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B.A.ECONOMICS
(First Year)

Micro Economics - I

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B.A. FIRST YEAR – SEMESTER- I

MICRO ECONOMICS – I

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UNIT- I

INTRODUCTION

1.1. Introduction

Micro economics and macroeconomics are the two approaches to economic problems and economic analysis. The terms were first coined and used by Ragnar Fisch in 1933 and have now been adopted by the economists all the world over. Micro economics studies the economic actions of a particular individual and a well-defined group of individuals, i.e., households, firms, industries, etc. and macroeconomics studies the broad aggregates, such as total employment and total consumption, and the aggregate national income. Microeconomics is also known as partial analysis and macroeconomics as aggregate analysis. It is because that micro economics is the partial differentiation of the total (macro).

Microeconomics studies the economic actions and behaviour of individual units and small groups of individual units. It is the study of small components of the economy. It establishes the relationship between facts and results, which are called economic laws. Microeconomics is also called "The Price Theory", because it deals with the price of goods and services, rewards of the factors of production and interaction of the markets. Microeconomics is the study of households, firms and industry. It explains the working of market for individual commodities and behaviour of individual buyer and seller in such market. There are two types of markets that are product market and factor market these markets are dependent on each other. The factors of production are earning in factor market but they are spending in product market. The change in one market is reflected in other market. There are differences in the working of these markets. Some economists prefer to begin their analysis of economic problems form the variables concerning individuals, individual firms, and individual industries, i.e. micro economics. The greater part of Marshallian economics is concerned with micro economics. These two branches of economics are complementary and for a thought discussion of economic problems and both are necessary concept.

1.3. BASIC CONCEPTS

Economic concepts refer to the collection of basic ideas that explain various occurrences in the economy, like the actions and choices of economic agents. Therefore, a basic understanding of the concepts is important in studying and analyzing the decisions and behavior of economic agents. For example, it includes the producers' and consumers' decisions on producing and buying.

1. Scarcity

Scarcity is one of the key economic concepts. In economics, it refers to the limited availability of resources for human consumption. The world population needs are unlimited, whereas the resources to meet the needs are limited. The limited feature of resources makes it more valuable and expensive. Effective resource allocation techniques and integration of alternatives confront the scarcity issues. Examples of scarce resources are oil and gold. Its scarcity will limit the human want for it.

2. Supply Demand

Another important economic concept is supply-demand. Supply refers to the number of goods and services available for consumers. The law of supply states that as price increases, also supply increases and vice versa. Hence the supply curve is upward sloping. Demand indicates the number of goods and services consumers are willing and able to purchase. According to the law of demand, as price increases, demand decreases and vice versa. Therefore it points to a downward sloping demand curve. If demand is greater than supply, the price of goods and services tends to increase in a market, but the price decreases if supply is greater than demand. The equilibrium price happens when the supply meets with demand. If the price of a chocolate brand increases, its demand decreases and vice versa. When the price of cocoa rises in the global market, chocolate price increases, and producers increase the supply to obtain the advantage.

3. Incentives

Incentive refers to the factor that influences the consumer in the decision-making process. Two types of incentives are intrinsic and extrinsic incentives. Intrinsic incentives originated in the consumer without any

outside pressure, whereas extrinsic incentives developed due to external rewards. For example, the decrease in the price of a discretionary item is an incentive to purchase that item.

4. Trade-off and Opportunity Cost

A trade-off occurs when a decision leads to choosing one thing over another. The loss incurred by not selecting the other option is called opportunity cost when one option is selected. For example, a trade-off occurs when Mr. A takes a day off at university to go to a cinema. The opportunity cost is what Mr. A loses by not attending university for a day like participation point.

5. Economic Systems

An economic system comprises various entities forming a social structure that enables a production system, allocation of resources, and exchange of products and services within a community. Capitalism, communism, socialism, and market economy are types of economic systems.

6. Factors of production

Another important economic concept is factors of production. It refers to inputs applied to the production process to create output: the goods and services produced in an economy. The essential factors of production forming the building blocks of an economy include land, labor, capital, and entrepreneurship. For example, consider a manufacturing entity, where factors of products are land representing the natural resources used, labor represents the work done by workers, capital represents the building, machinery, equipment, and tools involved in the production, and finally, the entrepreneur aligns other factors of production to create the output.

7. Production Possibilities

In economics, production possibility frontier is a curve in which each point represents the combination of two goods that can be produced using the given finite resources. For example, a farmer can produce 20,000 apples and 30,000 apricots in his fixed land so that the trees are placed to have adequate space to develop a healthy root system and receive enough sunlight. However, if he intends to produce 50,000 apricots, he will make only 10,000 apples on his farm.

8. Marginal Analysis

The marginal analysis compares the additional cost incurred and the corresponding additional benefit obtained from an activity. Usually, companies planning to expand their business by adding another production line or increasing volumes perform this analysis. For example, if a company has enough capacity to increase production but improves the warehouse facility, a marginal analysis indicates that expanding the warehouse capacity will not affect the marginal benefit. In other words, the ability to produce more products outweighs the increase in cost.

9. Circular Flow

The circular flow model in economics primarily portrays how money flows through different units in an economy. It connects the sources and sinks of factors of production, consumer & producer expenditures, and goods & services. For example, resources move from household to firm, and goods and services flow from firms to households.

10. International Trade

International trade occurs when a trade happens between countries. Goods and services are traded across countries contributing significantly to GDP. The two main types of international trade are import and export. Import is the purchase of goods or services from another country. In this form, payment has to be made to the other country. Thus, it involves the outflow of money. The sale of goods and services to another country is called exports. In this form, payment is received from another country. Thus, it involves an inflow of money. Examples of international trade include trade between companies in China and USA, and goods exported from China to the USA include electrical and electronic equipment.

1.4. DEFINITIONS OF ECONOMICS

According to K. E. Boulding, Microeconomics is the study of particular firms, particular households, individual prices, wages, incomes, industry and particular commodities.

According to R. H. Left witch, Microeconomics is concerned with the economic activities of such economic units as consumers, resource Owners and business firms.

According to Prof. Samuelson, "Micro economics studies the behaviour of individual parts and units of any economy, e. g., determination of the price of a product or study and observation of the behaviour of a consumer or a firm". The study of micro economics clears the economic status of the individual units. It helps us in determining the remuneration of individual units.

1.5. NATURE AND SCOPE OF MICRO ECONOMICS

Economics is defined as the social science that deals with the production, distribution, and consumption of goods and services. Evolved in the 19th century, the economic studies have become one of the most significant studies of modern days. From a small shop to a country, Economics plays a crucial role in the efficient running of both. No business can flourish without applying the principles of economics. The study of economics is extensive and varied. The nature and scope of economics depend upon the interaction of economic agents and how economies work. Let's analyze the nature and scope of economics deeply.

1.5.1. NATURE OF ECONOMICS

The nature of economics deals with the question that whether economics falls into the category of science or arts. Various economists have given their arguments in favour of science while others have their reservations for arts.

Economics as a Science

To consider anything as a science, first, we should know what science is all about? Science deals with systematic studies that signify the cause and effect relationship. In science, facts and figures are collected and are analyzed systematically to arrive at any certain conclusion. For these attributes, economics can be considered as a science. However, economics is treated as a social science because of the following features:

- It involves a systematic collection of facts and figures.

- Like in science, it is based on the formulation of theories and laws.
- It deals with the cause and effect relationship.

These points validate that the nature of economics is correlated with science. Just as in science, various economic theories are also based on logical reasoning.

Economics as an Art

It is said that "knowledge is science, action is art." Economic theories are used to solve various economic problems in society. Thus, it can be inferred that besides being a social science, economics is also an art.

1.5.2. SCOPE OF ECONOMICS

Economists use different economic theories to solve various economic problems in society. Its applicability is very vast. From a small organization to a multinational firm, economic laws come into play. The scope of economics can be understood under two subheads: Microeconomics and Macroeconomics. Let's discuss these in detail:

MICRO ECONOMICS

Microeconomics examines individual economic activity, industries, and their interaction. It has the following characteristics:

- **Elasticity:** It determines the ratio of change in the proportion of one variable to another variable. For example- the income elasticity of demand, the price elasticity of demand, the price elasticity of supply, etc.
- **Theory of Production:** It involves an efficient conversion of input into output. For example- packaging, shipping, storing, and manufacturing.
- Cost of Production: With the help of this theory, the object price is evaluated by the price of resources.
- **Monopoly:** Under this theory, the dominance of a single entity is studied in a particular field.
- **Oligopoly:** It corresponds to the dominance of small entities in a market.

MACRO ECONOMICS

- It is the study of an economy as a whole. It explains broad aggregates and their interactions "top down." Macroeconomics has the following characteristics:
- **Growth:** It studies the factors which explain economic growth such as the increase in output per capita of a country over a long period of time.
- **Business Cycle:** This theory emerged after the Great Depression of the 1930s. It advocates the involvement of the central bank and the government to formulate monetary and fiscal policies to monitor the output over the business cycle.
- **Unemployment:** It is measured by the unemployment rate. It is caused by various factors like rising in wages, a shortfall in vacancies, and more.
- **Inflation and Deflation:** Inflation corresponds to an increase in the price of a commodity, while deflation corresponds to a decrease in the price of a commodity. These indicators are valuable to evaluate the status of the economy of a country.

1.6. POSITIVE AND NORMATIVE APPROACHES

It is important to know the difference between positive economics and normative economics. Positive economics is concerned with explaining 'what it is,' that is, it describes theories and laws to explain observed economic phenomena, whereas normative economics is concerned with 'what should be' or 'what ought to be" the things.

J.N. Keynes drew the distinction between the two types of economics in the following manner:

"A positive science may be defined as a body of systematised knowledge concerning what it is; normative science or a regulative science as a body of systematised knowledge relating to criteria of what ought to be, and concerned with the ideal as distinguished from the actual. The objective of a

positive science is the establishment of uniformities (that is scientific laws)-, of a normative science, the determination of the ideals."

Thus, in positive economics we derive propositions, theories and laws following certain rules of logic. These theories, laws and propositions explain the cause and effect relationship between economic variables. In positive micro-economics, we are broadly concerned with explaining the determination of relative prices and the allocation of resources between different commodities.

In positive macro-economics, we are broadly concerned with how the level of national income and employment, aggregate consumption and investment and the general level of prices are determined. In these parts of positive economics, what should be the prices, what should be the saving rate, what should be the allocation of resources, and what should be the distribution of income are not discussed.

These questions of what should be and what ought to be, fall within the purview of normative economics. Thus, given the profit maximization assumption, positive economics states that monopolist will fix a price which will equate marginal cost with marginal revenue. The question what price should or ought to be fixed so that maximum social welfare is achieved lies outside the purview of positive economics. Similarly, given the monopsony in the labour market, positive economics explains how actual wage rate is determined.

It does not go into the question what wage rate should be paid to the workers so that they should not be exploited. Likewise, how national income between different individuals is distributed falls within the domain of positive economics. But positive economics is not concerned with the question how income should be distributed. On the other hand, normative economics is concerned with describing what should be the things. It is, therefore, also called prescriptive economics. Thus, wheat price for a product should be fixed, what wage rate should be paid, how income should be distributed, etc., fall within the purview of normative economics.

Normative Economics and Value Judgements:

It should be noted that, normative economics involves value judgements or what are simply known as values. By value judgements or values, we mean the conceptions of the people about what is good or bad. These conceptions regarding values of the people are based on the ethical, political, philosophical and religious beliefs of the people and are not based upon any scientific logic or law. Because normative economics involves value judgements eminent economist Professor Robbins contended that economics should not become normative in character.

He opined that it was unscientific to include the value judgements in the economic analysis. To quote him, "the role of the economist is more and more conceived of as that of the expert, who can say what consequences are likely to follow certain actions, but who cannot judge as an economist the desirability of ends." While drawing difference between economics and ethics he further writes, economics deals with ascertainable facts, ethics with valuations and obligations is outside its purview. The two fields of inquiry are not on the same plane of discourse.

Between the generalisations of positive and normative economics, there is a logical gulf fixed which no ingenuity can disguise and no juxtaposition in space or time bridge over. Propositions involving the verb 'ought' are different in kind from propositions involving the verb 'is'. Value judgements of various individuals differ and their rightness or wrongness cannot be decided on the basis of scientific logic or laws. Therefore, in our view, positive economic should be kept separate and distinct from normative economics.

However, because normative economics involves value judgements, it does not mean that it should be considered as useless or not meaningful and should not be the concern of economics. As a matter of fact, many vital issues concerning economic welfare of the society necessarily involve some value judgements. If economics is to become an "engine for social betterment', it has to adopt certain norms, ideals or criteria with which to evaluate economic issues and pass judgements on what is good and what is bad from the view-point of social welfare. We agree with Professor A.C. Pigou, "Our impulse is not the philosopher's impulse, knowledge for the sake of knowledge but rather

the physiologist's knowledge for the healing that knowledge may help to bring."

The economist should not refrain from making value judgements if there is a wide consensus about them among the community. Using his knowledge of economics and these value judgements he should comment upon the desirability or otherwise of certain policies and issues. Professor Paul Streeten rightly says, "Economists cannot and should not refrain from making value judgements if their studies are to be more than a purely formal technique of reasoning, algebra of choice. The technique, the algebra is important and ought to be as scientific as possible, but it is significant only as a means to study of wealth and welfare and of the ways to improve them." As is clear from above, normative economics is concerned with welfare propositions, since what is good or what is bad ultimately depends upon its effect on the welfare of the individual and the society. In recent years, a branch of economics, known as welfare economics, has been developed. This welfare economics seeks to evaluate the social desirability of alternative social states or economic policies. Thus, Professor Scitovsky writes, " welfare economics is that branch of economic analysis which is concerned primarily with establishment of criteria that can provide a positive basis for adopting policies which are likely to maximise social welfare.

Conclusion:

Thus the view that economics is only a positive science is divorced from reality. The science of economics cannot be separated from the normative aspect. Economics as a science is concerned with human welfare and involves ethical considerations. Therefore, economics is also a positive science.

As pointed out by Pigou, Marshall believed that "economic science is chiefly valuable neither as an intellectual gymnastics nor even as a means of winning truth for its own sake, but as a handmaid of ethics and a servant of practice." On these considerations, economics is not only "light-bearing," but also "fruit- bearing." Economists cannot afford to be mere spectators and arm-chair academicians. "An economist who is only an economist," said Fraser "is a poor pretty fish." In this age of planning when all nations aspire to be welfare states, it is only the economist who is in a position to advocate, condemn and

remedy the economic ills of the modern world. “When we elect to watch the play of human motives that are ordinary that are something mean and dismal and ignoble,” wrote Prof. Pigou, “our impulse is not the philosopher’s impulse, knowledge for the sake of knowledge but rather the physiologist’s, knowledge for the healing that knowledge may help to bring.” It is not enough for the economist to explain and analyse the problems of unequal distribution of wealth, industrial peace, social security, etc.

Rather his work is to offer suggestions for the solution of such problems. Had he remained a mere theoretician, poverty and misery and class-conflicts would have been the lot of mankind. The fact that economists are called upon to pronounce judgements and tender advice on economic problems shows that the normative aspect of the economic science has been gaining ground ever since the laissez-faire spirit became dead. Wotton is right when she says, “It is very difficult for economists to divest their discussions completely of all normative significance.” Myrdal is more forthright when he says that economics is necessarily value-loaded and “a ‘disinterested social science’ has never existed and, for logical reasons, cannot exist.”

About the relation between normative and positive economics, Friedman observes: “The conclusions of positive economics seem to be, and are, immediately relevant to important normative problems, to questions of what ought to be done and how any given goal can be attained.” Normative economics cannot be independent of positive economics, though positive economics is free from value judgements. Economics is, therefore, not only a positive science of “what is” but also a normative science of “what ought to be.”

1.7. INDUCTIVE AND DEDUCTIVE APPROACHES

Economic analysis is the assessment of a topic from the perspective of an economist. There are two types of economic study - Deductive Method and Inductive Method. Economic analysis refers to the investigation of a particular topic from the perspective of an economist. It includes conducting an in-depth study of various processes such as production, consumption, consumer behaviour, national income, employment and others. It evaluates the given

industry in detail with all the aspects associated with that particular industry.

Moreover, the primary aim of economic analysis is to determine the effectiveness of operations within an economy. There are two types of economic study or economic analysis: Deductive Method and Inductive Method. Here, we take a look at these methods and also present an overview of the process of making the hypothesis.

1.7.1. DEDUCTIVE APPROACHES

It is a method of economic investigation or economic analysis. It is also known as the analytical abstract priori method or the hypothetical method. In this method, a person is required to assume the factual information and then follow the phase of logical reasoning to arrive at a concrete result or conclusion. By including some assumptions and experiments, a theory is built in this method.

For instance, it is a common fact that businessmen strive for maximum profits. Therefore, assumptions such as businessmen buying materials at a cheaper cost and cutting labour costs are added to build an economic theory that offers solutions to qualitative and labour-related issues. Hence, the common rule to remember in the case of deductive methods is to move from general facts to particular assumptions and, eventually, constructive theories. Moreover, in the deductive method, simple facts help in creating complex hypotheses. Therefore, three stages or phases are recognised in the deductive method:

- Observation
- Logical reasoning
- Experimentation, instance and testing through observation.
- Making the hypothesis is an important component of the deductive method of economic analysis.

MERITS OF THE DEDUCTIVE APPROACHES

a) **Simple and convenient**: This method is observation based and is fairly easy to practice. For example, in the Law of Diminishing Marginal Utility, after the increase in consumption, the consumer reaches the point of satiety, and the utility of the good begins to diminish.

b) **Removes the need for experimentation**: Experiments are vital in subjects like chemistry and physics but not mandatory in the case of economics. Deductive method is an alternative to experiments as far as economics as a subject is concerned.

c) **Accurate results**: Deductive method includes logical reasoning on the part of the economist or the analyst. Hence, logical thinking increases the chances of precision and sets high standards.

