
4	10	8	2
5	8	8	0

It is assumed in the above table that the price of the product is Rs 8/- P per unit. The consumer will purchase as many units as make his marginal utility equal to the price.

Thus he will purchase 5 units and pays 8/- per unit. In this way he will spend in all Rs. 40/- But the total utility of the 5 units is equal to 65 units. He thus gets a consumer's surplus equal to $(65 - 40) = 25$ units.

Diagrammatic Representation:

We can represent consumer surplus with the help of the following diagram.



In the figure

Total utility derived by the consumer: ODEQ

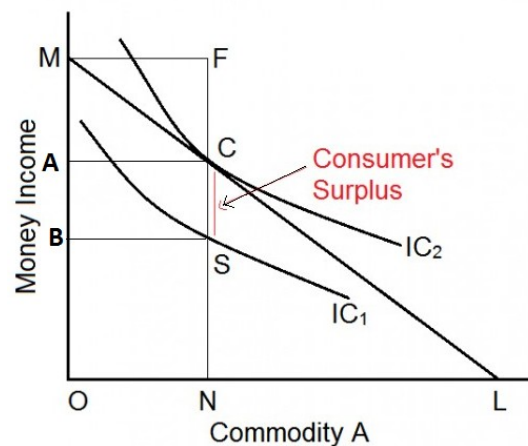
Total price paid by the consumer: OPEQ

Therefore consumers surplus: $ODEQ - OPEQ = PDE$

J.R. Hicks' Method of Measuring Consumer's Surplus

Prof. J.R. Hicks and R.G.D. Allen have criticised Marshallian assumptions of consumers surplus and introduced indifference curve approach to measure consumer's surplus..

Hicksian consumers surplus is explained in the following figure:



In figure 4, horizontal axis measures commodity A and vertical axis measures money income of the consumer. The explanation of the concept can be done in two steps.

Step 1: Assume that the consumer does not know the price of commodity A. This means that there is no price line or budget line to optimize his consumption. Therefore, he is on the combination S on indifference curve IC_1 . At point S, the consumer has ON quantity of commodity A and OB amount of money. This implies that the consumer has spent FS amount of money on ON quantity of commodity A.

Step 2: Assume that the consumer knows the price of commodity A. Hence, he can draw his price line or budget line ML. With this price line ML, the consumer realizes that he can shift to a higher indifference curve IC_2 . At equilibrium point C, the consumer has ON quantity of the commodity and OA amount of money. This implies that the consumer has spent less amount of money than expected for ON quantity of commodity A.. Therefore, CS is the consumer's surplus.

Therefore Hicksian consumers surplus is

- (a) The movement from a lower to a higher indifference curve.
- (b) The spending of less money on a commodity than expected
- (c) The possession of more money income than expected

The Hicks' version of measuring consumer's surplus attains results without Marshall's doubtful assumption. Hence, Hicks' version is considered to be superior to that of Marshall's.

11. What are Engel curves?

Engel curve - Normal good

Engel curve is named after a 19th century German statistician Christian Lorenz Ernst Engel, who developed it for the first time. Income consumption can be used to derive this curve. Engel curve indicates the relationship between the income level and the quantity of the commodity purchased by the consumer

Derivation of Engel curve for commodity 'X' is illustrated in the following figure.

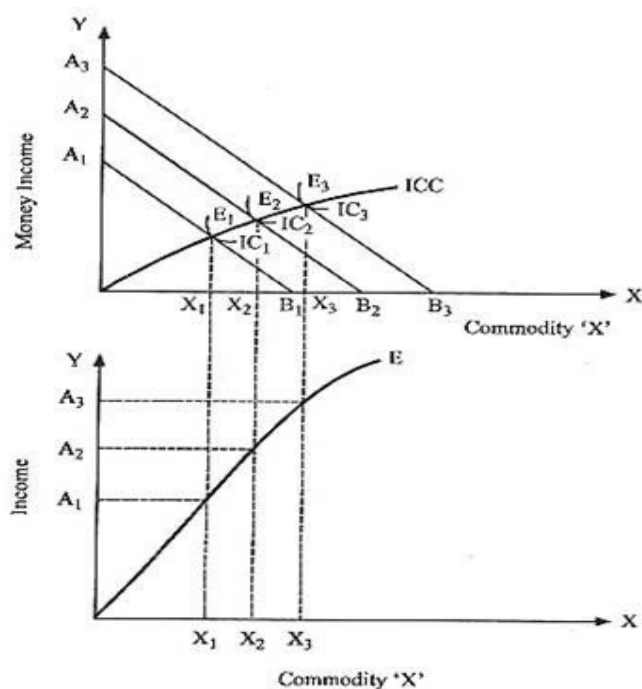


Fig. 5.38: Derivation of an Engel Curve for Commodity 'X'

Derivation of Engel curve for commodity X

In upper panel of Figure three parallel budget lines A_1B_1 , A_2B_2 and A_3B_3 correspond to OA_1 , OA_2 and OA_3 levels of money income respectively, prices of the commodities remaining constant. The income consumption curve (ICC) is obtained by joining different equilibrium points E_1, E_2 and E_3 . Each equilibrium point on the ICC corresponds to a particular quantity of commodity 'X'. Each point on the ICC also corresponds to a particular money income.

The various pairs of the income and the quantity purchased of commodity 'X' ((OA_1, OX_1) , (OA_2, OX_2) and (OA_3, OX_3)) corresponding to three equilibrium points E_1, E_2 and E_3 are plotted in the lower panel of the figure to obtain the Engel curve. This Engel curve indicates the relationship between the income level and the quantity of the commodity purchased by the consumer.

12. Explain Engel curve of an inferior good?

Engel Curve and Inferior Goods:

The shape of Engel curve depends upon the shape of income consumption curve (ICC). Inferior goods are the products with negative income effect. Such a case ICC slopes backward. The Engel curve also will have a negative slope.