DEMERITS OF DEDUCTIVE APPROACHES

The disadvantages of the deductive approaches are as follows:

a) **Assumption based**: Assumptions have a higher chance of going wrong and result in invalid solutions. This can lead to a serious economic crisis if done inappropriately.

b) **Imaginative**: There is a greater chance of the deductive method being far from reality since it works on the basis of imagination. Real-life problems cannot be solved by imaginative or utopic solutions.

1.7.2. INDUCTIVE APPROACHES

In the inductive method, analysts or theorists progress from a practical outlook to a scientific problem in order to shorten the gap between theoretical knowledge and practical applications. The induction method is carried out in two forms, via statistics and experimentation. This method is classically associated with statistical forms of investigations. It involves a lot of numbers, quantities and formal terms.

Merits of Inductive Approaches

a) It is a very practical and applicable method, and it is simply descriptive.

b) It is totally verifiable since it deals with quantities.

c) Laws and theories under the inductive method may not be universal but are condition specific.

DEMERITS OF INDUCTIVE METHOD

a) If in case the analysts or theorists do not possess a balanced and stable judgement, then this method is unhelpful as they will be extracting insufficient data.

b) Inductive method works on the basis of experiments, and experiments require materials and resources. It is often difficult to gather and access the facts required for experiments.
c) The Inductive method is an incomplete method alone. It can be used if combined with deductive methods or deductive reasoning.

1.7.3. MAKING THE HYPOTHESIS

Before dwelling on the process of making the hypothesis, one must understand the meaning of the hypothesis. Hypothesis refers to any idea or assumption based on proving an argument or answering any question. It consists of several components, such as background research, which includes in-depth knowledge of facts. This is followed by a literature review, which refers to the part where the analyst evaluates the searched facts. After all these steps are performed, then comes the part where the analyst must think about potential questions that can be asked or should be asked to reach a conclusion.

The following steps must be followed for making the hypothesis:

a) Gathering observational data regarding the topic.
b) The gathered data or information must be evaluated to look for the causes of the problem.
c) Next, analysts should create a list of problems concerning the topic.
d) After making the hypothesis, analysts must begin to confirm or disprove the matters of the hypothesis to reach a conclusion.

CONCLUSION

Deductive method and inductive method are, hence, complementary methods of economic analysis. The two methods work the best when used together. They are co-relative and help in establishing concrete theories and producing novice solutions to economic and social problems. Great economists such as Alfred Marshall also supported the complementary relationship between the two methods.

1.8. CONSUMERS AND FIRMS:

The consumer decision making process is the process by which consumers become aware of and identify their needs; collect information on how to best solve these needs; evaluate alternative available options; make a

purchasing decision; and evaluate their purchase. Understanding the consumer decision making process is important to any business, but eCommerce businesses have a unique opportunity to optimize it. Because online shoppers generate so much more data than those in brick-and-mortar stores, online retailers can use that data to implement conversion strategies for every stage of the process.

The 5 Stages of the Consumer Decision Making Process — and How to Optimize

It's important to note that the consumer decision making process has many different names, including but not limited to the buyer journey, buying cycle, buyer funnel, and consumer purchase decision process. But all the names essentially refer to the same thing: The journey a customer goes through when making a purchase. So, here's a breakdown of what happens in each step:

1) **Need recognition (awareness):** The first and most important stage of the buying process, because every sale begins when a customer becomes aware that they have a need for a product or service.
2) **Search for information (research):** During this stage, customers want to find out their options.
3) **Evaluation of alternatives (consideration):** This is the stage when a customer is comparing options to make the best choice.
4) **Purchasing decision (conversion)**: During this stage, buying behavior turns into action – it's time for the consumer to buy!
5) **Post-purchase evaluation (re-purchase):** After making a purchase, consumers consider whether it was worth it, whether they will recommend the product/service/brand to others, whether they would buy again, and what feedback they would give. Now, to show you how these stages of the buying decision process play out in real life, here are consumer buying process examples that outline each of the steps and ways for your eCommerce brand to maximize results during each stage.

1. Need recognition (Awareness)

The need recognition stage of the consumer decision making process starts when a consumer realizes a need. Needs come about because of two reasons:

Internal stimuli, normally a physiological or emotional needs, such as hunger, thirst, sickness, sleepiness, sadness, jealousy, etc.

External stimuli, like an advertisement, the smell of yummy food, etc.

Even if the core cause is vanity or convenience, at the most basic level, almost all purchases are driven by real or perceived physiological or emotional needs. The causes for these stimuli can be social (wanting to look cool and well dressed) or functional (needing a better computer to do work more effectively), but they speak to the same basic drivers. We buy groceries because without food in the house, we'll be hungry. We buy new clothes because we'll be cold, or we feel like everyone else has the latest handbag of the season, and we **2.**

2. Search for information (research)

As soon as a consumer recognizes a need and begins to search for an answer, you must be there to help! And where do consumers generally go to look for answers today? Google!

Example: Researching cameras

Now that the customer has realized a need to get a new camera, it's time to find solutions to his problem. In this stage, it's imperative that you are visible to the consumer searching for an answer.

Here are some things a consumer may be searching for:

Best cameras 2020

What is the best affordable camera?

Which cameras are top-rated?

The amount of information a customer needs to search for depends on how much he already knows about the solutions available, as well as the complexity of choices. For example, let's say there's someone looking for a camera as a gift, and he has no idea which type of camera he wants, or what features he needs.

He will need more information than someone who already knows exactly the type of camera he wants to buy, but just needs to find the right product and the right way to purchase it.

The amount of searching necessary is entirely dependent on the situation, and it can vary widely.

3. Evaluation of alternatives (consideration)

Now that the consumer has done research, it's time to evaluate their choices and see if there are any promising alternatives. During this phase, shoppers are aware of your brand and have been brought to your site to consider whether to purchase from you or a competitor.

Consumers make purchase decisions based on which available options best match their needs, and to minimize the risk of investing poorly, they will make sure there are no better options for them.

Their evaluation is influenced by two major characteristics:

Objective: Features, functionality, price, ease of use

Subjective: Feelings about a brand (based on previous experience or input from past customers)

4. Purchasing decision (conversion)

Alright, now it's money time. This is the stage when customers are ready to buy, have decided where and what they want to buy, and are ready to pull out their credit cards.

But wait! Not so fast. You can still lose a customer at this stage. This is the stage when the purchasing experience is key – it's imperative to make it as easy as possible.

5. Post-purchase evaluation (Re-purchase)

In this stage of the consumer purchase decision process, consumers reflect on their recent purchase. They think about how they feel about it, if it was a good investment, and most importantly, if they will return to the brand for future purchases and recommend the brand to friends and family.

In this stage, you need to have a post-purchase strategy to increase the likelihood that customers will engage with your brand again in the future. Return customers account for 1/3 of a store's total income on average, so make sure you're not missing out on this super valuable opportunity to increase your ecommerce conversion rate by turning shoppers into repeat buyers.

1.8.1. Decision Making

Decision making refers to making choices among alternative courses of action—which may also include inaction. While it can be argued that

management is decision making, half of the decisions made by managers within organizations ultimately fail. Therefore, increasing effectiveness in decision making is an important part of maximizing your effectiveness at work. Individuals throughout organizations use the information they gather to make a wide range of decisions. These decisions may affect the lives of others and change the course of an organization. For example, the decisions made by executives and consulting firms for Enron ultimately resulted in a $60 billion loss for investors, thousands of employees without jobs, and the loss of all employee retirement funds. But Sherron Watkins, a former Enron employee and now-famous whistle blower, uncovered the accounting problems and tried to enact change. Similarly, the decision made by firms to trade in mortgage-backed securities is having negative consequences for the entire economy in the United States. All parties involved in such outcomes made a decision, and everyone is now living with the consequences of those decisions.

1.8.2. RATIONALITY

If you say that someone is behaving "rationally," you probably mean that he or she is acting in a thoughtful, clear-headed way (as opposed to *irrationally*, which suggests that someone is acting emotionally or illogically). In the context of economics, the term *rationality* has a very specific meaning. It refers to an assumption that economists make about how people behave—remember that this is the starting point of all economics—in the face of scarcity. There simply aren't enough resources to satisfy all needs and wants. Charlie has only $10, he's hungry, and he needs to get to work. What will he do? An economist predicts that Charlie will behave in a predictable, rational manner, balancing costs against benefits to arrive at an action that maximizes his personal happiness or utility. As a result, he will choose a certain number of burgers and a certain number of bus tickets.

To put it differently, if an individual acts in an economically rational way, anything that increases the benefits or decreases the costs of some action is likely to increase the probability that the individual will choose that

action. Anything that decreases the benefits or increases the costs will likely reduce the probability that the individual will choose that action.

Economists assume that people will make choices in their own self-interest. They will choose those things that provide the greatest personal benefit, and they'll avoid or forego those that aren't as personally valuable and compelling. That's what we mean by the assumption of rationality. Do economists really believe that we only think of ourselves and don't ever try to benefit others? Not at all. The assumption that individuals are purely self-interested doesn't imply that individuals are greedy and selfish. People clearly derive satisfaction from helping others, so "self-interest" can also include pursuing things that benefit other people. One example is charitable behavior. When National Public Radio holds a fund drive, they often announce a situation where a benefactor has agreed to match the contributions made over a certain time period. If you pledge money during that time period, your action raises twice the amount you contribute. These matching fund situations tend to increase the amount of contributions, because people respond rationally, even when they are giving money to charity.

The assumption of rationality—also called the theory of rational behavior—is primarily a simplification that economists make in order to create a useful model of human decision-making.

If you consider your own personal choices, you will probably find that they are quite complex. You are balancing what you want right now with options you want to have in the future. You probably value the people around you—friends, family, neighbors—and you may consider the impact that your choices have on them. Setting aside the messy realm of personal choices for the time being, let's take a look at how decisions are made by consumers, by students, and by businesses in a world of economic rationality.

Rationality and Consumers

When a consumer is thinking about buying a product, what does he or she want? The theory of rational behavior would say that the consumer wants to maximize benefit and minimize cost. Let's look at a simple example. When a new movie is released, will you see it in the theater, or will you wait for it to be released on Netflix or on TV? If we consider only the monetary costs of your

choice, a movie ticket might cost $10 and you will only be able to see that movie one time. If you wait, you can probably watch it as part of your monthly Netflix or cable subscription without spending any more than you would spend without watching the movie.

Why would you pay $10 to watch the movie in the theater? You might want to see it right away, when it is only showing in the theater. You might want the theater experience, with the big screen and high-quality image and sound. You will make a decision that is economically rational, based on the following consideration: "Is the benefit and enjoyment that I get from seeing the movie in a theater worth the $10 cost?" As a consumer, you are making an economically rational decision about the costs and benefits.

Rationality and Students

How do students decide on a major? A number of things may factor into the decision, such as what type of career a student is interested in, the reputation of specific departments at the university a student is attending, and the student's preferences for specific fields of study. Let's take an example.

You go to college with the idea that you want to major in Business Management. During your first year, you discover that Business Analytics majors earn significantly higher salaries. This discovery increases the benefits in your mind of the Analytics major, and you decide to choose that major. You've just made an economically rational decision.

Rationality and Businesses

Businesses also have predictable behavior, but rather than seeking to maximize happiness or pleasure, they seek to maximize profits. When economists assume that businesses have a goal of maximizing profits, they can make predictions about how companies will react to changing business conditions.

For example, if wages in the United States increase, how will U.S. companies react? The rational reaction may be to move those jobs that can be performed elsewhere to countries with lower wages. This prediction is based on an oversimplification, and it might not hold true in every case—individual businesses would obviously need to understand the full cost of moving certain work out of the country before doing so. But the decision

would be made according to the impact on profit and would still be rational. If a company stands to earn more profit by moving some jobs overseas, then that's the result that economists would predict. Rationality suggests that consumers will act to maximize self-interest and businesses will act to maximize profits. Both are taking into account the benefits of a choice, given the costs.

1.9. Fundamental Economic Problem

Economics is mainly concerned with the achievement and use of material requirements to satisfy human wants. Human wants are unlimited and productive resources such as land and other natural resources, raw materials, capital equipment with which to produce goods and services to satisfy those wants are scarce and limited. Thus goods and services which satisfy human wants are scarce because productive resources with which to produce goods and services are scarce. The problem of scarcity of resources is felt not only by individuals but also by the society as a whole.

With wants being unlimited and resources scarce, we individually as well as collectively cannot satisfy all our wants. This gives rise to the problem of how to use scarce resources to attain maximum satisfaction. This is generally called 'the economic problem' as it lies at the root of all economic problems faced by the society. Every economic system, be it capitalist, socialist or mixed, has to contend with this central problem of scarcity of resources relative to wants for them.

Thus the economic problem derives from the scarcity of resources relative to human wants. This gives rise to the struggle of man for existence and efforts by him to promote his well-being. That the scarcity of resources in relation to human wants is the fundamental economic problem can be easily understood in the context of poor and developing countries like India where quite a large number of population lives at a bare subsistence level. The struggle for existence due to the scarcity of resources is too obvious in them to need any elaborate explanation. However, to say that the developed countries, such as U.S.A., where affluence and prosperity have been brought about also confront the scarcity problem raises some doubts.

But the fact is that, despite of their affluence and riches, developed societies too face the problem of scarcity. Of course, their possession of goods and services has enormously increased, but so his their wants. Indeed, their wants for goods and services has been multiplying during the course of economic growth so that their present wants still remain ahead of their resources and capacity to produce.

As has been said above, the problem of scarcity of resources arises not merely due to the limited resources and capacity to produce alone but also due to immense human wants. So long as human wants for goods and services remain ahead of the resources, both natural and acquired, the economic problem of scarcity would be there.

If Americans today, for example, were to content to live at the level of the Indian middle class people, all their wants would be fully satisfied with their available resources and capacity to produce. In that situation they would face little or no scarcity and economic problem for them would disappear. To conclude, the affluent and developed countries of U.S.A. and Western Europe face the problem of scarcity even today as their present wants remain ahead of their increased resources and capability to produce.

Scarcity of resources requires that efficient and optimum use of resources be made so that we should get most out of them and thus maximum possible satisfaction of the people is achieved. Further, since all wants cannot be satisfied due to scarcity of resources we face the problem of choice — choice among multiple wants which are to be satisfied. If it is decided to use more resources in one line of production, then some resources must be withdrawn from another commodity.

Thus, the problem of choice from the viewpoint of the society as a whole refers to which goods and in what quantities are to be produced and how productive resources allocated for their production accordingly so as to achieve the greatest possible satisfaction of the people. That an eminent English Economist Lord Robbins defines economics in terms of this basic economic problem.

According to him, “Economic is a science which studies human behaviour as a relationship between ends and scarce resources which have

alternative uses." Ends refer to wants which are considered to be unlimited. The use and allocation of scarce resources to produce goods and services has to be such as would maximise satisfaction. This applies both to the behaviour of the individual as well as to that of the society as a whole.

The scarcity of resources also compels us to decide how the different goods should be produced, that is, what production methods should be employed for the production of goods so as to make best possible use of the available resources. If the resources were unlimited, the problem of how goods should be produced would not have arisen. This is because with unlimited resources it would not matter whichever method, efficient or inefficient, was employed for the production of goods.

Further, due to scarcity of resources goods cannot be produced in sufficient quantities to satisfy all wants of all the people of a society. This raises the question that should get how much from the national output. That is, how the national output is distributed among various members of a society. Lastly, people are not content with the meagre resources they have. They want to improve their material well-being by increasing their resources. Thus human society wants to have economic growth and development so as to overcome or reduce the problem of scarcity. The promotion of economic growth and development requires accumulation of capital and improvement in technology.

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UNIT- II

UTILITY ANALYSIS

2.1. The Utility Theory

The utility theory aims to explain the situation of consumer behavior in regard to the satisfaction that a consumer gets from the consumption of a commodity. Utility theory was developed and introduced in 1870 by a British Economist, William Stanley Jevons. The term utility refer to the satisfaction or benefit that a consumer derives consumption of the commodity. The utility can be measured in utils.

Utility Analysis

Utility analysis, attempts to explain consumer behavior, on the basis of satisfaction derived from the consumption of commodities. Of course, the utility derived from the consumption affects the consumer's purchase and consumption decision. The concept of utility can be explained with the help of various examples:

1. A person who is on fasting for two days when offered food will get utility (satisfaction)
2. A kid when crying is offered toys to play also gets satisfaction. Thus, both examples referred above offers satisfaction owing to the satisfaction of needs and wants.

2.1.1. Types of Utility

There are two types of utility:

1. **Total Utility**
2. **Marginal Utility**

Total Utility:

The term total utility means the total satisfaction derived from the consumption of commodities.

Marginal Utility:

Marginal utility be defined as the additional utility derived from the consumption of an additional unit of a commodity. Therefore, we can say that Marginal utility is the extra satisfaction gained from a one more additional unit of that particular commodity. Marginal utility may be calculated as follows:

Marginal Utility = change in Total Utility / change in quantity consumed.

2.1.2. Cardinal Utility Analysis

Cardinal utility analysis is based on the cardinal measurement of utility which assumes that utility is measurable and additive. This theory was developed by neo-classical economists like Marshall, Pigou, and Robertson etc. It is expressed as a quantity measured in hypothetical units which called utils. If a consumer imagines that one mango has 8 utils and an apple 4 utils, it implies that the utility of mango is twice than of an apple.

Assumptions of Cardinal Utility Analysis:

1. Rational consumer Cardinal utility analysis assumes that consumer is rational. He makes every effort to maximize his total utility under the income and price constraint. While going for the purchase or consumption of good, a consumer will act rationally to maximize his level satisfaction.