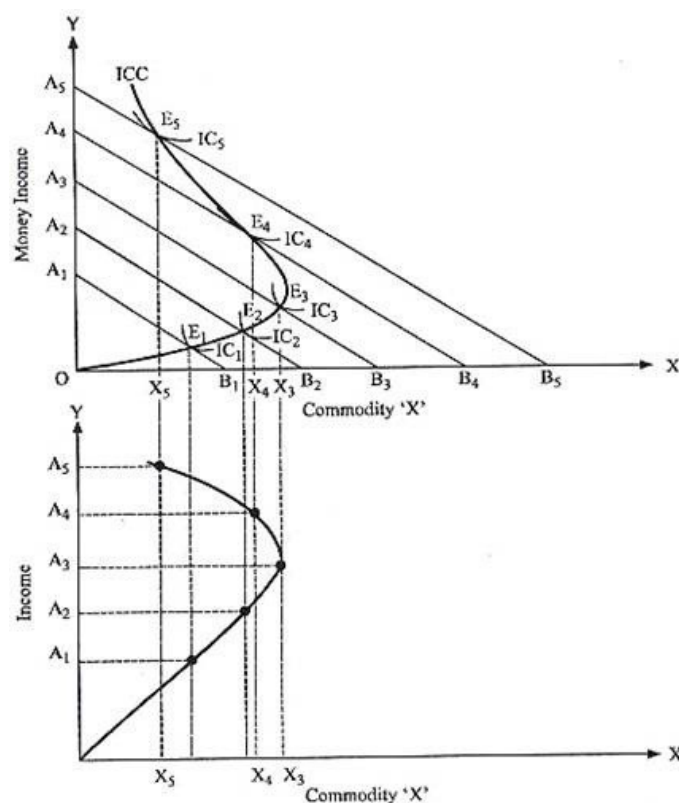


Fig. 5.39: Derivation of an Engel Curve for an Inferior Commodity

Derivation of Engel curve for an inferior commodity X

In the figure, ICC rises upto point E₃ and bends backward beyond this point. When various income levels OA₁, OA₂, OA₃, OA₄ and OA₅ are plotted against the quantities demanded corresponding to equilibrium points (E₁, E₂, E₃, E₄ and E₅ respectively) on these budget lines in the lower panel diagram, an Engel curve is formed for the inferior commodity 'X'.

This Engel curve rises upward (positive slope) initially, but bends backward beyond a point. Its shape is again similar to that of the income consumption curve.

13. What is the superiority of Revealed preference theory over indifference curve analysis?

Hicksian Indifference curve analysis

Based on psychological introspective information

Assumes continuity in consumption

Assumes Rationality in consumer behavior

Based on Weak ordering

DMRS is in operation

Samualsons Revealed Preference theory

Based on behaviouristic analysis (based on observed consumer behavior)So it is more realistic and scientific

Consumer can have only one combination and so it is discontinues

Expression of likes and dislikes of the consumer

Based on strong ordering

No DMRS is required for RPT

More complicated explanation to Income effect

Simplified analysis through “Over compensation effect”

More unrealistic assumption

More scientific assumptions

It Provides a basis to welfare economics

14. What is indifference curve? What are the properties of it?

“An Indifference curve shows different combination of two goods which give consumers the same level of satisfaction”.

Indifference Map: theoretically it is possible to represent various indifference curves on same diagram and it is called indifference map. It is shown below.

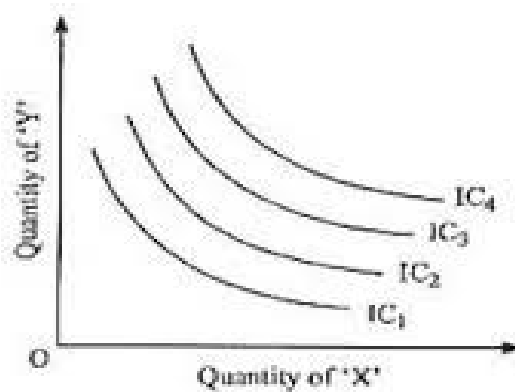


Fig. 5.2: Indifference Map

The following points can be derived from an indifference map.

5. An indifference curve represent a particular level of satisfaction
6. All the points on one indifference curve represent same level of satisfaction.
7. Higher the IC, Higher will be the level of satisfaction and lower the IC lower will be the level of satisfaction.
8. Since a consumer is rational, he always prefer higher IC than lower IC.

Properties of Indifference curve

- **Property I. Indifference curves slope downward to the right.** This property implies that an indifference curve has a negative slope. When the amount of one good in the combination is increased, the amount of the other good is reduced. This must be so if the level of satisfaction is to remain the same on an indifference curve.
- **Property II: Indifference curves are convex to the origin.** This property implies the application of the law of diminishing Marginal Rate of Substitution(DMRS) is in operation.

- Property III: Indifference curves cannot intersect each other: If they intersect each other, the feature of same satisfaction from all the combination may not work.
- Property IV: A higher indifference curve represents a higher level of satisfaction than a lower indifference curve:

15. Distinguish between income consumption curve and Engel curve? (Draw diagrams of previous questions of income consumption curve and Engel curve.)

Income Consumption Curve

Associated with Indifference curve analysis developed by Hicks and Allen

Explain the relation between income and Consumption of two commodities

Derived from different equilibrium points with product x and Y

Anlyse the nature of the product: Inferior and Normal.

It is used to derive Engel cuve

Engel curve

Associated with Ernst Engel, a famous German statistician

Explain the relation between income and Consumption of one commodity

Derived by joining income level and corresponding consumption of x alone

Anlyse the nature of the product: Necessary, Luxury, ordinary, Inferior and Normal.

It is has various other applications

16. What is PCC? How demand curve is derived from PCC?

Price effect and utility maximization- The derivation of price consumption curve

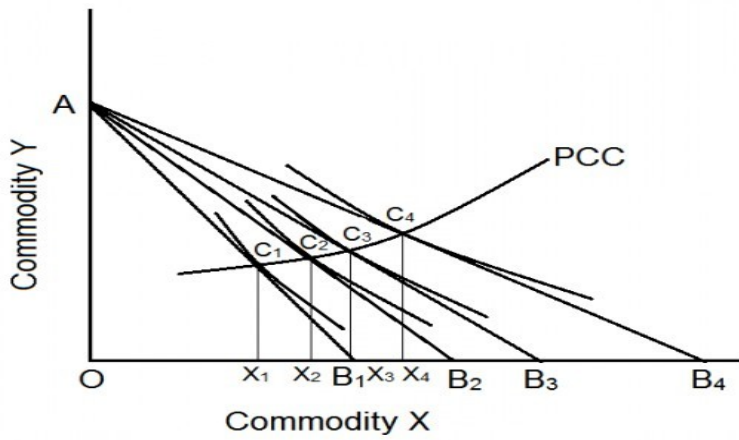
Price effect is the change in consumption of a commodity when its price changes. When price of a product is changed, the maximum quantity of a product that can be purchased by the consumer will be altered. A price increase will decrease the amount that can be purchased and it makes the budget line steeper and vice versa.

Types of Price Effect: There are two types of income effect.

- **Price effect for normal good:** It explains the inverse relationship between price and quantity
- **Price effect for giffen good:** It shows the direct relationship between price and quantity dedmanded. When price is decreased, quantity demanded also will decrease.

When price changes the income price line will be changed and the equilibrium point will be shifted of to a new position where the new income price line is tangent to another indifference curve. Thus in the case of a normal commodity, It result in an increase in the quantity demanded of the commodity when price falls which is shown below.

PCC for a normal commodity



Here, when price of product X falls original budget line AB1 shifts to AB2, to AB3 and then to AB4 and accordingly the equilibrium points shifts from C1 to C2, C3 and then to C4. By connecting different equilibrium PCC is derived.

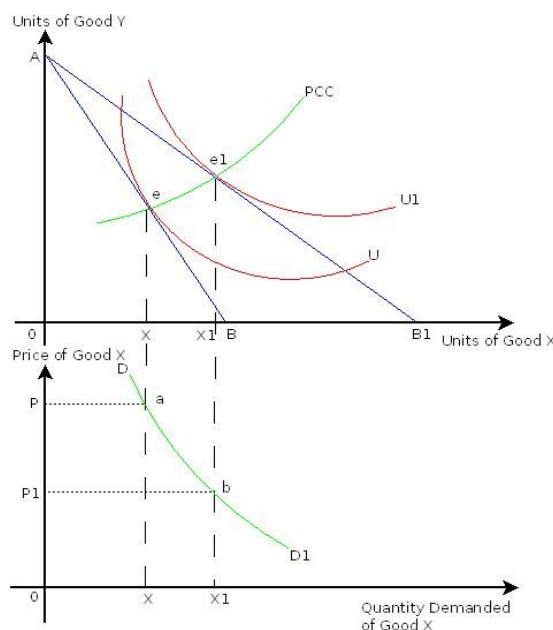
Thus, Price consumption Curve is the locus of various combinations of different equilibrium points when price of a product is changing. Here when price falls, quantity consumed increases.

Consumer's response to price changes -

Derivation of individual demand curve for a normal good

When price of a commodity is changed, the demand for the commodity will also be changed. As per the law of demand there is inverse relationship between quantity demanded and price. The price consumption curve can be used to plot the inverse relationship between Price and demand.

Consider the following figure with two segments



In the upper portion of the diagram, two equilibrium points 'e' and 'e1' are derived when price of good X is decreased. In the lower portion point 'a' is derived by considering highest price of good X and the corresponding demand for good X. similarly point 'b' In the lower portion is derived by considering price decrease of good X and the corresponding demand for good X. by joining points 'a' and 'b' we can derive demand curve for good X. this demand curve show inverse relationship between price and quantity demanded.

17. Distinguish between strong ordering and weak ordering.

Strong ordering

A group of combinations are strongly ordered when there is perfect place to each combination. Suppose there are different combination available such as A,B,C & D, it shall be possible for the consumer to say which combination is mostly preferred. That is $A > B > C > D$ is the example of strong ordering. The strong ordering is applied in the revealed preference theory of Samuelson. **Strong ordering is the absence of indifference.**

Weak ordering.

A group of combinations are weakly ordered when there is no perfect position to each combination. Suppose there are different combination available such as A,B,C & D, it is not possible for the consumer to say which combination is mostly preferred. There is a confusion from the part of consumer. That is $A = B = C = D$ is the example of weak ordering. The weak ordering is applied in the Indifference curve analysis of consumer behavior. **Weak ordering is the presence of indifference.**

VERY SHORT ANSWER TYPE QUESTIONS (2 MARKS):

1. Define utility?

The power of a commodity to satisfy the wants of consumer is termed as utility. The concept was first introduced by Jermy Bentham. It is the want satisfying power of a commodity or service. It is measured in the units of 'Utils'. It is purely a subjective concept and there for it varies from person to person and from situation to situation.

2. What is marginal utility?

Marginal utility is the additional utility obtains from an additional unit of any commodity consumed or acquired. In other words it is the satisfaction derived from the last unit of consumption. It is measured the difference between the utility of the total units of stock of consumption of a given commodity and that of consuming one unit less in the stock considered. Symbolically $MU_x = T_{ux} - T_{ux-1}$.

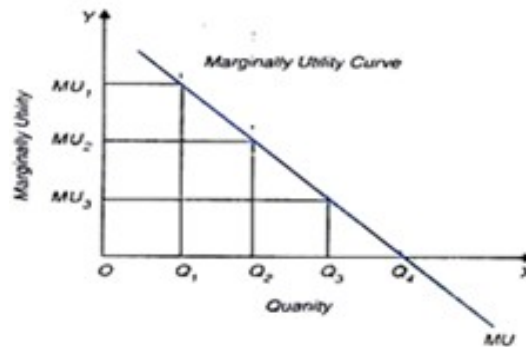


Fig. Marginal Utility

3. Distinguish between marginal utility and total utility.

Total utility is the entire utility derived when consuming all the units of a commodity by the consumer. Suppose if a consumer is consuming 5 units of apple, all the utility consumer realized by consuming all the 5 apples are termed as total utility. It is the sum of Marginal utilities.

Marginal utility is the additional utility obtains from an additional unit of any commodity consumed or acquired. In other words it is the satisfaction derived from the last unit of consumption. Symbolically $MU_x = T_{ux} - T_{ux-1}$.

4. What is cardinal measurability of utility?

Cardinal Approach to consumer equilibrium was developed by Alfred Marshall. It is based on the assumption that utility (want satisfying power of a commodity or service) can be measured using numbers like 1, 2, 3, 4... etc. Thus a person can say that he derives utility equal to 10 units from the consumption of a unit of good A and 20 units from the consumption of a unit of good B.

5. Distinguish between cardinal utility and ordinal utility.

These are the two main approaches to measure utility.