2. Cardinal measurement of Utility the utility of each commodity is measurable and quantifiable i.e. Utility is cardinal concept. The most convenient measure is money. Thus utility can be measured quantitatively in monetary units or cardinal units. Therefore whenever a person consumes any commodity, he can express or measure his satisfaction in cardinal term. For example, a person having a glass of milk can say that he got 10 utils from it. Moreover cardinal measurement of utility enables the comparison of utilities derived from two different goods. For example, a person can say that the utility he gets from the consumption of milk is twice the utility he gets from the consumption of Juice.

3. Constant Marginal Utility of Money the utility derived from commodities are measured in terms of money. According to Marshall, money is the measuring rod of money. So, money is a unit of measurement in cardinal approach. Marshall argues that that the amount of money which a person is prepared to pay for a unit of a good rather than go without it is a measure of utility he derives from that good. According to him measurement of marginal utility of good in terms of money is only possible if the marginal utility of money itself remains constant. Hence, marginal utility of money should be constant.

4. Diminishing Marginal Utility if the stock of commodities increases with the consumer, each additional stock or unit of the commodity gives him lesser

and lesser satisfaction. Every additional intake of good will yield less utility as compared to the utility obtained from the previous unit of the good. It means utility increases at a decreasing rate.

5. Independent Utilities It means utility obtained from one commodity is not dependent on utility obtained from another commodity. In other words, it means that the utility which a consumer derives from the consumption of that commodity is the function of the quantity of only that good. It is not affected by the consumption of other commodities.

Approaches to Cardinal Utility Analysis the two approaches of Cardinal utility analysis are as follows:

1. Law of Diminishing Marginal Utility
2. Law of Equi-Marginal Utility

2.1.3. Ordinal Utility Theory:

Ordinal utility approach is a school of thought that believes that utility cannot be measured quantitatively, that is, utility is not additive rather it could only be ranked according to preference. The consumer must be able to determine the order of preference when faced with different bundles of goods by ranking the various 'baskets of goods' according to the satisfaction that each bundle gives. For instance, if a consumer derives 3 utils from the consumption of one unit of commodity X and 12 utils from the consumption of commodity Y, this means that the consumer derives more satisfaction from consuming commodity Y than from commodity X. Though to the cardinals, the consumer derives four times more utility from one unit of Y than from X. The ordinal utility theory explains consumer behaviour by the use of indifference curve.

Assumptions of Ordinal Utility Approach

(i) Rationality: - The consumer is assumed to be rational meaning that he aims at maximizing total utility given his limited income and the prices of goods and services.

(ii) Utility is Ordinal: - According to this assumption, utility is assumed not to be measurable but can only be ranked according to the order of preference for different kinds of goods.

(iii) Transitivity and Consistency of Choice: - By transitivity of choice, it means that if a consumer prefers bundle A to B and bundle B to C, then invariably, the consumer must prefer bundle A to C. Symbolically, it is written as: If A > B and B > C; then A > C. By consistency of choice, it is assumed that the consumer is consistent in his choice making. If two bundles A and B are available to the consumer, if the consumer prefers bundle A to B in one period, he cannot choose bundle B over A nor treat them as equal. Symbolically: If A > B, then B > A and A ≠ B

(iv) Diminishing Marginal Rate of Substitution (MRS):- MRS is the rate at which the consumer can exchange between two goods and still be at the same level of satisfaction. This assumption is based on the fact that the preferences are ranked in terms of indifference curves which are assumed to be convex to the origin.

(v) **The Total Utility of the** consumer depends on the quantities of the commodities consumed. That is, the total utility is the addition of the different utilities. u = f (q1, q2 ----- qn)

(vi) Non Satiation: - it is assumed that the consumer would always prefer a larger bundle of goods to a smaller bundle of the same good. He is never over supplied with goods within the normal range of consumption.

2.2. LAW OF DIMINISHING MARGINAL UTILITY

According to the Law of Diminishing Marginal Utility, marginal utility of a good diminishes as an individual consumes more units of a good. In other words, as a consumer takes more units of a good, the extra utility or satisfaction that he derives from an extra unit of the good goes on falling. It should be carefully noted that is the marginal utility and not the total utility than declines with the increase in the consumption of a good. The law of diminishing marginal utility means that the total utility increases but at a decreasing rate.

“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.” This law is based upon two important facts. Firstly, while the total wants of a man are virtually unlimited, each single want is satiable. Therefore, as an individual consumes more and more units of goods, intensity of his want for

the goods goes on falling and a point is reached where the individual no longer wants any more units of the goods. That is, when saturation point is reached, marginal utility of goods becomes zero. Zero marginal utility of goods implies that the individual has all that he wants of the goods in question.

The second fact on which the law of diminishing marginal utility is based is that the different goods are not perfect substitutes for each other in the satisfaction of various particular wants. When an individual consumes more and more units of a goods, the intensity of particular want for the goods diminishes but if the units of that goods could be devoted to the satisfaction of other wants and yield as much satisfaction as they did initially in the satisfaction of the first want, marginal utility of the good would not have diminished. It is obvious from the above that the law of diminishing marginal utility describes a familiar and fundamental tendency of human nature. This law has been arrived at by introspection and by observing how people behave.

Table 2.1. Diminishing Marginal Utility

Cups of Tea	**Total Utility**	**Marginal utility**
Consumed per day	(units)	(units)
1	12	12
2	22	10
3	30	8
4	36	6
5	40	4
6	41	1
7	39	-2
8	34	-5

Consider Table 2.1 in which we have presented the total and marginal utilities derived by a person from cups of tea consumed per day. When one cup of tea is taken per day, the total utility derived by the person is 12 units. And because this is the first cup its marginal utility is also 12. With the consumption of 2nd cup per day, the total utility rises to 22 but marginal utility falls to 10. It will be seen from the table that as the consumption of tea

increases to six cups per day, marginal utility from the additional cups goes on diminishing (i.e., the total utility goes on increasing at a diminishing rate). However, when the cups of tea consumed per day increase to seven, then instead of giving positive marginal utility, the seventh cup gives negative marginal utility equal to -2. This is because too many cups of tea consumed per day (say more than six for a particular individual) may cause him acidity and gas trouble. Thus, the extra cups of tea beyond six to the individual in question give him disutility rather than positive satisfaction.

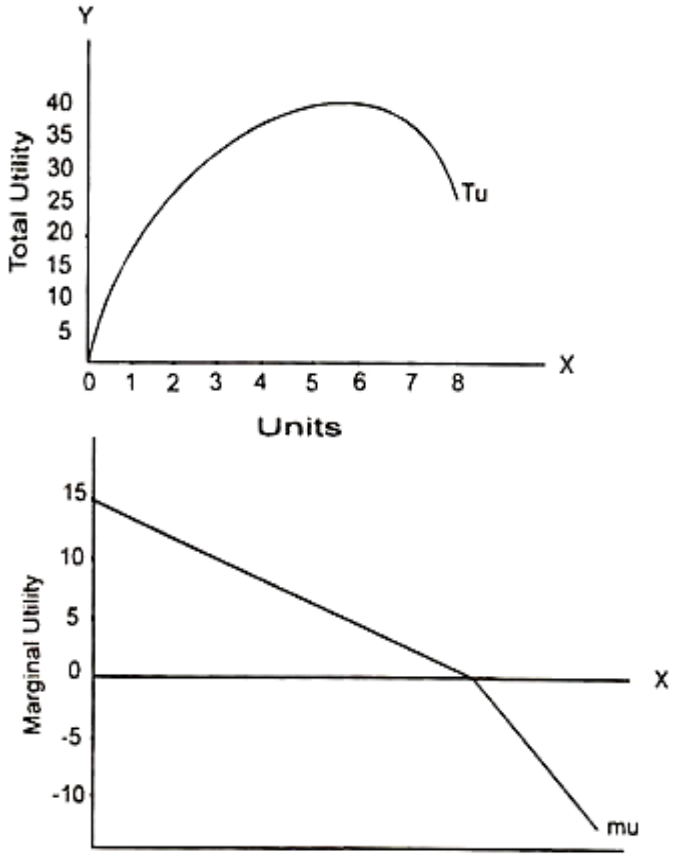


Fig.2.1. Diminishing Marginal Utility

We have graphically represented the data of the above table in Figure 2.1 We have constructed rectangles representing the total utility obtained from various numbers of cups of tea consumed per day. As will be seen in the Figure, the length of the rectangle goes on increasing up to the sixth cup of tea and beyond that length of the rectangle declines, indicating thereby that up to the sixth cup of tea total utility obtained from the increasing cups of tea goes on increasing whereas beyond the 6th cup, total utility declines. In other words, marginal utility of the additional cups up to the 6th cup is positive, whereas beyond the sixth cup marginal utility is negative. The marginal utility

obtained by the consumer from additional cups of tea as he increases the consumption of tea has been shaded. A glance at the Figure 2.1 will show that this shaded area goes on declining which shows that marginal utility from the additional cups of tea is diminishing. We have joined the various rectangles by a smooth curve which is the curve of total utility which rises Up to a point and then declines due to negative marginal utility.

Moreover, the shaded areas of the rectangles representing marginal utility of the various cups of tea have also been shown separately in the figure given below. We have joined the shaded rectangles by a smooth curve which is the curve of marginal utility. As will be seen, this marginal utility curve goes on declining throughout and even falls below the x-axis. Portion below the x-axis indicates the negative marginal utility. This downward-sloping marginal utility curve has an important implication for consumer's behavior regarding demand for goods. We shall explain how the demand curve is derived from marginal utility curve. The main reason why the demand curves for good slope downward is the fact of diminishing marginal utility. The significance of the diminishing marginal utility of a good for the theory of demand is that the quantity demanded of a good rises as the price falls and vice versa. Thus, it is because of the diminishing marginal utility that the demand curve slopes downward.

2.3. LAW OF EQUI-MARGINAL UTILITY

The equi-marginal principle is based on the law of diminishing marginal utility. The equi-marginal principle states that a consumer will be maximizing his total utility when he allocates his fixed money income in such a way that the utility derived from the last unit of money spent on each good is equal. Suppose a man purchases two goods X and Y whose prices are P_X and P_Y, respectively. As he purchases more of X, his MU_X declines while MU_Y rises. Only at the margin the last unit of money spent on X has the same utility as the last unit of money spent on Y and the person thereby maximizes his satisfaction. Only when this is true, the consumer will not be distributing his money in buying good X and Y, since by reallocating his expenditure he cannot increase his total utility.

This condition for a consumer to maximize utility is usually written in the following form:

$$MU_X/P_X = MU_Y/P_Y$$

So long as MU_Y/P_Y is higher than MU_X/P_X, the consumer will go on substituting Y for X until the marginal utilities of both X and Y are equalized. The marginal utility per rupee spent is the marginal utility obtained from the last unit of good consumed divided by the price of good (i.e., MU_X/P_X or MU_Y/P_Y). A consumer thus gets maximum utility from his limited income when the marginal utility per rupee spent is equal for all goods.

Example:

This equi-marginal principle or the law of substitution can be explained in terms of an arithmetical example. In Table 2.3, we have shown marginal utility schedule of X and Y from the different units consumed. Let us also assume that prices of X and Y are Rs. 4 and Rs. 5, respectively.

Table 2.3. Marginal Utility Schedules

Number of units consumed	MU_X	MU_Y
1	40	55
2	36	50
3	32	30
4	28	20
5	24	15
6	20	5

MU_X and MU_Y schedules show diminishing marginal utilities for both goods X and Y from the different units consumed. Dividing MU_X and MU_Y by their respective prices we obtain weighted marginal utility or marginal utility of money expenditure. This has been shown in Table 2.3.

Table.2.3. MU_X/P_X and MU_Y/P_Y schedules

Number of units consumed	MU_X/P_X	MU_Y/P_Y
1	10	11
2	9	10
3	8	6
4	7	4
5	6	3
6	5	1

MU_X/P_X and MU_Y/P_Y are equal to 6 when 5 units of X and 3 units of Y are purchased. By purchasing these combinations of X and Y, the consumer spends his entire money income of Rs. 35 (= Rs. 4 x 5 + Rs. 5 x 3) and, thus, gets maximum satisfaction [10 + 9 + 8 + 7 + 6] + [11 + 10 + 6] = 67 units. Purchase of any other combination other than this involves lower volume of satisfaction.

Graphical Representation:

The above principle can also be illustrated in terms of a figure. We have drawn marginal utility curves for goods X and Y in Fig 2.2(a) and (b). Here we use marginal utility and price. Marginal utility per rupee spent on good X = MU_X/P_X, and that of Y = MU_Y/P_Y. The MU_X/P_X curve has been shown in Fig. 2.2(a) while the MU_Y/P_Y curve has been shown in Fig. 2.2(b). We have not drawn negative portion of the marginal utility curves.

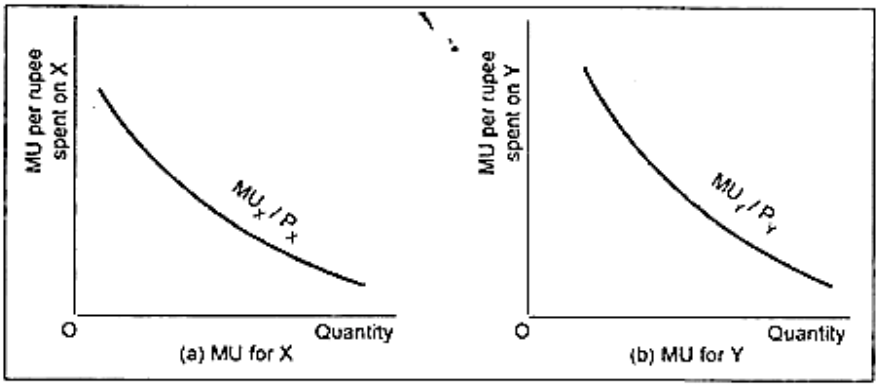


Fig. 2.2. MUs for X and Y

Now, by superimposing Fig. 2.2(b) on Fig. 2.2(a), we get Fig. 2.3 in which we measure available income—00'—of the consumer on the horizontal axis.

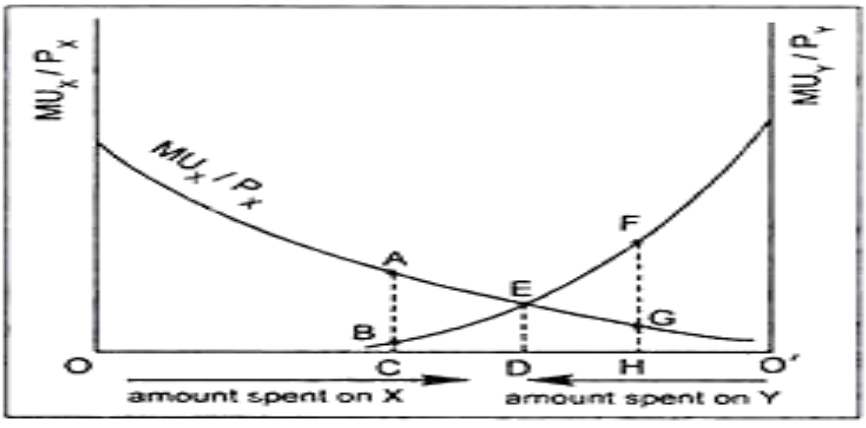


Fig. 2.3. Equi – marginal principle

Our consumer maximizes his total utility by spending OD amount on good X and O'D amount on good Y. By purchasing this combination, the consumer equalizes marginal utilities per rupee spent on X and Y at point E (i.e., $MU_X/P_X = MU_Y/P_Y = ED$). No other combination will give greater satisfaction.

If our consumer spends OC on good X and O'C on good Y then MU_X/P_X will exceed MU_Y/ P_Y by the distance AB. This will induce the consumer to buy more of X and less of Y. As a result, MU_X/P_X will fall, while MU_Y/P_Y will rise until equality is restored at point E. Similarly, if the consumer spends OH on X and O'H on Y then $MU_X/P_X < MU_Y/P_Y$. Now, the consumer will buy more of Y and less of X. This substitution between X and Y will continue until $MU_X/P_X = MU_Y/P_Y$. Therefore, the consumer can derive maximum satisfaction only when marginal utility per rupee spent on good X is the same as the marginal utility per rupee spent on another good Y. When this condition is met, the consumer does not find any interest in changing his expenditure pattern.

The equilibrium condition can now be rewritten as:

$MU_X/P_X = MU_Y/P_Y$

This equation can, however, be rearranged in the following form**:**

$MU_X/MU_Y = P_X/P_Y$

This equation states that a consumer reaches equilibrium when he equalizes the ratio of marginal utilities of both goods with the price ratio.

However, this equilibrium condition can be extended to **'n'** number of commodities.

For 'n' number of commodities, the equilibrium condition is:

$MU_A/P_A = MU_B/P_B = MU_C/P_C = \ldots\ldots = MU_n/P_n$

Limitations:

Firstly, the law of equi-marginal utility is based on the measurability of utility in cardinal numbers. But utility is a subjective concept and, hence, not quantifiable.

Secondly, this law assumes that the consumer acts rationally. No consumer, in fact, purchases commodity in accordance with this principle of substitution. In fact, purchases are often guided by habit, sentiment, prejudice, or custom.

Thirdly, this law cannot be applied in the case of indivisible commodities like motor car, refrigerator, etc. Since these commodities are not divisible into smaller units, the law may seem to be inoperative.

Derivation of Demand Curve from Equi-Marginal Utility:

In order to be able to derive the demand curve for a commodity we must know the equilibrium purchase plan of a consumer of various commodities. We want to know the equilibrium purchase of commodities because the basic aim of a consumer is the maximization of satisfaction from the consumption of various commodities. The equilibrium of the consumer may be explained in terms of the law of equi-marginal utility or the law of substitution. This law states that a consumer will be maximizing his satisfaction from the expenditure of his limited money income when the marginal utility per rupee spent on, say, one good, X, is the same as the marginal utility of rupee spent on another good, Y. In other words, a consumer reaches equilibrium when the marginal utility per rupee of good X (MU_X/P_X) is equal to the marginal utility per rupee of good Y (MU_Y/P_Y).

2.4. INDIFFERENCE CURVE:

2.4.1. Meaning of Indifference Curve:

When a consumer consumes various goods and services, then there are some combinations, which give him exactly the same total satisfaction. The graphical representation of such combinations is termed as indifference curve. Indifference curve refers to the graphical representation of various alternative combinations of bundles of two goods among which the consumer is indifferent. Alternately, indifference curve is a locus of points that show such combinations of two commodities which give the consumer same satisfaction. Let us understand this with the help of following indifference schedule, which shows all the combinations giving equal satisfaction to the consumer.

Table 2.4: Indifference schedule

Combination of apples and bananas	Apples (A)	Bananas (B)
P	1	15
Q	2	10
R	3	6
S	4	3
T	5	1

As seen in the schedule, consumer is indifferent between five combinations of apple and banana. Combination 'P' (1A + 15B) gives the same utility as (2A + 10B), (3A + 6B) and so on. When these combinations are represented graphically and joined together, we get an indifference curve 'IC_1' as shown in In the diagram, apples are measured along the X-axis and bananas on the Y

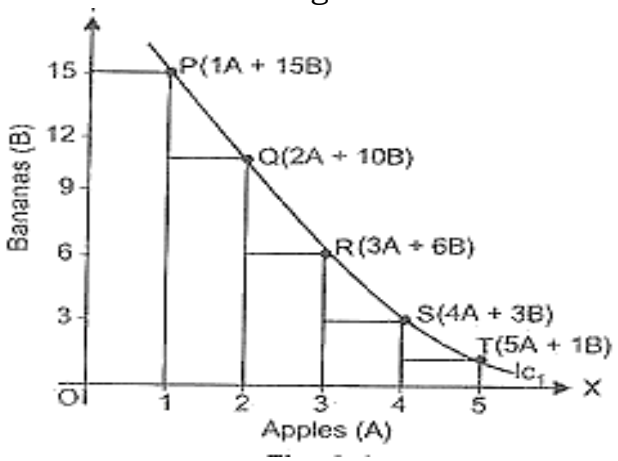


Fig. 2.4. Indifference curve

Axis. All points (P, Q, R, S and T) on the curve show different combinations of Apples and bananas. These points are joined with the help of a smooth curve, known as indifference curve (IC_1). An indifference curve is the locus of all the points, representing different combinations that are equally satisfactory to the consumer. Every point on IC_1, represents an equal amount of satisfaction to the consumer. So, the consumer is said to be indifferent between the combinations located on Indifference Curve 'IC_1'. The combinations P, Q, R, S and T give equal satisfaction to the consumer and therefore he is indifferent among them. These combinations are together known as 'Indifference Set'.

2.4.2. Indifference Map:

Indifference Map refers to the family of indifference curves that represent consumer preferences over all the bundles of the two goods. An indifference curve represents all the combinations, which provide same level of satisfaction. However, every higher or lower level of satisfaction can be shown on different indifference curves. It means, infinite number of indifference curves can be drawn.

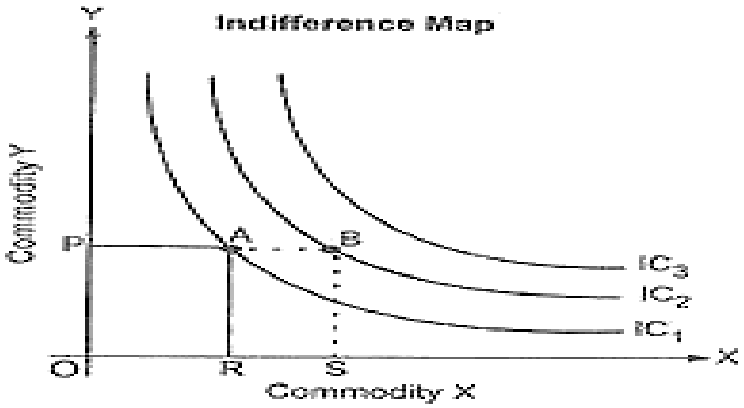


Fig.2.5. Indifference Map

In Fig. 2.5, IC_1 represents the lowest satisfaction, IC_2 shows satisfaction more than that of IC_1 and the highest level of satisfaction is depicted by indifference curve IC_3. However, each indifference curve shows the same level of satisfaction individually. It must be noted that 'Higher Indifference curves represent higher levels of satisfaction' as higher indifference curve represents larger bundle of goods, which means more utility because of monotonic preference.

2.4.3. PROPERTIES OF INDIFFERENCE CURVE:

1. Indifference curves are always convex to the origin:

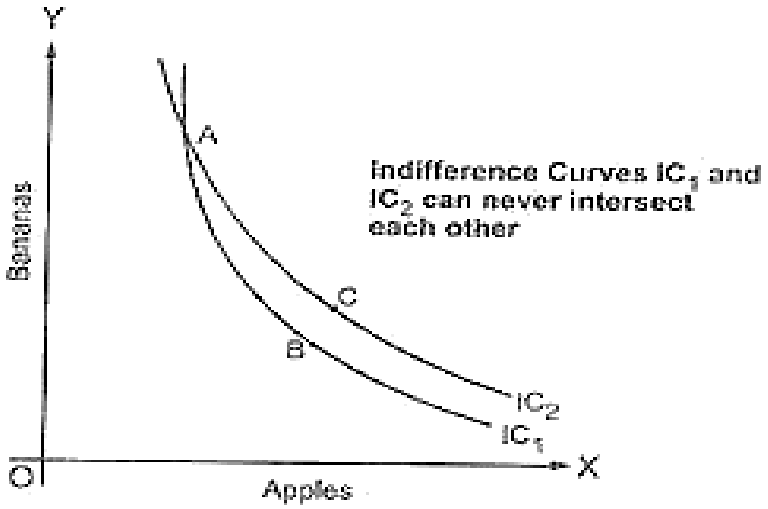
An indifference curve is convex to the origin because of diminishing MRS. MRS decreased continuously because of the law of diminishing marginal utility. As seen in Table 3.3, when the consumer consumes more and more of apples, his marginal utility from apples keeps on declining and he is willing to give up less and less of bananas for each apple. Therefore, indifference curves are convex to the origin (see Fig. 3.13). It must be noted that MRS indicates the slope of indifference curve.

2. Indifference curve slope downwards:

It implies that as a consumer consumes more of one good, he must consume less of the other good. It happens because if the consumer decides to have more units of one good (say apples), he will have to reduce the number of units of another good (say bananas), so that total utility remains the same.

3. Higher Indifference curves represent higher levels of satisfaction:

Higher indifference curve represents large bundle of goods, which



means more utility because of monotonic preference. Consider point 'A' on IC_X and point 'B' on IC_2 in Fig. At 'A', consumer gets the combination (OR, OP) of the two commodities X and Y. At 'B', consumer gets the combination (OS, OP). As OS > OR, the consumer gets more satisfaction at IC_2.

4. Indifference curves can never intersect each other:

As two indifference curves cannot represent the same level of satisfaction, they cannot intersect each other. It means, only one indifference curve will pass through a given point on an indifference map. In Fig. 3.14, satisfaction from point A and from B on IC_1 will be the same. Similarly, points A and C on IC_2 also give the same level of satisfaction. It means, points B and C should also give the same level of satisfaction. However, this is not possible, as B and C lie on two different indifference curves, IC_1 and IC_2 respectively and represent different levels of satisfaction. Therefore, two indifference curves cannot intersect each other.

2.4.4. Assumptions of Indifference Curve

The various assumptions of indifference curve are:

1. Two commodities:

It is assumed that the consumer has a fixed amount of money, whole of which is to be spent on the two goods, given constant prices of both the goods.

2. Non Satiety:

It is assumed that the consumer has not reached the point of saturation. Consumer always prefer more of both commodities, i.e. he always tries to move to a higher indifference curve to get higher and higher satisfaction.

3. Ordinal Utility:

Consumer can rank his preferences on the basis of the satisfaction from each bundle of goods.

4. Diminishing marginal rate of substitution:

Indifference curve analysis assumes diminishing marginal rate of substitution. Due to this assumption, an indifference curve is convex to the origin.

5. Rational Consumer:

The consumer is assumed to behave in a rational manner, i.e. he aims to maximize his total satisfaction

2.5. MARGINAL RATE OF SUBSTITUTION (MRS):

MRS refers to the rate at which the commodities can be substituted with each other, so that total satisfaction of the consumer remains the same. For example, in the example of apples (A) and bananas (B), MRS of 'A' for 'B', will be number of units of 'B', that the consumer is willing to sacrifice for an additional unit of 'A', so as to maintain the same level of satisfaction.

MRS_{AB} = Units of Bananas (B) willing to Sacrifice / Units of Apples (A) willing to Gain

$MRS_{AB} = \Delta B/\Delta A$

MRS_{AB} is the rate at which a consumer is willing to give up Bananas for one more unit of Apple. It means, MRS measures the slope of indifference curve.

It must be noted that in mathematical terms, MRS should always be negative as numerator (units to be sacrificed) will always have negative value. However, for analysis, absolute value of MRS is always considered. The concept of MRS_{AB} is explained through Table 2.5 and Fig. 2.5

Table 2.5: MRS between Apple and Banana:

Combination	Apples (A)	Banana (B)	MRS_{AB}
P	1	15	–
Q	2	10	5B:1 A
R	3	6	4B:1A
S	4	3	3B:1A
T	5	1	2B:1 A

As seen in the given schedule and diagram, when consumer moves from P to Q, he sacrifices 5 bananas for 1 apple. Thus, MRS_{AB} comes out to be 5:1. Similarly, from Q to R, MRS_{AB} is 4:1. In combination T, the sacrifice falls to 2 bananas for 1 apple. In other words, the MRS of apples for bananas is diminishing.

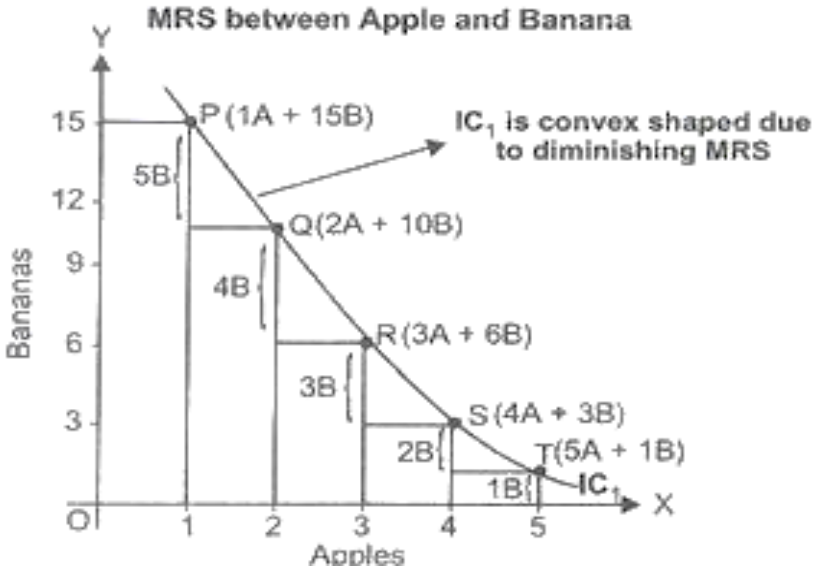


Fig.2.5 Marginal Rate of Substitution

Why Marginal Rate of Substitution diminishes?

MRS falls because of the law of diminishing marginal utility. In the given example of apples and bananas, Combination 'P' has only 1 apple and, therefore, apple is relatively more important than bananas. Due to this, the consumer is willing to give up more bananas for an additional apple. But as he consumes more and more of apples, his marginal utility from apples keeps on declining. As a result, he is willing to give up less and less of bananas for each apple.

2.6. INCOME EFFECT, SUBSTITUTION EFFECT AND PRICE EFFECT

2.6.1. INCOME EFFECT:

The consumer's equilibrium it was assumed that the income of the consumer remains constant, given the prices of the goods X and Y. Given the tastes and preferences of the consumer and the prices of the two goods, if the income of the consumer changes, the effect it will have on his purchases is known as the income Effect. If the income of the consumer increases his budget line will shift upward to the right, parallel to the original budget line. On the contrary, a fall in his income will shift the budget line inward to the left. The budget lines are parallel to each other because relative prices remain unchanged.

In Figure 2.6 when the budget line is PQ, the equilibrium point is R where it touches the indifference curve I_1. If now the income of the consumer increases, PQ will move to the right as the budget line P_1, I_1, and the new equilibrium point is S where it touches the indifference curve I_2. As income increases further, PQ becomes the budget line with T as its equilibrium point. The locus of these equilibrium points R, S and T traces out a curve which is called the income-consumption curve (ICC). The ICC curve shows the income effect of changes in consumer's income on the purchases of the two goods, given their relative prices.

Normally, when the income of the consumer increases, he purchases larger quantities of two goods. In Figure he buys RA of Y and OA of X at the equilibrium point R on the budget line PQ. As his income increases, he buys SB of Y and OB of X at the equilibrium point S and P_1, Q_1, budget line and still more of the two goods TC of Y and OC of X, on the budget line P_2Q_2.

Usually, the income consumption curve slopes upwards to the right as shown in Figure. But an income-consumption curve can have any shape provided it does not intersect an indifference curve more than once. We can have five types of income consumption curves. The first type is explained above in Figure where the ICC curve has a positive slope throughout its range. Here the income effect is also positive and both X and Y are normal goods.

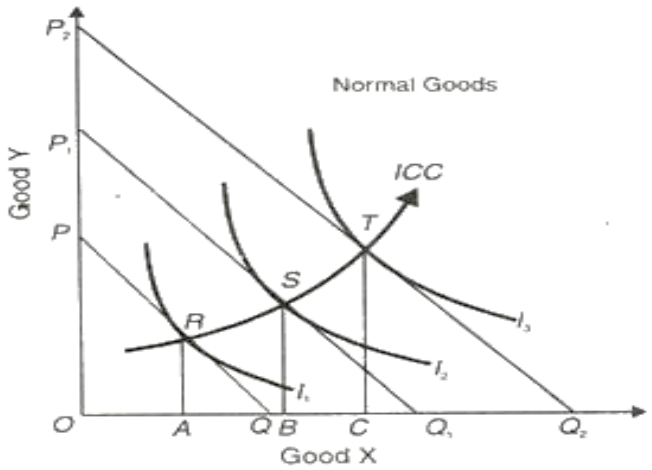


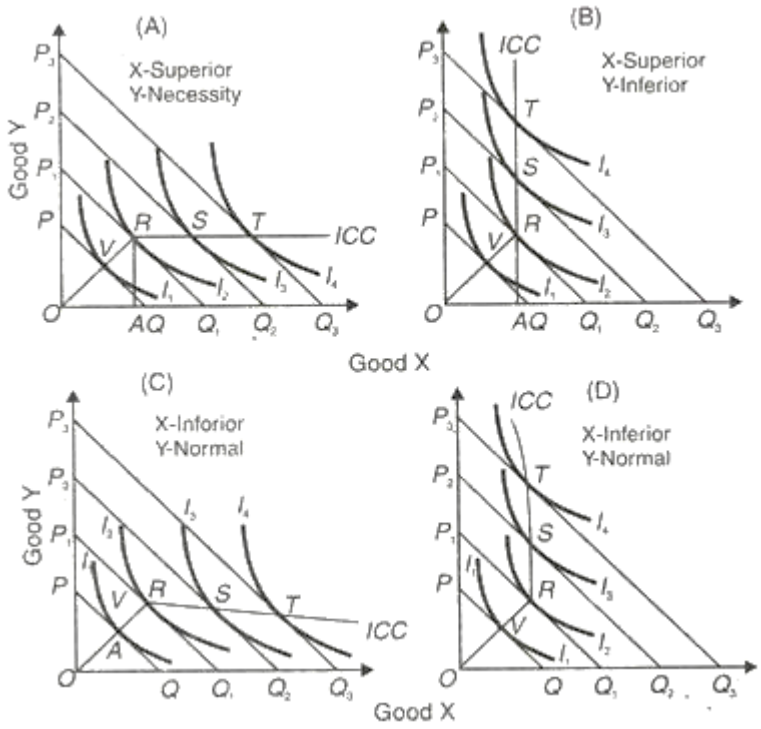
Fig.2.6. Income consumption curve

The second type of ICC curve may have a positive slope in the beginning but become and stay horizontal beyond a certain point when the income of the consumer continues to increase. In Figure the ICC curve slopes upwards with the increase in income up to the equilibrium point R at the budget line P_1Q_1 on the indifference cure I_2. Beyond this point it becomes horizontal which signifies that the consumer has reached the saturation point with regard to the consumption of good Y. He buys the same amount of Y (RA) as before despite further increases in his income. It often happens in the case of a necessity (like salt) whose demand remains the same even when the income of the consumer continues to increase further. Here Y is a necessity.

Figure (B) shows a vertical income consumption curve when the consumption of good X reaches the saturation level R on the part of the consumer. He has no inclination to increase its purchases despite further increases in his income. He continues to purchase OA of it even at higher income levels. Thus X is a necessity here.

The last two types of income consumption curves relate to inferior goods. The demand of inferior goods falls, when the income of the consumer increases beyond a certain level, and he replaces them by superior substitutes. He may replace coarse grains by wheat or rice, and coarse cloth by a fine variety. In Figure (C), good Y is inferior and X is a superior or luxury good. Upto point R the ICC curve has- a positive slope and beyond that it is negatively inclined. The consumer's purchases of Y fall with the increase in his income. Similarly in Figure (D), good X is shown as inferior and Y is a superior good beyond the equilibrium point R when the ICC curve turns back

upon itself. In both these cases the income effect is negative beyond point R on the income-consumption curve ICC.