Cardinal Approach to consumer equilibrium was developed by Alfred Marshall, It is based on the assumption that utility (want satisfying power of a commodity or service) can be measured using numbers like 1, 2, 3, 4... etc. Thus a person can say that he derives utility equal to 10 units from the consumption of a unit of good A and 20 units from the consumption of a unit of good B.

Ordinal Approach to consumer equilibrium was developed by Hicks and Allen. It is also called Indifference curve analysis. It is based on the assumption that utility (want satisfying power of a commodity or service) cannot be measured but can be compared and ranked such as Ist, IInd, IIIRD.....etc.

6. What is meant by consumer equilibrium?

A consumer is said to be in equilibrium, when he does not intend to change his level of consumption, i.e., when he derives maximum satisfaction. Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure.

7. Define an Indifference curve?

There are various combinations of two commodities available to the consumer. The consumer is grouping certain combinations as a set such that all the combinations from same group will provide him same level of satisfaction. Consider the following set of combinations

Set I

$$a = 1x + 5y$$

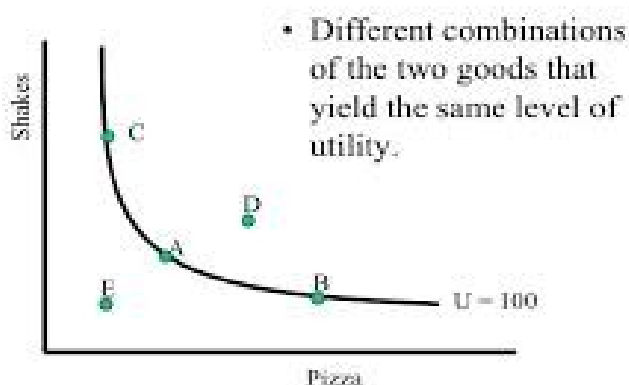
$$b = 2x + 3y$$

$$c = 3x + 4y$$

In set I combinations as the consumer moves from combination 'a' to combination 'b' and then to 'c', the consumption of x increases and consumption of y decreases. Here all the points provides the consumer same level of satisfaction. It can be plotted in a diagram and by joining points a, b and c, it is possible to derive a curve which is known as indifference curve.

Thus "an Indifference curve shows different combination of two goods which give consumers the same level of satisfaction".

Indifference Curves



8. What is ordinal utility approach?

Ordinal Approach to consumer equilibrium was developed by Hicks and Allen. It is also called Indifference curve analysis. It is based on the assumption that utility (want satisfying power of a commodity or service) cannot be measured but can be compared and ranked such as Ist, IInd, IIIrd.....etc. It can be represented as indifference curves. An Indifference curve shows different combination of two goods which give consumers the same level of satisfaction.

9. What is income effect?

Income effect is the change in consumption of a commodity when income of the consumer is changed. When income of the consumer is changed, the maximum quantities of products that can be purchased by the consumer will be altered and thus there will be a parallel shift of income price line either upward or downward. Income increase will be represented by an upward shift of budget line and vice versa.

Types of Income Effect: There are two types of income effect.

- **Positive income effect:** When with the increase in income, there is increase in consumption, that is known as Positive Income Effect. Income effect is positive to normal commodities.
- **Negative Income Effect:** when with the increase in income there is decrease in consumption, that is known as Negative Income Effect. The negative income effect is applicable in case of inferior goods. Inferior goods are those goods, which are purchased less as one's income rises.

10. What is substitution effect?

When price of the commodity is decreased, that product will become cheaper as compared to the high priced substitutes. So consumer will have a tendency to use more of this low priced product. This effect is termed as Substitution effect. Substitution effect is always positive. Theoretically price effect is a combination of income effect and substitution effect

11. What is price effect?

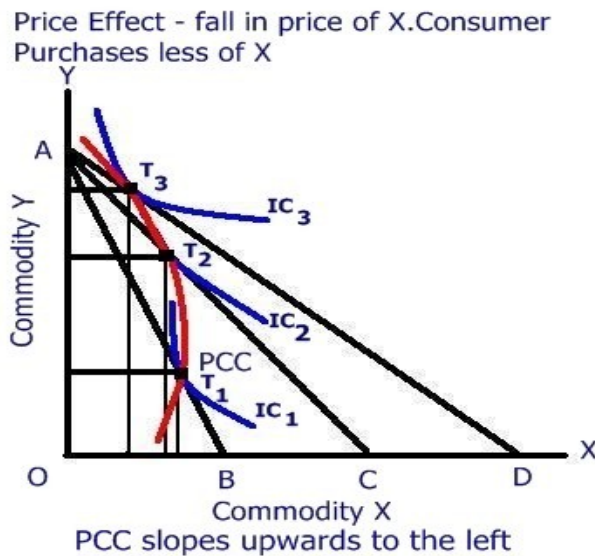
According to the law of demand, there is inverse relationship between prices of commodities and its demand. This law of demand operates because of the working of income effect and substitution effect.

Price effect: Price effect is the change in quantity demanded of a commodity due to change in price of the same commodity. Price effect is the combination of income effect and substitution effect. OR

$$\text{Price Effect} = \text{Substitution Effect} + \text{Income Effect}$$

12. What are giffen goods?

Giffen goods are special type of inferior goods whose negative income effect is greater than positive substitution effect. So price effect will be negative and therefore Price consumption curve will be backward bending. Here the **law of demand will not operate**. So when price falls demand also decreases. It is shown in the figure below.



In the figure as the price of product X falls price line shifts from AB to AC and then to AD which leads to the shift of equilibrium from T1 to T2 and then to T3. PCC is derived by connecting the different equilibrium points. Here PCC is back ward bending which shows that when price of X falls, its demand also decreases. So product X is a giffen good.

13. What is an inferior good?

Inferior goods are those goods whose income effect is negative. In such a case when income of the consumer is increased, the quantity consumed of the product under consideration will be decreased. So ICC will be backward bending. This is illustrated in the following figure.