2.6.2. THE SUBSTITUTION EFFECT:

The substitution effect relates to the change in the quantity demanded resulting from a change in the price of good due to the substitution of relatively cheaper good for a dearer one, while keeping the price of the other good and real income and tastes of the consumer as constant. Prof. Hicks has explained the substitution effect independent of the income effect through compensating variation in income. "The substitution effect is the increase in the quantity bought as the price of the commodity falls, after adjusting income so as to keep the real purchasing power of the consumer the same as before. This adjustment in income is called compensating variations and is shown graphically by a parallel shift of the new budget line until it become tangent to the initial indifference curve." Thus on the basis of the methods of compensating variation, the substitution effect measure the effect of change in the relative price of a good with real income constant. The increase in the real income of the consumer as a result of fall in the price of, say good X, is so withdrawn that he is neither better off nor worse off than before.

The substitution effect is explained in Figure 2.17 where the original budget line is PQ with equilibrium at point R on the indifference curve I_1. At R, the consumer is buying OB of X and BR of Y. Suppose the price of X falls so that his new budget line is PQ_1. With the fall in the price of X, the real income of the consumer increases. To make the compensating variation in income or to keep the consumer's real income constant, take away the increase in his income equal to PM of good Y or Q_1N of good X so that his budget line PQ_1 shifts to the left as MN and is parallel to it.

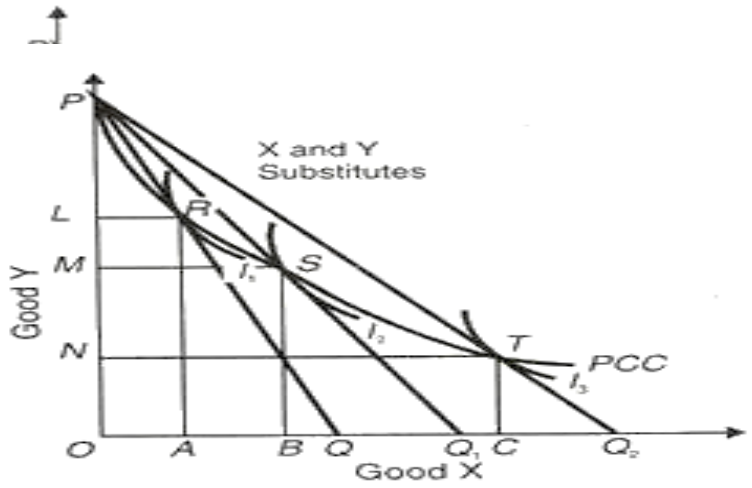


Fig.2.17. Substitution Effect

At the same time, MN is tangent to the original indifference curve l_1 but at point H where the consumer buys OD of X and DH of Y. Thus PM of Y or Q_1N of X represents the compensating variation in income, as shown by the line MN being tangent to the curve I_1 at point H. Now the consumer substitutes X for Y and moves from point R to H or the horizontal distance from B to D. This movement is called the substitution effect. The substitution affect is always negative because when the price of a good falls (or rises), more (or less) of it would be purchased, the real income of the consumer and price of the other good remaining constant. In other words, the relation between price and quantity demanded being inverse, the substitution effect is negative.

2.6.3. THE PRICE EFFECT:

The price effect indicates the way the consumer's purchases of good X change, when its price changes, A given his income, tastes and preferences and the price of good Y. This is shown in Figure. Suppose the price of X falls. The budget line PQ will extend further out to the right as PQ_1, showing that

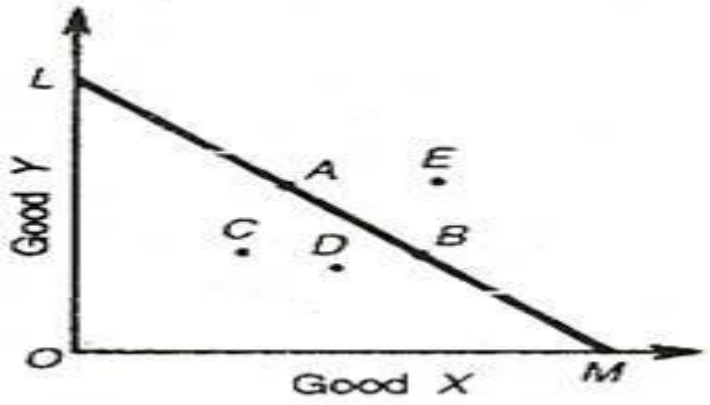
the consumer will buy more X than before as X has become cheaper. The budget line PQ_2 shows a further fall in the price of X. Any rise in the price of X will be represented by the budget line being drawn inward to the left of the original budget line towards the origin. If we regard PQ_2, as the original budget line, a two time rise in the price of X will lead to the shifting of the budget line to PQ_1, and PQ_2. Each of the budget lines fanning out from P is a tangent to an indifference curve I_1, I_2, and I_3 at R, S and T respectively. The curve PCC connecting the locus of these equilibrium points is called the price-consumption curve. The price-consumption curve indicates the price effect of a change in the price of X on the consumer's purchases of the two goods X and Y, given his income, tastes, preferences and the price of good Y.

2.7. REVEALED PREFERENCE THEORY

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 hypothesis which states that choice reveals preference. Keeping this fact into view, 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. He can do this for two reasons. First, combination A may be cheaper than the other combinations B, C, D. Seconds 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 Figure 2.4

Given the income and prices of the two goods X and Y. LM is the price-income line of the consumer. The triangle OLM is the area of choice for the consumer which shows the various combinations of X and Y on the given price- income situation LM. In other words, the consumer can choose any combination between A and B on the line LM or between C and D below this 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. But combination E is beyond the reach of the consumer being dearer for him because it lies above his price-income line LM. Therefore, A is revealed preferred to other combinations within and on the triangle OLM.

Assumptions:

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

(1) The consumer's tastes do not change.

(2) His choice for a combination reveals his preference for that.

(3) The consumer chooses only one combination at a given price-income line, i.e., any change in relative prices will always lead to some change in what he purchases.

(4) He prefers a combination of more goods to less in any situation.

(5) The consumer's choice is based on strong ordering.

(6) 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 is the two-term consistency, according to Hicks which must satisfy two conditions on a straight line curve: (a) If A is left to B, B must be right of A. (b) If A is right of B, B must be left of A.

(7) This theory is based on the assumption of transitivity. Transitivity, however, refers to three-term consistency. If A is preferred to B, and B to C, then the consumer must prefer A to C. This assumption is necessary for the revealed preference theory if the consumer is to make a consistent choice from given alternative situations.

(8) 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:

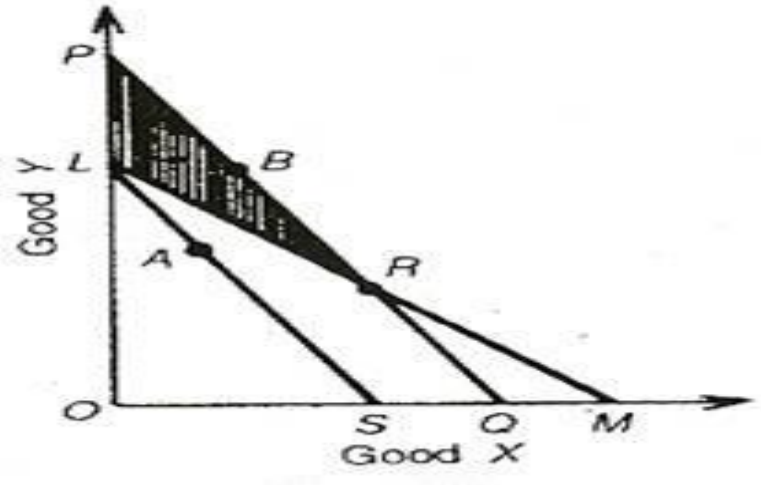
Given these assumptions, Samuelson states his "Fundamental Theorem of Consumption Theory," also known as demand theorem, thus: "Any good (simple or composite) that is known always to increase in demand when money income alone rises must definitely shrink in demand when its price alone rises." It means 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:

First, we take a rise in the price of, say, good X. To prove this Fundamental Theorem, let us divide it into two stages. Firstly, take a consumer who spends his entire income on two goods X and Y. LM is his original price-income line where the consumer is observed to have chosen the combination represented by R in Figure 2.4. The triangle OLM is the consumer's area of choice for the different combinations of V and Y available to him, as given by his price-income line LM. 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 combination, say, point A which shows that the consumer will buy less of A than before as the price of

A" 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 in terms of good Y 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. Mow the triangle 0P0 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 ay other combination, say, B 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.

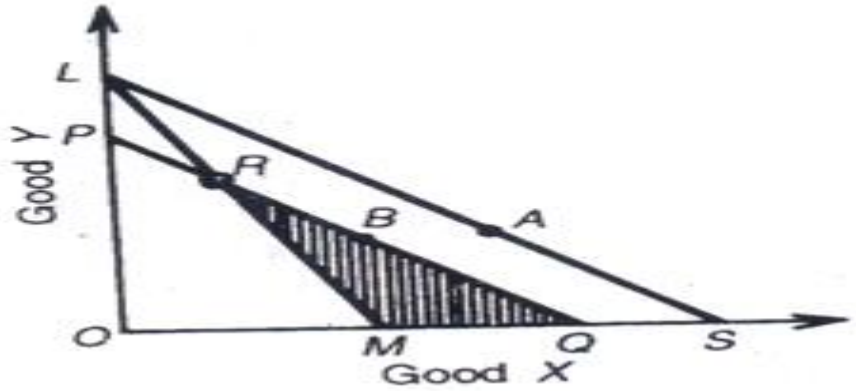
In the second stage, if the packet of extra money LP given to the consumer is taken back, he will be to the left of R at point A on the price-income line LS where he will buy less of X, if the income elasticity of demand for X is positive. Since with the rise in the price of X, its demand has fallen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

With the rise in the price of X, the consumer buys less of X. So price elasticity of demands negative because price and demand move in the opposite directions. But with the rise in the price of X, the real income of the

consumer falls and buys less of X. Therefore, his income elasticity of demand is positive because both income and demand move in the same direction.

Fall in Price:

The demand theorem can also be proved when the price of good X falls. It can be defined thus: "Any good (simple or composite) that is known always to decrease demand when money income alone falls must definitely expand in demand when its price alone falls." LM is the original price-income line on



which the consumer reveals his preference at point R. With the fall in the price of X, the price of Y remaining constant, his new price-income line is LS. The consumer reveals his preference on this line at, say, combination A which shows that he buys more of X than before. The movement from point R to A is the price effect as a result of fall in the price of X which has led to increase in its demand.

Suppose the increase in the real income of the consumer as a result of fall in the price of X is taken away from him in the form of LP quantity of Y. Now PQ becomes his new price-income line which is parallel to LS and passes through R. The new triangle OPQ becomes his area of choice. Since the consumer was revealing his preference at point R on the line LM, all points lying above R on the segment RP of line PQ will be inconsistent with his choice.

This is because on the RP segment he will have less of good X when its price has fallen. But this is not possible. The consumer will, therefore, reject all combinations above R. He will either choose combination R or any other combination, say, B on the segment RQ of the line PQ in the shaded area MRQ. If he chooses the combination R, he will buy the same quantities of X and Y which he was buying before the fall in the price of X. And if he chooses

the combination B, he will buy more of X and less of Y than before. The movement from R to B is the substitution effect of a fall in the price of X.

If the money taken from the consumer in the form of LP is returned to him, he will be at the old combination A on the price-income line LS where he will buy more of X with the fall in its price. The movement from B to A is the income effect. So the demand theorem is again proved that positive income elasticity means negative price elasticity of demand.

It is to be noted that Samuelson's explanation of the substitution effect is different from that of the indifference curve analysis. In the case of indifference curve analysis, the consumer moves from one combination to another on the same indifference curve and his real income remains constant.

Conclusion:

It appears from the above discussion that the revealed preference approach is in no way an improvement over the indifference curve analysis of Hicks and Allen. It is unable to isolate the substitution effect from the income effect, neglects Giffen's Paradox and fails to study market demand analysis. But the fact is that in a single-valued demand function, the indifferent behaviour is replaced by the observed market behaviour of the consumer. This makes the revealed preference theory somewhat more realistic than the indifference curve technique.

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UNIT – III

DEMAND AND SUPPLY ANALYSIS

3.1. DEMAND

3.1.1. MEANING OF DEMAND:

The demand for a commodity is its quantity which consumers are able and willing to buy at various prices during a given period of time. So, for a commodity to have demand the consumer must possess willingness to buy it, the ability or means to buy it, and it must be related to per unit of time i.e. per day, per week, per month or per year. Demand is a function of price (p), income (y), prices of related goods (pr) and tastes (f) and is expressed as D=f (p, y, pr, t). When income, prices of related goods and tastes are given, the demand function is D=f (p). It shows the "quantities of a commodity purchased at given prices. In the Marshallian analysis, the other determinants of demand are taken as given and constant.

3.1.2. FACTORS INFLUENCING DEMAND:

The factors which determine the level of demand for any commodity are the following:

1. Price:

The higher the price of a commodity, the lower the quantity demanded. The lower the price, the higher the quantity demanded.

2. Prices of other Commodities:

There are three types of commodities in this context.

Substitutes:

If a rise (or fall) in the price of one commodity leads to an increase (or decline) in the demand for another commodity, the two commodities are said to be substitutes. In other words, substitutes are those commodities which satisfy similar wants, such as tea and coffee. If the price of coffee falls, the demand for coffee rises which brings a fall in the demand for tea because the consumers of tea shift their demand to coffee which has become cheaper. On the other hand, if the price of coffee rises, its demand will fall. But the demand for tea will rise because the consumers of coffee will shift their demand to tea.

Complementary Commodities:

Where the demand for two commodities is linked to each other, such as cars and petrol, bread and butter, tea and sugar, etc., they are said to be complementary goods. Complementary goods are those which cannot be used without each other. If, say, the price of cars rises and they become expensive, the demand for them will fall and so will the demand for petrol. On the contrary, if the price of cars falls and they become cheaper, the demand for them will increase and so will the demand for petrol.

Unrelated Goods:

If the two commodities are unrelated, say refrigerator and bicycle, a change in the price of one will have no effect on the quantity demanded of the other.

3. Income:

A rise in the consumer's income raises the demand for a commodity, and a fall in his income reduces the demand for it.

4. Tastes:

When there is a change in the tastes of consumers in favour of a commodity, say due to fashion, its demand will rise, with no change in its price, in the prices of other commodities, and in the income of the consumer. On the other hand, a change in tastes against a commodity leads to a fall in its demand, other factors affecting demand remaining unchanged.

Individuals Demand Schedule and Curve:

An individual consumer's demand refers to the quantities of a commodity demanded by him at various prices, other things remaining equal (y, pr and t). An individual's demand for commodity "is shown on the demand schedule and on the demand curve. A demand schedule is a list of prices and quantities and its graphic representation is a demand curve.

Table 3.1: Demand Schedule

Price (Rs.)	Quantity (units)
6	10
5	20
4	30
3	40
2	60
1	80

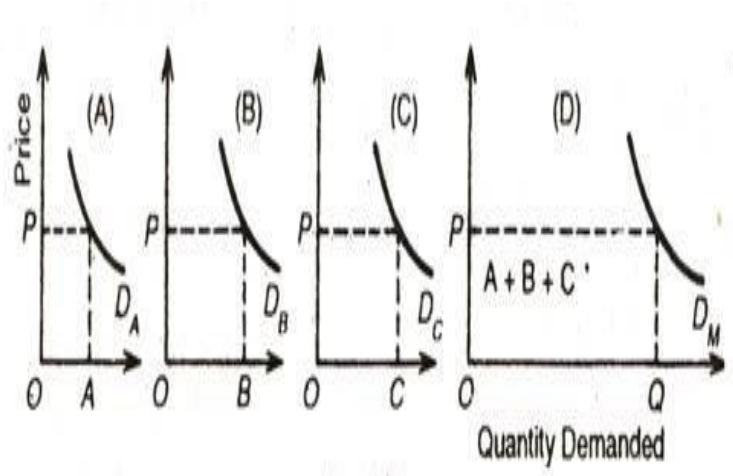
The demand schedule reveals that when the price is Rs. 6, the quantity demanded is 10 units. If the price happens to be Rs. 5, the quantity demanded is 20 units, and so on. In Figure DD_1 is the demand curve drawn on the basis of the above demand schedule. The dotted points D, P, Q, R, S, T and U show the various price-quantity combinations. Marshall calls them "demand points". The first combination is represented by the first dot and the remaining price- quantity combinations move to the right toward D_1.

The Market Demand Schedule and Curve:

In a market, there is not one consumer but many consumers of a

commodity. The market demand of a commodity is depicted on a demand schedule and a demand curve. They show the sum total of various quantities

demand by all the individuals at various prices. Suppose there are three individuals A, B and C in a market who purchase the commodity. The demand schedule for the commodity is depicted in Table 2.5. The last column (5) of the Table represents the market demand of the commodity at various prices.



It is arrived at by adding columns (2), (3) and (4) representing the demand of consumers A, B and C respectively. The relation between columns (1) and (5) shows the market demand schedule. When the price is very high Rs. 6 per kg. The market demand for the commodity is 70 kgs. As the price falls, the demand increases. When the price is the lowest Re. 1 per kg., the market demand per week is 360 kgs.