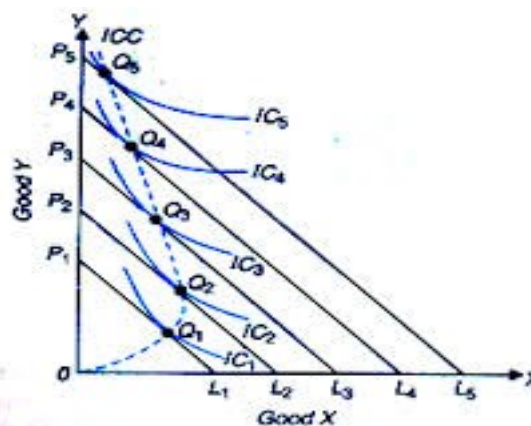


Fig. 8.29. Income Consumption Curve in Case of Good X being Inferior Good

In the figure above, as income of the consumer is increased, the income price line shifts from P1L1 to P2L2, P3L3 ect to P5L5. As a result the equilibrium points also shifts from Q1,Q2.....Q5. by connecting these equilibrium points, the ICC is derived (dotted line in the figure) and it is backward bending

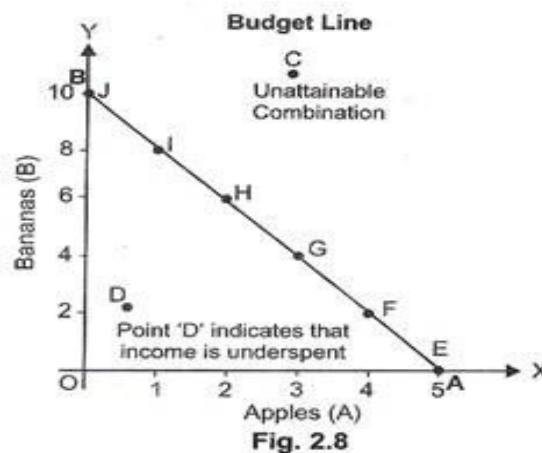
14. What is compensating variation in income?

In Hicksian decomposing of price effect, substitution effect can be identified by eliminating income effect from price effect. For this a portion of money income is to be taken away from the consumer. This is done by keeping the consumer at the same old level of satisfaction. Hicks call this process as **“Compensating Variation in Income”**. Thus compensating variation in income is the process of eliminating income effect of a price change by taking away a portion of money income, when price of the product is decreased.

15. Define an income price line.

Budget line or Income Price Line is the graphical representation of all possible combination of two commodities that can be purchased by the consumer by using his given income.

Consider the following illustration:



In the picture

- OA = Maximum Quantity of apples that can be purchased by the consumer along with zero Banana consumption.
- OB = Maximum Quantity of Bananas that can be purchased by the consumer along with zero apples consumption
- Points J, I, H, G, F, E = Possible consumption points.
- Point D = Inferior point (Entire income is not spent)
- Point C = Un attainable or beyond the reach of the income of the consumer.

So a rational consumer always wants to consume maximum and therefore he will consume a point on the income price line. Thus Budget line or Income Price Line is the graphical representation of all possible combination of two commodities that can be purchased by the consumer by using his given income. Slope of budget line is the price ratios of two commodities.

16. What is an Engel curve? (see short essay questions)

17. What is strong ordering?

A group of combinations are strongly ordered when there is perfect place to each combination. Suppose there are different combination available such as A,B,C & D, it shall be possible for the consumer to say which combination is mostly preferred. That is $A > B > C > D$ is the example of strong ordering. The strong ordering is applied in the revealed preference theory of Samuelson. **Strong ordering is the absence of indifference.**

18. What is weak ordering?

A group of combinations are weakly ordered when there is no perfect position to each combination. Suppose there are different combination available such as A,B,C & D, it is not possible for the consumer to say which combination is mostly preferred. There is a confusion from the part of consumer. That is $A = B = C = D$ is the example of weak ordering. The weak ordering is applied in the Indifference curve analysis of consumer behavior. **Weak ordering is the presence of indifference.**

19. What is cost difference?

The term cost difference is associated with Slutsky method of decomposing price effect. In this method, to eliminate income effect, a portion of money income is taken away from the consumer. Slutsky called this process as 'cost difference'. Here the consumer can just afford the original combination of the commodities. In other words we are holding purchasing power of the consumer constant. Here consumer is able to purchase the same old combination of the products.

20. What are the properties of indifference curve?

- Property I. Indifference curves slope downward to the right.
- Property II: Indifference curves are convex to the origin..
- Property III: Indifference curves cannot intersect each other
- Property IV: A higher indifference curve represents a higher level of satisfaction than a lower indifference curve:

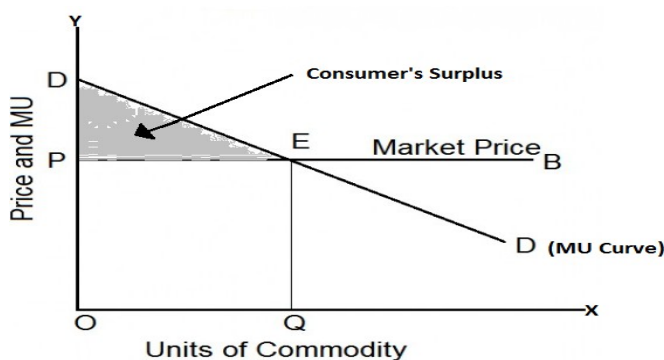
21. Define consumer's surplus.

Consumer's surplus is the excess of what we are prepared to pay over what we actually pay for a commodity. It is the difference between what we are prepared to pay and what we actually pay.

Thus, Consumer's surplus = what one is prepared to pay minus what one actually pays.

We can put it in the form of an equation thus:

- **Consumer's Surplus = Total Utility derived from a product – Total Amount Spent on the same product.**



22. What is the importance of consumer's surplus?

Importance of Consumer's Surplus:

- It has great practical importance and is useful in a number of ways:
- In Public Finance it is applied in areas such as taxation
- It helps the Businessman and Monopolist to fix price accordingly to get more profit.
- It helps in Comparing Advantages of Different Places and in assessing welfare related with it.
- It is used to Distinguish between Value-in-Use and Value-in-Exchange:
- Consumer's surplus is used Measuring Benefits from International Trade:

MODULE-IV

THEORY OF PRODUCTION

Basic concepts

1. Production

Production refers to the transformation of resources into outputs of goods and services.

2. Firm

Firm is an organization that combines and organizes resources for the purpose of producing goods and services for sale at a profit.