Table 2.1: Market Demand Schedule

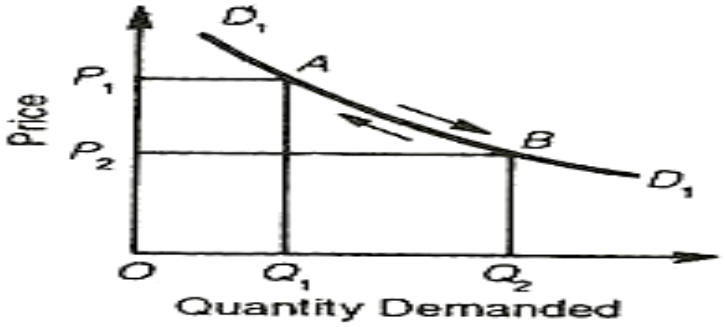
Price per kg. (Rs.) (1)	A (2)	Quantity Demanded in kgs. B + (3) +	C (4)	Total Demand (5)
6	10	20	40	70
5	20	40	60	120
4	30	60	80	170
3	40	80	100	220
2	60	100	120	280
1	80	120	160	360

From Table 2.1. We draw the market demand curve in Figure 2.1. D_M is the market demand curve which is the horizontal summation of all the individual demand curves $D_A + D_B + D_C$. The market demand for a commodity depends

on all factors that determine an individual's demand. But a better way of drawing a market demand curve is to add together sideways (lateral summation) of all the individual demand curves.

3.2. THE LAW OF DEMAND:

The law of demand expresses a relationship between the quantity demanded and its price. It may be defined in Marshall's words as "the amount Demanded increases with a fall in price, and diminishes with a rise in price." Thus it expresses an inverse relation between price and demand. The law refers to the direction in which quantity demanded changes with a change in price. On the figure, it is represented by the slope of the demand curve which



is normally negative throughout its length. The inverse price-demand relationship is based on other things remaining equal. This phrase points towards certain important assumptions on which this law is based.

It's Assumptions.

These assumptions are: (i) there is no change in the tastes and preferences of the consumer; (ii) the income of the consumer remains constant; (iii) there is no change in customs; (iv) the commodity to be used should not confer distinction on the consumer; (v) there should not be any substitutes of the commodity; (vi) there should not be any change in the prices of other products; (vii) there should not be any possibility of change in the price of the product being used; (viii) there should not be any change in the quality of the product; and (ix) the habits of the consumers should remain unchanged. Given these conditions, the law of demand operates. If there is change even in one of these conditions, it will stop operating.

Causes of Downward Sloping Demand Curve:

Why does a demand curve slope downward from left to right? The reasons for this also clarify the working of the law of demand. The following are the main reasons for the downward sloping demand curve.

(1) The law of demand is based on the law of Diminishing Marginal Utility. According to this law, when a consumer buys more units of a commodity, the marginal utility of that commodity continues to decline. Therefore, the consumer will buy more units of that commodity only when its price falls. When less units are available, utility will be high and the consumer will be prepared to pay more for the commodity. This proves that the demand will be more at a lower price and it will be less at a higher price. That is why the demand curve is downward sloping.

(2) Every commodity has certain consumers but when its price falls, new consumers start consuming it, as a result demand increases. On the contrary, with the increase in the price of the product, many consumers will either reduce or stop its consumption and the demand will be reduced. Thus, due to the price effect when consumers consume more or less of the commodity, the demand curve slopes downward.

(3) When the price of a commodity falls, the real income of the consumer increases because he has to spend less in order to buy the same quantity. On the contrary, with the rise in the price of the commodity, the real income of the consumer falls. This is called the income effect. Under the influence of this effect, with the fall in the price of the commodity the consumer buys more of it and also spends a portion of the increased income in buying other commodities. For instance, with the fall in the price of milk, he will buy more of it but at the same time, he will increase the demand for other commodities. On the other hand, with the increase in the price of milk he will reduce its demand. The income effect of a change in the price of an ordinary commodity being positive, the demand curve slopes downward.

(4) The other effect of change in the price of the commodity is the substitution effect. With the fall in the price of a commodity, the prices of its substitutes remaining the same, consumers will buy more of this commodity rather than the substitutes. As a result, its demand will increase. On the contrary, with the rise in the price of the commodity (under consideration) its

demand will fall, given the prices of the substitutes. For instance, with the fall in the price of tea, the price of coffee being unchanged, the demand for tea will rise, and contrariwise, with the increase in the price of tea, its demand will fall.

(5) There are persons in different income groups in every society but the majority is in low income group. The downward sloping demand curve depends upon this group. Ordinary people buy more when price falls and less when price rises. The rich do not have any effect on the demand curve because they are capable of buying the same quantity even at a higher price.

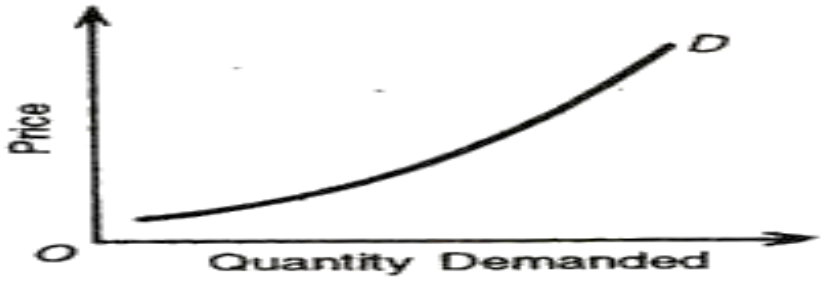
(6) There are different uses of certain commodities and services that are responsible for the negative slope of the demand curve. With the increase in the price of such products, they will be used only for more important uses and their demand will fall. On the contrary, with the fall in price, they will be put to various uses and their demand will rise. For instance, with the increase in the electricity charges, power will be used primarily for domestic lighting, but if the charges are reduced, people will use power for cooking, fans, heaters, etc.

Exceptions to the Law of Demand:

In certain cases, the demand curve slopes up from left to right, i.e., it has a positive slope. Under certain circumstances, consumers buy more when the price of a commodity rises, and less when price falls, as shown by the D curve in Figure. Many causes are attributed to an upward sloping demand curve.

(i) War:

If shortage is feared in anticipation of war, people "may start buying for building stocks or for hoarding even when the" price rises.



(ii) Depression:

During a depression, the prices of commodities are very low and the demand for them is also less. This is because of the lack of purchasing power with consumers.

(iii) Giffen Paradox:

If a commodity happens to be a necessity of life like wheat and its price goes up, consumers are forced to curtail the consumption of more expensive foods like meat and fish, and wheat being still the cheapest, food they will consume more of it. The Marshallian example is applicable to developed economies. It the case of an underdeveloped economy, with the fall in the price of an inferior commodity like maize, consumers will start consuming more of the superior commodity like wheat. As a result, the demand for maize will fall. This is what Marshall called the Giffen Paradox which makes the demand curve to have a positive slope.

(iv) Demonstration Effect:

If consumers are affected by the principle of conspicuous consumption or demonstration effect, they will like to buy more of those commodities which confer distinction on the possessor, when their prices rise. On the other hand, with the fall in the prices of such articles, their demand falls, as is the case with diamonds.

(v) Ignorance Effect:

Consumers buy more at a higher price under the influence of the "ignorance effect", where a commodity may be mistaken for some other commodity, due to deceptive packing, label, etc.

(vi) Speculation:

Marshall mentions speculation as one of the important exceptions to the downward sloping demand curve. According to him, the law of demand does not apply to the demand in a campaign between groups of speculators. When a group unloads a great quantity of a thing on to the market, the price falls and the other group begins buying it. When it has raised the price of the thing, it arranges to sell a great deal quietly. Thus when price rises, demand also increases.

Defects of Utility Analysis or Demand Theory:

The Marshallian utility analysis has many defects and weaknesses which are discussed below.

(1) Utility cannot be measured cardinally:

The entire Marshallian utility analysis is based on the hypothesis that utility is cardinally measured in 'utils' or units and that utility can be added and subtracted. For instance, when a consumer takes the first chapati, he gets utility equivalent to 15 units; from the second and third chapati "10 and 5 units respectively and when he consumes the fourth chapati marginal utility becomes zero. If it is supposed that he has no desire after the fourth chapati, the utility from the fifth will be negative 5 units if he takes this chapati. In this way, the total utility in each case will be 15, 25, 30 and 30, when from the fifth chapati the total utility will be 25 (30-5). It shows that utility is transitive.

(2) Single Commodity Model is Unrealistic:

The utility analysis is a single commodity model in which the utility of one commodity is regarded independent of the other. Marshall considered substitutes and complementary as one commodity, but it makes the utility analysis unrealistic. For instance, tea and coffee are substitute products. When there is a change in the stock of any one product, there is change in the marginal utility of both the products. Suppose there is increase in the stock of tea. There will not only be fall in the marginal utility of tea but also of coffee.

(3) Money is an Imperfect Measure of Utility:

Marshall measured utility in terms of money, but money is an incorrect and imperfect measure of utility because the value of money often changes. If there is fall in the value of money, the consumer will not be getting the same utility from the homogeneous units of a commodity at different times. Fall in the value of money is a natural consequence of rise in prices.

(4) Marginal Utility of Money is not constant:

The utility analysis assumes the marginal utility of money to be constant. Marshall supported this argument on the plea that a consumer spends only a small portion of his income on a commodity at a time so that

there is an insignificant reduction in the stock of the remaining amount of money. But the fact is that a consumer does not buy only one commodity but a number of commodities at a time.

(5) Man is not rational:

The utility analysis is based on the assumption that the consumer is rational who prudently buys the commodity and has the capacity to calculate the dis-utilities and utilities of different commodities, and buys only those units which give him greater utility. This assumption is also unrealistic because no consumer compares the utility and disutility from each unit of a commodity while buying it. Rather, he buys them under the influence of his desires, tastes or habits. Moreover, consumer's income and prices of commodities also influence his purchases. Thus the consumer does not buy commodities rationally. This makes the utility analysis unrealistic and impracticable.

(6) Utility Analysis does not study Income Effect, Substitution Effect and Price Effect:

The greatest defect in the utility analysis is that it ignores the study of income effect, substitution effect and price effect. The utility analysis does not explain the effect of a rise or fall in the income of the consumer on the demand for the commodities. It thus neglects the income effect. Again, when with the change in the price of one commodity there is a relative change in the price of the other commodity, the consumer substitute's one for the other.

(7) Utility Analysis fails to clarify the Study of Inferior and Giffen Goods:

Marshall's utility analysis of demand does not clarify the fact as to why a fall in the prices of inferior and giffen goods leads to a decline in their demand. Marshall failed to explain this paradox because the utility analysis does not discuss the income and substitution effects of the price effect. This makes the Marshallian law of demand incomplete.

3.3. REASONS FOR DOWNWARD SLOPING DEMAND CURVE– EXCEPTIONS

The six important exceptions to the law of demand. The exceptions are: 1. Speculative Demand 2. Snob Appeal or Veblen Good 3. Using Price as an Index of Quality 4. Giffin Good 5. Possibility of Future Rise in Prices 6. Highly Essential Good.

Law of Demand: Exception - 1.

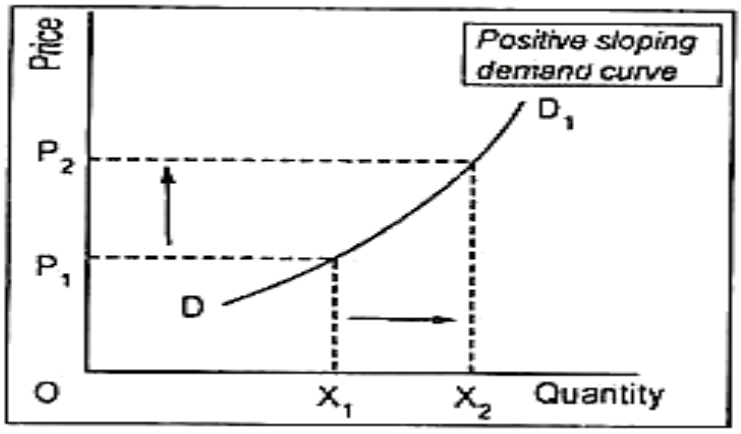
Speculative Demand:

In a speculative market (such as the stock market), a rise in the price of a commodity (such as, share) creates an impression among buyers that its price will rise further. So people start buying more of a share when its price rises. This is not truly an exception to the law of demand in the sense that the demand curve here is not upward sloping. Hence, there is no movement along it from left to right. In fact, in a speculative market, we see a shift of a normal downward sloping demand curve— people buy more at the same price. Some people wrongly refer to this as an exception because they get confused between the two issues—movement along a demand curve and a shift of the demand curve.

Law of Demand: Exception - 2.

Snob Appeal or Veblen Good:

People sometimes buy certain commodities like diamonds at high prices not due to their intrinsic worth but for a different reason. The basic object is to display their riches to the other members of the community to which they themselves belong. This is known as 'snob appeal', which induces people to purchase items of conspicuous consumption. Such a commodity is also known as Veblen good whose demand rises (fails) when its price rises (falls).This is a genuine exception to the law of demand. The demand curve for such an item will be upward sloping (Fig. 2.8). Thus if, the price of diamond falls, people will buy less of it. In a word, purchasers value diamonds and other costly items because of their prices and because of the psychic satisfaction that they derive from it.



Exceptional Demand Curve

Law of Demand: Exception - 3.

Using Price as an Index of Quality:

Most consumers do not have the capacity or technical knowledge to examine the physical properties of a product (such as, reliability, durability, economy, etc.,) as in the case of an item such as a motor car or a VCR. So, in the absence of other information, price is taken as an index of quality. Thus, a high-priced car is more valued than a low-priced one. A costly book is often considered to be more useful by a student than a cheaper title. In such cases, the demand curve may be upward sloping. This argument is not a new one. This applies to our previous case where we referred to commodities having snob appeal. So this point really reinforces the previous one.

Law of Demand: Exception - 4.

Giffen Good:

A **'Giffen good'** is a special variety of inferior good. Sir Robert Giffen of Scotland observed in the 19th century (1840s) that poor people spent the major portion of their income on a staple item, viz., potato. If the price of this good rises they will become so poor that they will be found to spend less on other items and buy more potatoes in order to get a minimum diet and keep themselves alive. For such goods, the demand curve will be upward sloping.

Law of Demand: Exception - 5.

Possibility of Future Rise in Prices:

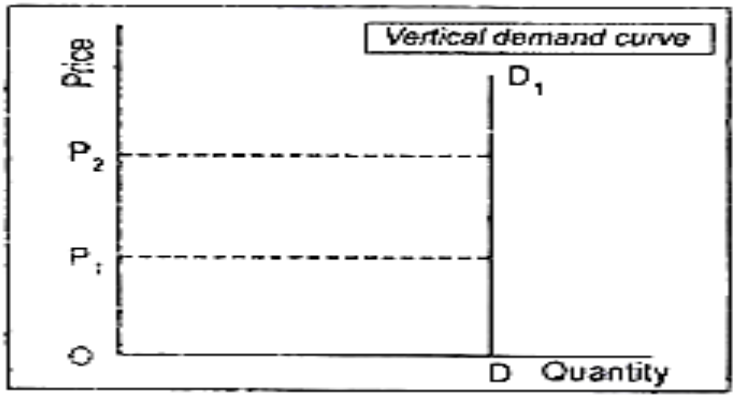
If a consumer anticipates that the price of a commodity will rise in future he will purchase more of that commodity now. The consumer will purchase more even if current price is high. In all the cases mentioned above,

the demand curve DD_1 exhibits positive slope as shown in Fig. 2.8. At a price OP_1, a consumer demands OX_1 of a commodity. As its price rises to OP_2, demand also rises to OX_2. Thus, the law of demand breaks down.

Law of Demand: Exception - 6.

Highly Essential Good:

Finally, in case of certain highly essential items such as life- saving drugs, people buy a fixed quantity at all possible price. Heart patients will buy the same quantity of 'Sorbitrate' whether price is high or low. Their response to price change is almost nil. In cases of such commodities, the demand curve is likely to be a vertical straight line (Fig. 2.9). At a price OP_1, the heart patient consumer demands OD amount of 'Sorbitrate'. In spite of its price rise to OP_2, the consumer buys the same quantity of it.



Exceptional Vertical Demand Curve

3.4. ELASTICITY OF DEMAND:

3.4.1. Concept of Elasticity of Demand:

The law of demand indicates the direction of change in quantity demanded to a change in price. It states that when price falls, demand rises. But how much the quantity demanded rises (or falls) following a certain fall (or rise) in prices cannot be known from the law of demand.

3.4.2. MEANING OF ELASTICITY OF DEMAND:

Demand extends or contracts respectively with a fall or rise in price. This quality of demand by virtue of which it changes (increases or decreases) when price changes (decreases or increases) is called Elasticity of Demand.

"The elasticity (or responsiveness) of demand in a market is great or small according as the amount demanded increases much or little for a given fall in price, and diminishes much or little for a given rise in price". – Dr. Marshall. Elasticity means sensitiveness or responsiveness of demand to the change in price. This change, sensitiveness or responsiveness, may be small or great. Take the case of salt. Even a big fall in its price may not induce an appreciable ex appreciable extension in its demand. On the other hand, a slight fall in the price of oranges may cause a considerable extension in their demand. That is why we say that the demand in the former case is 'inelastic' and in the latter case it is 'elastic'.

The demand is elastic when with a small change in price there is a great change in demand; it is inelastic or less elastic when even a big change in price induces only a slight change in demand. In the words of Dr. Marshall, "The elasticity (or responsiveness) of demand in a market is great or small according as the amount demanded increases much or little for a given fall in price, and diminishes much or little for a given rise in price. "But the demand cannot be perfectly 'elastic' or 'inelastic'. Completely elastic demand will mean that a slight fall (or rise) in the price of the commodity concerned induces an infinite extension (or contraction) in its demand. Completely inelastic demand will mean that any amount of fall (or rise) in the price of the commodity would not induce any extension (or contraction) in its demand. Both these conditions are unrealistic. That is why we say that elasticity of demand may be 'more or less', but it is seldom perfectly elastic or absolutely inelastic.

3.4.3 TYPES OF ELASTICITY:

Distinction may be made between Price Elasticity, Income Elasticity and Cross Elasticity. Price Elasticity is the responsiveness of demand to change in price; income elasticity means a change in demand in response to a change in the consumer's income; and cross elasticity means a change in the demand for a commodity owing to change in the price of another commodity.

Degrees of Elasticity of Demand:

We have seen above that some commodities have very elastic demand, while others have less elastic demand. Let us now try to understand the different degrees of elasticity of demand with the help of curves.

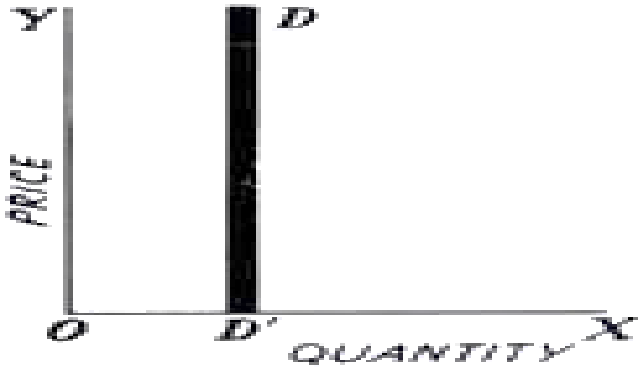


Fig.3.1. Infinite Elasticity

(a) Infinite or Perfect Elasticity of Demand:

Let as first take one extreme case of elasticity of demand, viz., when it is infinite or perfect. Elasticity of demand is infinity when even a negligible fall in the price of the commodity leads to an infinite extension in the demand for it. In Fig. 3.1 the horizontal straight line DD' shows infinite elasticity of demand. Even when the price remains the same, the demand goes on changing.

(b) Perfectly Inelastic Demand:

The other extreme limit is when demand is perfectly inelastic. It means that howsoever great the rise or fall in the price of the commodity in question, its demand remains absolutely unchanged. In Fig. 3.2, the vertical line DD' shows a perfectly inelastic demand. In other words, in this case elasticity of demand is zero. No amount of change in price induces a change in demand. In the real world, there is no commodity the demand for which may be absolutely inelastic, i.e., changes in its price will fail to bring about any

Fig. 3.2. Zero Elasticity

change at all in the demand for it. Some extension/contraction is bound to occur that is why economists say that elasticity of demand is a matter of degree only. In the same manner, there are few commodities in whose case

the demand is perfectly elastic. Thus, in real life, the elasticity of demand of most goods and services lies between the two limits given above, viz., infinity and zero. Some have highly elastic demand while others have less elastic demand.

(c) Very Elastic Demand:

Demand is said to be very elastic when even a small change in the price of a commodity leads to a considerable extension/contraction of the amount demanded of it. In Fig. 3.3, DD' curve illustrates such a demand. As a result of change of T in the price, the quantity demanded extends/contracts by MM', which clearly is comparatively a large change in demand.

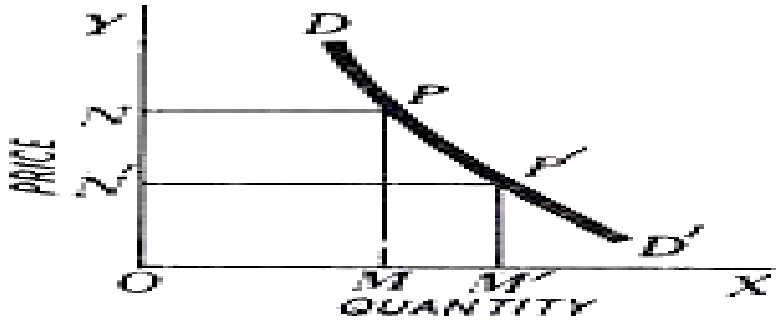


Fig. 3.3 Very Elastic Demand

(d) Less Elastic Demand:

When even a substantial change in price brings only a small extension/contraction in demand, it is said to be less elastic. In Fig. 3.4, DD' shows less elastic demand. A fall of NN' in price extends demand by MM' only, which is very small.

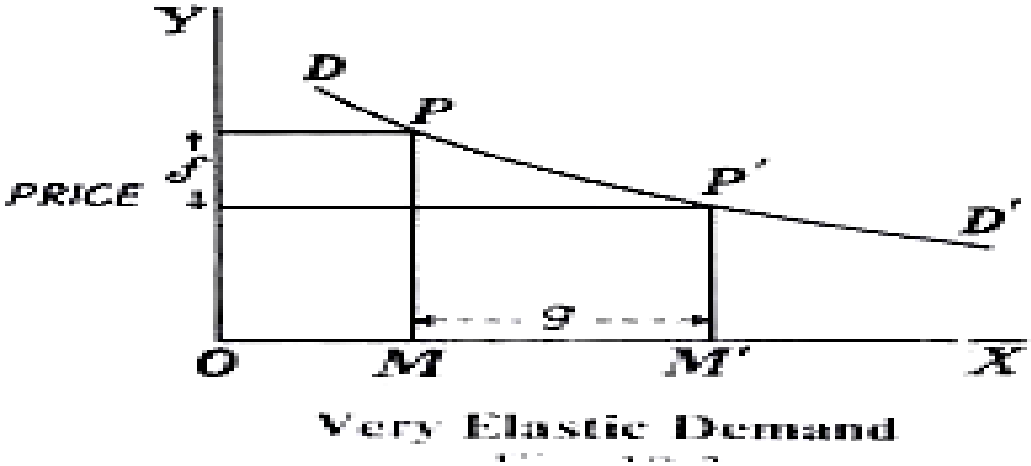


Fig. 3.4. Less Elastic Demand

3.4.4. FACTORS DETERMINING ELASTICITY OF DEMAND:

There are various factors on which elasticity of demand depends:

(a) Nature of the Commodity:

In the first place, it depends on the nature of the commodity. Commodities which are supposed to be essential or critical to our daily lives must have an inelastic demand, since price change of these items does not bring about a greater change in quantity demanded. But, luxury goods have an elastic demand. Demand for these good can be quickly reduced when their prices rise. When their prices fall, consumers demand these goods in larger quantities. However, whether a particular commodity is a necessary or a luxury depends on income, tastes and preferences of the consumer. A particular good may be necessary to someone having an inelastic demand. Same commodity may be elastic to another consumer. For instance, owning a TV may be a luxury item to a low income person. But the same may be bought as an essential item by a rich person.

(b) Availability of Substitutes:

Secondly, commodities having large number of substitutes must have an elastic demand. Some products, such as Horlicks, Complan, Viva, Maltova, Milo, etc., have quite a large number of close substitutes. A change in the price of, say, Horlicks—the prices of other substitutes remaining constant—will lead a consumer to substitute one beverage for another. If the price of Horlicks goes down, buyers will demand more of it and less of its substitutes. Conversely, demand is fairly inelastic in the case of those commodities which do not have a large number of substitutes.

(c) Extent of Uses:

Thirdly, there are some commodities which can be used for a variety of purposes. For example, electricity. If price per unit of electricity consumed falls, people will reduce their consumption of its substitutes (e.g., coal, gas, etc.) and increase the consumption of electricity. Coefficient of price elasticity of demand in this case must be greater than one. On the other hand, when a commodity is used only for one or two purposes, a price change will have less effect on its quantity demanded and, therefore, demand will be inelastic.

(d) Habit Good:

Fourthly, there are some commodities consumed out of habits and conventions— they have an elastic demand. Even in the face of rising prices of those commodities or falling income, people will consume those (such as, cigarette). For this reason, price elasticity as well as income elasticity of demand for this type of commodity is inelastic. Further, gold ornaments are used in the marriage ceremony rather out of convention, though gold prices are rising. When gold is used in this way, its demand becomes inelastic.

(e) Time Dimension:

Fifthly, shorter the time, lower will be the elasticity of demand. This is because in the short run satisfactory substitutes of a product may not be available. Thus, demand for a product in the short run usually becomes inelastic. Such a commodity will be elastic in the long run when close substitutes may be produced. Thus, the response of quantity demanded to a change in price will tend to be greater (smaller), the longer (shorter) the time-span considered. In the long run, there is enough time for adjustments to be made following a change in price.

(f) The Importance of being Unimportant:

Sixthly, people often pay little attention to the price of a product if it constitutes a relatively small part in their budget. For example, if the fire of railway ticket of a tourist who travels by rail once in a year is increased form Rs. 125 to Rs. 135, then he may not postpone his journey. This means he is unresponsive to such price hike and his demand is inelastic. This is called 'the importance of being unimportant'.

(g) Durability:

Finally, durable commodities have an elastic demand. If the price of these goods rises, people will spend less on these goods. On the other hand, following a fall in the price of durable commodities (e.g., refrigerator), people demand more of them. In the case of non-durable commodities, demand is elastic.

3.4.5 MEASUREMENT OF ELASTICITY OF DEMAND:

There are three methods of measuring elasticity of demand. These are:

(a) Total outlay (revenue) method

(b) Point elasticity method

(c) Arc elasticity method

All these methods are described below:

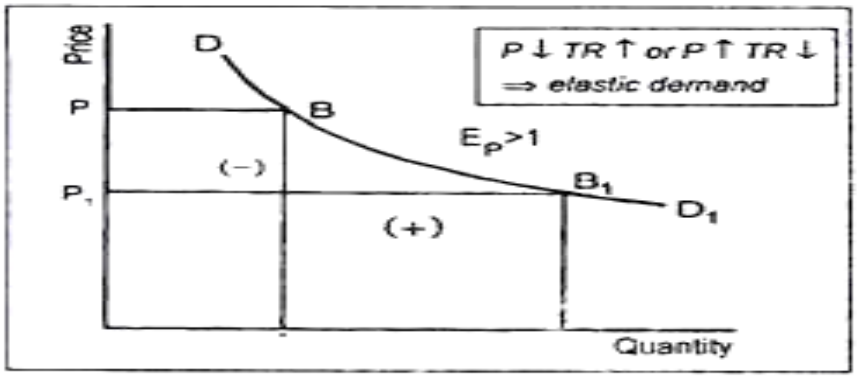
1. Elasticity and Total Revenue or Outlay Method:

Marshall offered the method of total revenue or total outlay for estimating elasticity of demand. What the sellers receive from the sale of commodities is called total expenditure or outlay of buyers. There is no difference between total revenue and total outlay since what is spent by the buyers is received as income by the sellers.

Thus, total outlay/revenue is the price multiplied by the quantity purchases, i.e., TR = P × Q. Here we want to measure how much total outlay changes following a change in price. It depends upon the elasticity of demand.

(a) Elastic Demand:

Suppose price declines (rises). As a result, total expenditure rises (falls). Under the circumstance, the value of elasticity of demand becomes greater than one. In Fig. We have drawn a demand curve having a value of greater than one.



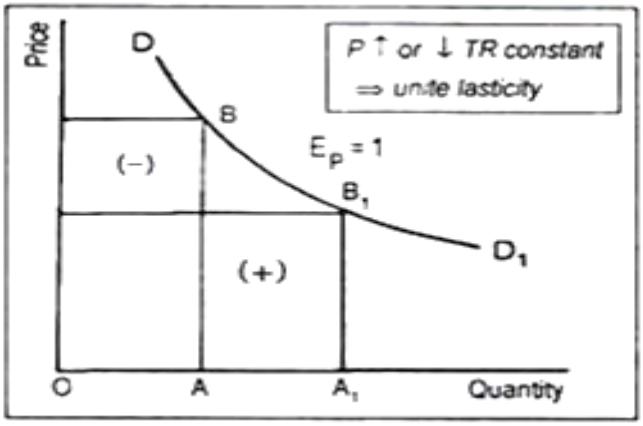
Elastic Demand

At a price OP, OA is demanded. Thus, the total expenditure equals OP × OA = rectangle OPBA. As price drops to OP_1, the quantity demanded rises to OA_1. Now, the total expenditure becomes $OP_1 \times OA_1$ = rectangle $OP_1B_1A_1$.

Since rectangle $OP_1B_1A_1$ > rectangle OPBA, demand is said to be elastic. Remember: When price and total outlay move in opposite direction, demand for the product becomes elastic.

(b) Inelastic Demand:

If the total outlay falls when price falls, or if total outlay rises when price rises, then demand is said to be inelastic (i.e., $E_p < 1$). In Figure initial total outlay is $OP_1 \times OA_1$ = rectangle OPBA. Now, if price falls, total outlay becomes $OP_1 \times OA_1$ = rectangle $OP_1B_1A_1$. Fig. 2.48 suggests that the rectangle OPBA is larger than the rectangle $OP_1B_1A_1$. Hence, demand is inelastic.



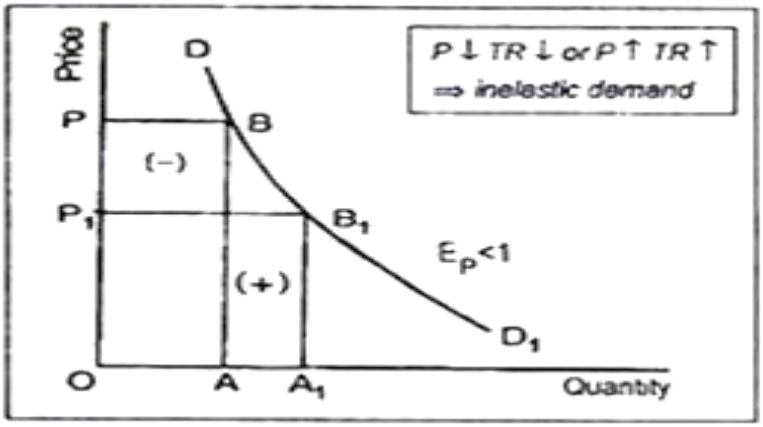
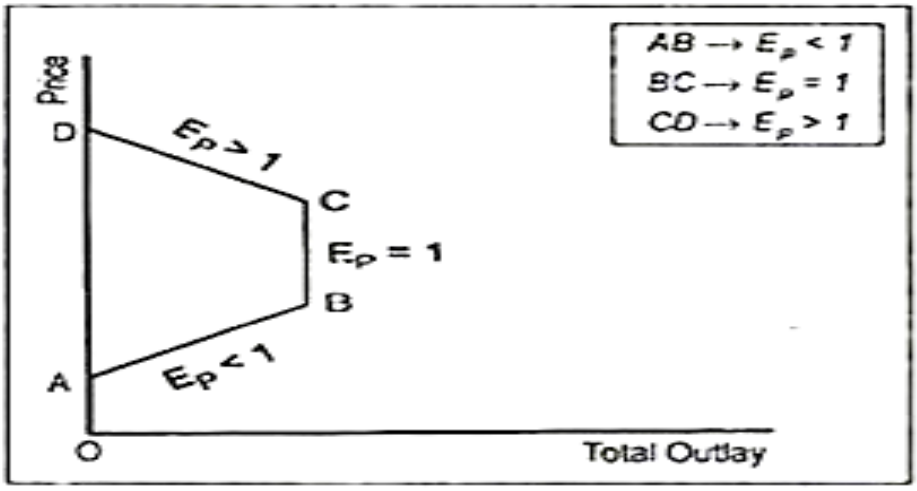


Fig.3.6. Inelastic Demand

(c) Unit Elasticity:

Irrespective of variations in demand and price, if the total outlay does not change, then demand is unit elastic (i.e., $E_p = 1$). In Fig. 3.7., we see that at price OP, total outlay is rectangle OPBA. When price declines to OP, total outlay becomes the area $OP_1B_1A_1$.

Since rectangle OPBA = rectangle $OP_1B_1A_1$, demand is said to have a unitary elasticity. The demand curve then looks like a rectangular hyperbola since the area of all the rectangles formed by the demand curve is always the same.



(d) Perfectly Inelastic Demand:

These relations between elasticity of demand and total outlay (P × Q = TR) may be presented here in a tabular form:

Table3.1: Elasticity and TR

Change in price	E_p	Change in TR	Nature of the good
Increase	$E_p > 1$	Decrease	Luxury
Decrease	$E_p > 1$	Increase	
Increase	$E_p < 1$	Increase	Necessary
Decrease	$E_p < 1$	Decrease	
Increase	$E_p = 1$	No change	—
Decrease	$E_p = 1$	No change	

The relationship between elasticity and total outlay can also be explained in terms of Fig. 3.8. Where we measure price of the commodity on the vertical axis and the total outlay on the horizontal axis. Here ABCD is the total outlay curve. In the segment AB, demand is inelastic ($E_p < 1$), because price and total outlay move in the same direction. Demand is said to be elastic ($E_p > 1$) in the region CD since price and total outlay move in opposite direction. As total outlay remains invariant when price changes in the region BC, demand is unitary elastic.

2. Point Elasticity Method:

When the change in price is infinitesimally small, Marshall Method may not provide accurate estimate of elasticity of demand. In that case, a geometrical method may be employed. This method aims at measuring elasticity of demand at a particular point on a demand curve. So long, we tried to calculate the elasticity over certain area or segment of a demand curve and the terms elastic, inelastic and unit elastic had been applied to the whole demand curve. However, such is not true. It may happen that the demand for a product can be elastic in one price range and inelastic in another. In fact, the degree of elasticity varies from one price range to another. So, it is better to calculate elasticity at a particular point on a demand curve to have an accurate estimate. This is explained in terms of Fig. 3.9.

Demand curve is DD_1. To measure elasticity of demand at point E, we have drawn a straight line CF tangent to DD_1 at point E. Points E and H are very close to each other. As price declines from OP_1 to OP_2, quantity demanded rises from OM_1 to OM_2.