3. Inputs

Inputs, resources or factors of production are the means of producing the goods and services demanded by the society

4. Fixed inputs

Fixed inputs are those that cannot be varied or can be varied with excessive cost during the time period under consideration.

5. Variable inputs

Those inputs which can be varied easily and on short notice during the time period under consideration

6. **Short run:** The time period during which at least one input is fixed.

7. **long run:** The time period during which all inputs are variable.

8. The Production Function

The production function shows the maximum quantity of output 'q', that can be produced as a function of the quantities of inputs, labour and capital, used in the production processes.

i.e $q_{\max} = f(L, K)$

9. The law of variable proportions (diminishing returns)

The more units of variable input are used with a fixed amount of other inputs, the marginal product of the variable factor eventually declines as seen in the slope of the total product curve.

10. Marginal Product

The marginal product of a variable factor is the additional contribution made by that factor to total product when one more unit of it will be employed with other fixed factors in production processes. i.e. $MP_L = \frac{\Delta Q}{\Delta L}$, when factor 'K' is fixed.

11. Average Product

The average product of a variable factor is the output per unit of that factor, and is obtained by dividing total product (TP) by the total quantity of that factor employed.

i.e. $AP_L = TP/L$.

12. Returns to scale

It is the long run production relationship when all inputs are variable. Suppose output doubles, when both labour and capital doubles in production process, it is called constant returns to scale, if output less than doubles, it is called decreasing returns to scale and if output more than doubles it is called increasing returns to scale.

13. Isoquant

It is a tool to derive the producer's equilibrium with two variable inputs. It shows the different combinations of two inputs (for eg. Labour and capital) that gives the same level of output. It is downward sloped and the two inputs are present in X and Y axis.

14. Marginal Rate Of Technical Substitution(MRTS)

It is defined as the absolute slope of the Isoquant. It is defined in terms of two inputs, labour and capital, as the units of capital that will be replaced for an extra unit of labour in order to remain in the same level of output along the same isoquant. $MRTS_{LforK} = \left| \frac{\Delta K}{\Delta Y} \right|$

15. The Isocost line

It is another tool to derive the producer's equilibrium with two variable inputs. It shows different combinations of labor and capital for which the total cost is the same. It is downward sloped and the position in X and Y axis is based on the prices of the factors. Suppose the price of capital is 'r' means the rental price of capital and 'w' the wage rate, the price of labour. The slope is defined as

$\left| \frac{w}{r} \right|$. Here it is to be noted that we take the absolute value in spite of the downward slope of the isoquant as negative values do not have any sense in Economics.

16. Producers equilibrium

Producers equilibrium is defined as the tangency points of the isoquant and isocostlines. It is the point where $MRTS_{LforK} = \left| \frac{\Delta K}{\Delta Y} \right| = \left| \frac{w}{r} \right|$.

17. Expansion Path

The line joining the origin with the points of tangency of isoquants and isocost lines with inputs prices held constant. It shows the least cost combinations to produce various output levels.

18. Elasticity of substitution.

A measure of the responsiveness of the input ratio to a change in the input price ratio. The elasticity of substitution is equal to the absolute value of the ratio of the percentage change in the input ratio

to the percentage change in input price ratio. $\sigma = \left| \frac{\text{percentage change in } L/K}{\text{percentage change in } w/r} \right|$

QUESTIONS AND ANSWERS**Multiple Choice Questions**

- The firm produces with the expectation of
a) goodwill b) profit c) power
- Production with one variable input is called
a) returns to scale b) variable proportions c) constant returns
- The production function is a
a) technological relation b) economic relation c) behavioural relation
- In the Law of variable proportions, suppose $MP = 0$, the TP is
a) constant b) increasing c) decreasing
- In the law of variable proportions, the economically meaningful range is
a) Stage I b) Stage II c) Stage III
- The shape of the isoquant are
a) convex to origin b) concave to origin c) concave to origin
- The particular shape of the isoquant is due to
a) Price ratio b) diminishing MRTS c) other reasons

Short Essay Questions

1. Explain the law of diminishing marginal productivity or the diminishing returns

The production with one variable input explains the law of diminishing returns. It postulates that as more units of a variable input are used with a fixed amount of other inputs, after a point, a smaller and smaller returns will accrue to each additional unit of the variable input. In other words, the marginal product of the variable input eventually declines. This occurs because each additional unit of the variable input has less and less of the fixed inputs with which to work. This is shown in the table below.

Units of input L	total product TP	Marginal product MP	Average product AP
1	100	100	100
2	220	120	110
3	360	140	120
4	460	100	115
5	530	70	106
6	570	40	95
7	595	25	85
8	600	5	75
9	594	-6	66
10	560	-34	56

In the example, there are increasing returns to labour for the first three units of labor employed. The law of diminishing returns sets in with the fourth worker. Remember here that capital, land etc are fixed. Eventually, additional workers will not have much capital to work with and consequently, they will add less and less to output.

Based on the law of diminishing returns, there are some relationship between the MP and TP curves.

1. If $MP > 0$, TP will be rising as L increases.
2. If $MP = 0$, TP will be constant as L increases.
3. If $MP < 0$, TP will be falling as L increases.

2. Explain the concept of returns to scale

Returns to scale refer to how output responds to an equiproportionate change in all inputs. It is regarded as long run production function when all inputs are variable. In our case, suppose labour and capital are both doubled, and then if output doubles, we have constant returns to scale. If output less than doubles, we have decreasing returns to scale, and if

output more than doubles, we have increasing returns to scale. The figures below illustrates various concepts of returns to scale.

Constant returns to scale: the distance between successive multiple isoquant is constant. Doubling the factor inputs achieves double the level of initial output; trebling inputs achieves treble output, and so on.

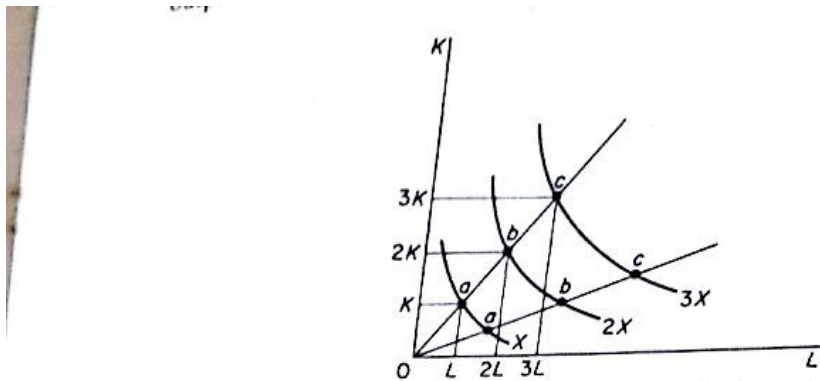


Figure 3.18 Constant returns to scale: $Oa = ab = bc$

Decreasing returns to scale. The distance between consecutive multiple-isoquants increases. By doubling the inputs, output increases by less than twice its original level. In figure 3.19 the point a' , defined by $2K$ and $2L$, lies on an isoquant below the one showing $2X$.

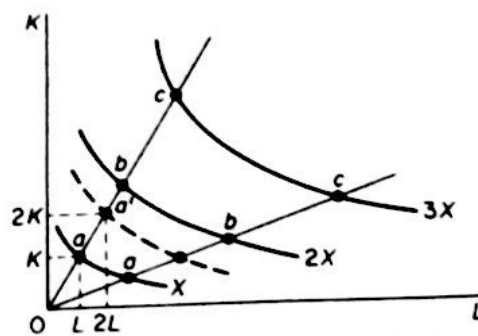


Figure 3.19 Decreasing returns to scale: $Oa < ab < bc$

Increasing returns to scale. The distance between consecutive multiple-isoquants decreases. By doubling the inputs, output is more than doubled. In figure 3.20 doubling K and L leads to point b' which lies on an isoquant above the one denoting $2X$.

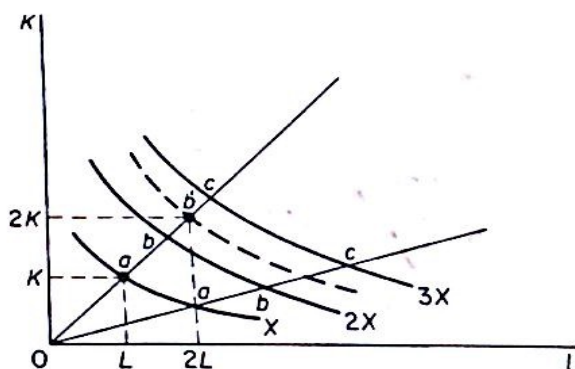


Figure 3.20 Increasing returns to scale: $0a > ab > bc$

3. Why Isoquants are convex to origin

This is an important property of the isoquants. It is due to the reason of diminishing MRTS. The diminishing MRTS (decreasing slope) tells us that the productivity of any one input is limited. As more and more labor is added to the production processes in place of capital, the productivity of labour falls, and the rate at which capital replacement diminishes. Similarly, when more capital is added in place of labour, the productivity of capital falls and consequently the labour replacement diminishes. This property is called diminishing MRTS.

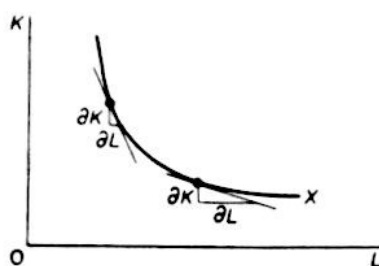


Figure 3.13

The slope of the isoquant decreases (in absolute terms) as we move downwards along the isoquant, showing the increasing difficulty in substituting K for L . The slope of the isoquant is called the *rate of technical substitution*, or the *marginal rate of substitution (MRS)* of the factors:

4. What are the properties of the Isoquants.

1. They negatively sloped in the economically relevant range.
2. They are convex to origin
3. They do not intersect

(Provide Explanations also.)

Essay Type questions

1. Explain the law of variable proportions with suitable illustrations ?

The law of variable proportion is applicable to the production with one variable factor (labour), while other factors like capital, land etc remain constant. The law can be stated as follows,

The MP of a variable input (which is being added to other inputs which are fixed in quantity) will eventually decline with its continuing use in the production processes.

As more labour is added to a fixed amount of another input, capital, the proportion of labour to the fixed input (the labour / capital ratio) becomes such that the MP of labour starts declining. For instance, as more farm labourers are added to a given size farm, the extra output or MP of an additional worker becomes smaller. As MP declines some relationships occurs between TP and MP. This can be explained with the following table.

Units of input L	Total Product	Marginal product	Average product
1	100	100	100
2	220	120	110
3	360	140	120
4	460	100	115
5	530	70	106
6	570	40	95
7	595	25	85
8	600	5	75
9	594	-6	66
10	560	-34	56

Based on the law of variable proportions, there are some relationship between the MP and TP curves.

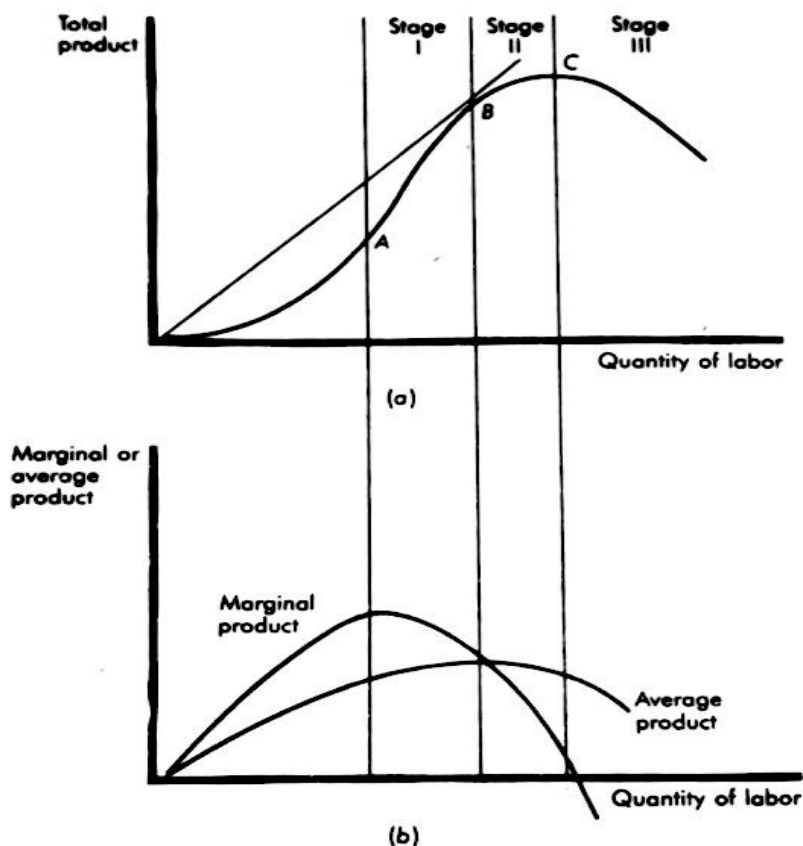


FIGURE 6.4 Relationship between TP, MP, and AP curves and the three stages of production.

If $MP > 0$, TP will be rising as L increases.

If $MP = 0$, TP will be constant as L increases.

If $MP < 0$, TP will be falling as L increases.

The three stages of production

Based on the behavior of MP and AP, economists have classified production into three stages:

Stage I: $MP > 0$, AP rising. Thus $MP > AP$.

Stage II: $MP > 0$, but AP is falling. $MP < AP$ but TP is increasing (because $MP > 0$)

Stage III: $MP < 0$. In case TP is falling

No profit maximizing producer would produce in stage 1 or 1. In stage 1 by adding one more unit of labour, the producer can increase the average productivity of all the units. Thus, it would be unwise on the part of the producer to stop production in this stage. As for stage III, it does not pay the producer to be in this region because by reducing the labor input she can increase the total output and save the cost of a unit of labor.

Thus, the economically meaningful range is just given by stage II. All these results are shown in the figure. At the point A, we can see that MP is maximized. At The point B, since AP is maximized, we have AP=MP. At the point CD, total product reaches a maximum. Thus MP=0 at this point.

2. Discuss the producers equilibrium according to the least cost combination of inputs.?

The producers equilibrium with two variable inputs is shown with the help of two separate tools developed in the analysis of production, the isoquants and isocost lines. The producer has in mind the minimization of cost with a given level of output or maximization output with given cost. This is illustrated by superimposing the two tools on the same model. Let us discuss the process of creation of this model.

The isoquant

An isoquant shows the various combinations of two inputs (say, labour and capital) that can be used to produce a specific level of output. A higher isoquant refers to a larger output, whereas a lower isoquant refers to a smaller output.

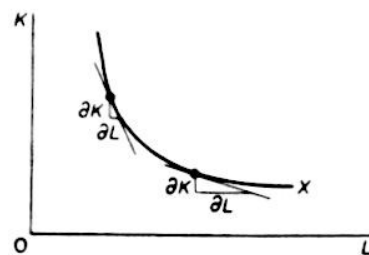


Figure 3.13

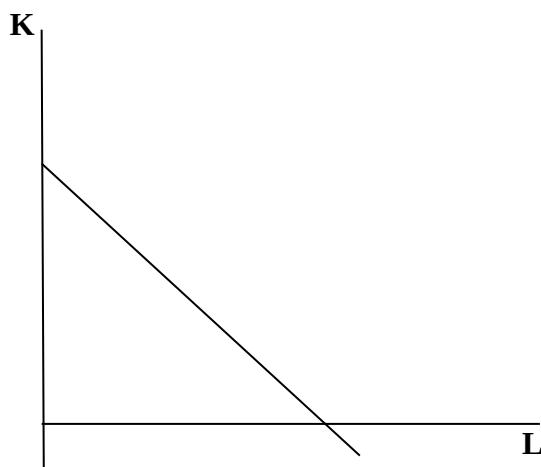
The slope of the isoquant decreases (in absolute terms) as we move downwards along the isoquant, showing the increasing difficulty in substituting K for L. The slope of the isoquant is called the rate of technical substitution, or the marginal rate of substitution (MRS) of the factors:

The absolute value of the slope of the isoquant is called the marginal rate of technical substitution (MRTS). For a downward movement along an isoquant, the marginal rate of technical substitution of labour for capital (MRTS_{LK}) is given by $-\frac{\Delta K}{\Delta L}$. It measures the amount of capital that the firm can give up by using one additional unit of labour and still remain on the same isoquant. Because of the reduction in K, MRTS_{LK} is negative. However, we multiply -1 and express it as a positive value.

Isocost lines

Suppose that a firm uses only labor and capital in production. Then the total cost (TC) of the firm for the use of a specific quantity of labour and capital is equal to the price of labour (w or the wage rate) times the quantity of labour hired (L), plus the price of capital (r or the rental price of capital) times the quantity of capital rented (K). The total cost of the firm thus can be expressed as

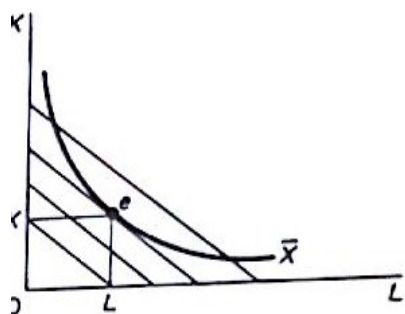
$TC=wL+rK$, that is total cost is equal to the amount that the firm spends on labor (wL) plus the amount that the firm spends on capital (rK).



An Isocost line shows various combinations of labour and capital that the firm can hire or rent for the given total cost . The slope of the isocost line is defined as $-\frac{w}{r}$, and we use the absolute value.

The least cost combination of inputs

Since a firm's total cost of production vary with output, we have a family of isocost lines to make decision on consumer's equilibrium. The producers objective is to minimize the cost production of a given level of output. Producer must use the input combination that is located on the lowest isocost line that enables the production of a particular level of output. Consider the figure below ,



The firm minimizes its costs by employing the combination of K and L , determined by the point of tangency of the \bar{X} isoquant with the lowest isocost line. Points below e are desirable because they show lower cost but are not attainable for the current output. Point above e show higher costs. Hence point e is the least cost point.

The the cost minimizing or optimal input input combination is defined as point where the isoquant is tangent to an isocost line.

At the point of tangency , the slope of the Isoquant, $MRTS = \text{slope of the isocost line}, \frac{w}{r}$

symbolically, $\frac{\Delta K}{\Delta L} = \frac{w}{r}$. This is the least cost combination inputs .

The minimization of cost for a given output is the other side of maximization of output with given cost , In either of the case, a tangency solution between isoquant and isocost line is required.

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