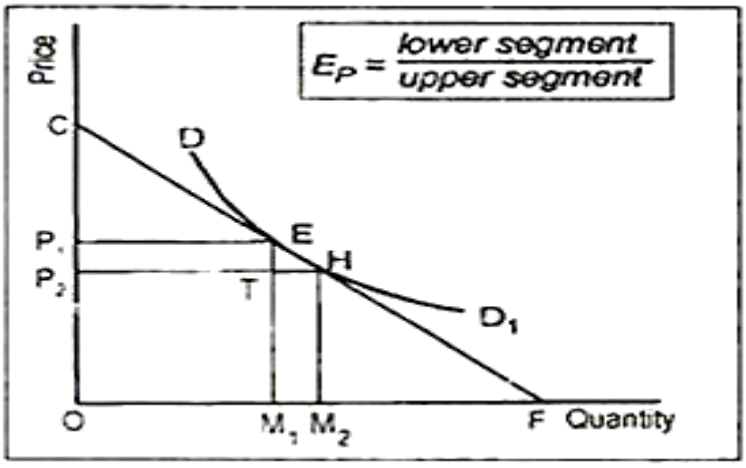
The formula for elasticity of demand is:

$E_P = \Delta Q/Q \div \Delta P/P$

The slope of the demand curve is:

$\Delta P/\Delta Q = M_1E / M_1F$

$\therefore \Delta Q/\Delta P = M_1F / M_1E$



The second component of the elasticity formula is:

$P/Q = M_1E / OM_1$

$\therefore E_P = \Delta Q/\Delta P. P/Q = M_1F/M_1E. M_1E/OM_1 = M_1F/OM_1$

Note that EM_1F, CP_1E and COF are similar triangles, the elasticity of demand

Price (P)	Demand (Q)
Rs. 60.00 (P_1)	400 (Q_1)
Rs. 50.00 (P_2)	800 (Q_2)

curve DD_1 at point E can be measured as:

$\therefore E_P = M_1F/OM_1 = P_1O/P_1 = EF/EC$

Thus, elasticity of demand at point E on a curvilinear demand curve DD_1 is approximately equal to EF/EC = lower segment of the demand curve/upper segment of the demand curve.

3. Arc Elasticity Method:

For very small movements in price and quantity, point elasticity method is an appropriate one. In other words, point elasticity method measures (price) elasticity of demand at a particular point on the demand curve. However, if price change is somewhat of a larger magnitude then geometrical method may give misleading estimate. To avoid this problem, elasticity is measured over an arc of the demand curve. In other words, when we intend to estimate (price) elasticity of demand over some portion (i.e., the arc) of the demand curve, we then have arc elasticity method. Sometimes we know two prices and two quantities. Under the circumstance, the point elasticity method may not provide good estimate. What is required in this case is the average elasticity of two prices and two quantities. This is called 'arc' elasticity, because it measures the average elasticity on an arc of a demand curve.

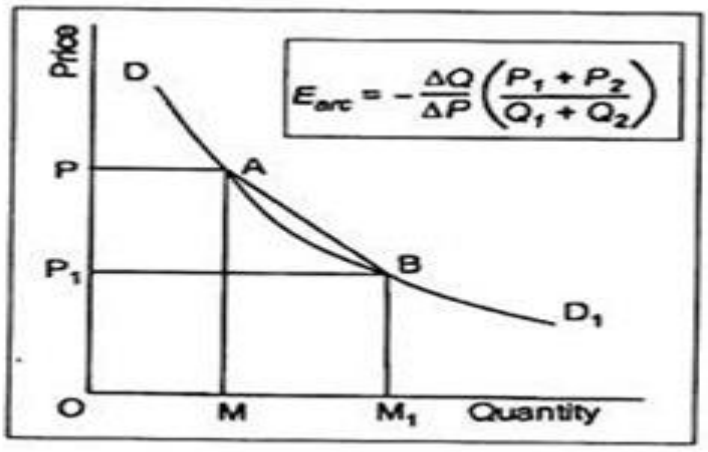
Suppose we have the following information about two prices and quantities:

Here changes in both price and quantity are much larger. Using old price (P_1) and old quantity (Q_1), one finds the value of elasticity of demand as:

$$E_P = \Delta Q / \Delta P. P_1/Q_1 = -400/100. 60/400 = -6.0$$

When new price (P_2) and new quantity (Q_2) are taken into account, the coefficient becomes

$$E_P = \Delta Q / \Delta P. P_2/Q_2 = -400/100. 50/800 = -2.5$$



Thus, estimation of elasticity in accordance with the formula for point elasticity method gives vastly different results. In other words, since elasticity of demand varies depending on the base, one should consider average price and average quantity demanded to calculate elasticity of demand. That is to say, we want to measure average elasticity over an arc of the demand curve (i.e., mid-point or average, price and quantity):

In terms of Fig, we want to compute arc price elasticity of demand over the arc AB of the demand curve DD_1. In other words, we want to measure elasticity between points A and B. The above formula measures arc elasticity

$$E_{arc} = -\frac{\Delta Q}{\left(\frac{Q_1 + Q_2}{2}\right)} \div \frac{\Delta P}{\left(\frac{P_1 + P_2}{2}\right)}$$

$$= \frac{\Delta Q}{\left(\frac{Q_1 + Q_2}{2}\right)} \times \frac{\left(\frac{P_1 + P_2}{2}\right)}{\Delta P}$$

$$= -\frac{\Delta Q}{\Delta P}\left(\frac{P_1 + P_2}{Q_1 + Q_2}\right)$$

In our above example, the arc elasticity is

$$E_{arc} = -\frac{400}{10} \cdot \frac{60 + 50}{400 + 800} = -\frac{400}{10} \cdot \frac{110}{1200} = -3.66$$

over the straight line AB.

To do so, we have to take the average of prices (OP and OP_1) and average of quantities (OM and OM_1). Greater the convexity of the demand curve between A and B, one obtains almost perfect estimate of elasticity. Or greater the concavity of the demand curve between points A and B, the poorer the approximation of measurement of arc elasticity. As we go on making the price change smaller and smaller, the arc of the demand curve may vanish or

converge to a point. So, as a special case of arc elasticity, the concept of point elasticity becomes relevant.

3.5. CONSUMER'S SURPLUS

3.5.1. Introduction to Consumer Surplus:

The doctrine of Consumer's Surplus which occupies an important place in the Marshallian System of Welfare Economic Analysis was originally stated by William Stanley Jevons and French Engineer economist Arsens Jules Dupuit in 1844 in a Crude form. Later on Dr. Alfred Marshall explained this concept in "The Pure Theory of Domestic Values" as consumer's rent.

In his 'Principles of Economics' he further elaborated this concept in logical details and describe it as "Consumer's Surplus". He is called the Consumer's Surplus.

3.5.2. Explanation of the Concept of Consumer Surplus:

In actual life, when we buy a commodity for consumption, we gain some utility by consuming it, at the same time we lose some utility in terms of the price that we need to pay for it. In the beginning, utility gained is usually higher than the utility lost. This concept is used to explain the gap between total utility that a consumer gets from the consumption of a certain commodity and the total money value which he actually pays for the same.

For Example:

Suppose, a student goes to buy a book. He is willing to pay Rs. 20 for the book. But he gets the book for Rs. 15. Thus, he has saved Rs. 5. This is called Consumer's Surplus.

Potential Price – Actual Price = Consumer's Surplus.

3.5.3. Definition of Consumer Surplus:

- Regarding this Prof. Marshall has said that "The excess of price which he (consumer) would be willing to pay rather than go without. The thing over that which he actually does pay, is the economic measure of this surplus satisfaction. It may be called "Consumer's Surplus".
- According to Penson – "The difference between what we would pay and what we have to pay is called Consumer's Surplus."

- ❖ According to Prof. J. K. Mehta – "Consumer's Surplus obtained by a person from a commodity is the difference between satisfaction which he derives from it and which he foregoes in order to procure that commodity."
- ❖ As per Samuelson – "There is always a gap between total welfare and total economic value. This gap is the nature of a surplus which consumer gets because he always receives more than he pays."
- ❖ According to Taussig – "Consumer's Surplus is the difference between the sums which measures total exchange value".

3.5.4. Assumptions of Consumer's Surplus:

Prof. Marshall has discussed the concept of Consumer's Surplus on the basis of the following assumptions:

a. **Marginal Utility of Money is Constant**:

The marginal utility of money to the consumer remains constant. It is so when the money spent on purchasing the commodity is only a small fraction of this total income.

b. **No Close Substitutes Available**:

The commodity in question has no close substitutes and if it does have any substitute, the same may be regarded as an identical commodity and thus only one demand should may be prepared.

c. **Utility can be measured**:

The utility is capable of cardinal measurement through the measuring rod of money. Moreover, the utility obtainable from one good is absolutely independent of the utility from the other goods. No goods affect the utility that can be derived from the other goods.

d. **Tastes and Incomes are same**:

That all people are of identical tastes, fashions and their incomes also are the same.

3.5.5. Explanation of the Law:

The above definition of Prof. Marshall can be explained with the help of practical examples:

(i) Consumer's Surplus when there is single purchase and

(ii) Consumer's Surplus when there is multiple unit purchase.

Marginal Utility, Price and Consumer's Surplus Schedule

Units of bread	Marginal Utility (in Rs.)	Price (in Rs.)	Consumer's Surplus (in Rs.)
1	10	2	8
2	8	2	6
3	6	2	4
4	4	2	2
5	2	2	0
6	0	2	-2

(i) Consumer Surplus on Single Unit Purchase:

When a consumer purchases only one unit of a commodity even then the Consumer Surplus arises. Let us suppose a student is willing to pay Rs. 30 for a particular book and when he actually go to market and purchase it at Rs. 25. Thus Rs. 5 (30-25) is the Consumer's Surplus.

(ii) Consumer's Surplus on a Multi-unit Commodity:

In our real life one purchases number of units of a particular commodity. The price that a consumer pays for all the different units of commodity actually measures the utilities of the marginal unit and he pays the same price for different commodities. The excess of utilities he derives from different commodities and the actual price paid is called as Consumer's Surplus. Let us take an example of a person whose marginal utility, price and Consumer's Surplus schedule for bread is given in the above table:

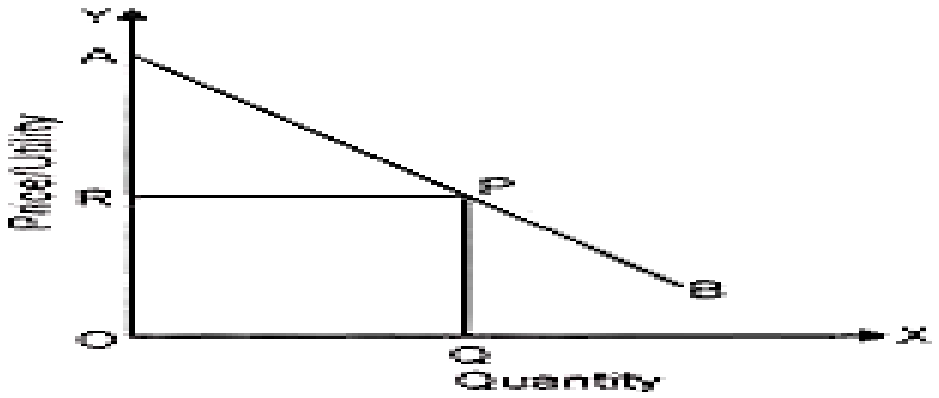
The above table expresses the various amounts of utilities he derives from the consumption of different units of bread. From the first bread alone he derives marginal utility of Rs. 10 but the price which he pays is Rs. 2 and hence Rs. 8 is the Consumer's Surplus. Similarly, the Consumer's Surplus from 2nd, 3rd, 4th and 5th units are 6, 4, and 2 and zero respectively. A rational consumer will consume only 5th commodity where the marginal utility is equal to its price and thereby maximises his Consumer's Surplus. If he will consume the 6th unit he derive zero marginal utility where as he pays the price as Rs. 2. A rational consumer will not consume that commodity.

3.5.6. Diagrammatic Representation of Consumer Surplus:

In this diagram AB is a demand curve of a consumer OR is the market price. The price line is parallel to X axis because of perfect competition. At point P the marginal curve AB intersect the market price curve OR. Thus for

OQ quantity the consumer derives utility as AOQP where as he pays ROQP. Thus, triangular shaded area ARP is Consumer's Surplus.

Consumer's Surplus = Total Utility-(Marginal Utility) x (Multiply x No. of Units purchased)



Consumer surplus

Criticism of the Concept of Consumer's Surplus, Or Difficulties in the Measurement of Consumer's Surplus:

The concept of Consumer's Surplus has been criticised on several grounds:

1. This Concept is Imaginary:

The concept is complete imaginary, illogical and illusory. You just imagine, what you are prepared to pay and you proceed to deduct from that what you actually pay. It is all hypothetical. One may say that one is prepared to pay anything. Hence it is unreal.

2. Measurement of this Concept is Difficult:

The critics of this concept allege that measurement of Consumer's Surplus is difficult. It is because utility is a subjective concept and will vary from person to person. Total utility is impossible to measure because when we consume more units it is said that the marginal utility of even earlier units start diminishing. Prof. Hicks and Allen have contended and proved that utility being a subjective phenomenon, is determinate and immeasurable.

3. This Concept is not Applicable to Substitutes:

The concept may not apply in case of goods which have substitutes. Why should on imagine how much will be willing to pay for a commodity. One finds it hard to think that the substitute of a commodity has no significant effect on the surplus satisfaction he derives from the commodity.

Decidedly, the consumer will feel more satisfied if two good substitutes as well as complements are made available to him than in case he gets only one of the two at a time. The consumer can properly appreciate the utility from a pen only when the same is accompanied by ink.

4. The Marginal Utility of Money never Remains Constant:

It is improper to assume with Prof. Marshall that the marginal utility of money remains constant and does not alter with increase or decrease in the money stock with the consumer. Therefore, it is incorrect to believe the consistency of the marginal utility of money in real life.

5. Exhaustion of Surplus Utility:

It is said that if a consumer knew that any such thing existed, he would go on buying more and more till the surplus utility he enjoyed disappeared. This is not correct. A consumer does not run after a surplus yielded by one commodity. He has to weigh the utilities of other commodities too.

6. This Concept is not Applicable to Necessaries:

The idea of Consumer's Surplus does not apply to the necessaries of life or conventional necessaries. In such cases the surplus is immeasurable. What would not a man be prepared to pay for a glass of water when he is dying of thirst?

7. The Complete List of Demand and Price not Available to Consumer:

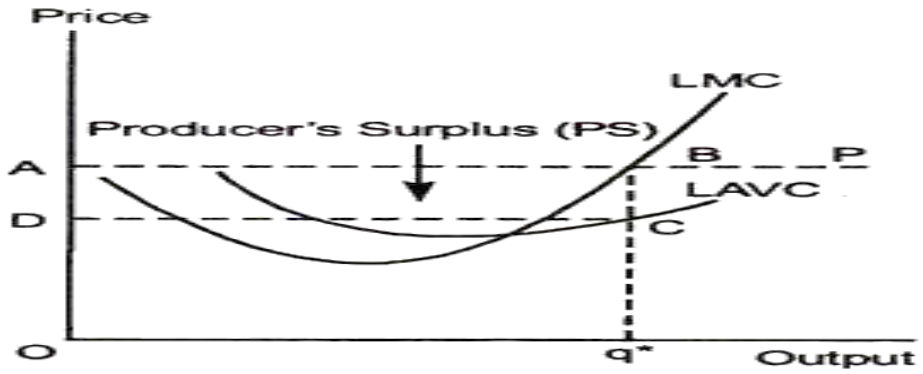
Another ground on which the concept has been criticized is that the complete and reliable list of demand and prices is never available to the consumer. The demand schedule according to which he regulates and decides his purchases is not necessary to come true in practice.

3.6. Producers surplus

The producer's surplus of a firm is the sum over all units of production of the difference between the market price and the MC of production. Thus, just as the consumer's surplus measures the area below the demand curve of an individual and above the market price, producer's surplus measures the area above a producer's supply curve and below the market price. Illustrates the producer's surplus for a firm. The profit-maximising output is q*, where P – MC. Producer's surplus is given by the area ABCD — under the demand curve and above the MC curve, from zero output to the profit-maximizing

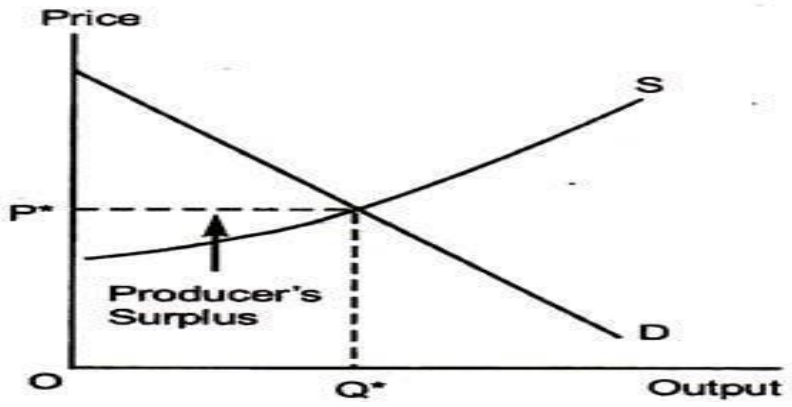
output q*. Alternatively, it can be defined as the difference between the firm's revenue and its total variable costs (TVC) which is represented by the area ABCD = Revenue OABq* – Variable Cost (ODCq*).

Producer's surplus is related to profit, but is not equal to it. Producer's surplus subtracts only variable costs from revenues, while profit subtracts both variable and fixed costs. PS = TR – TVC and Profit – π-TR- TVC – TFC. Thus, producer's surplus is always greater than profit.



Producer's surplus in the short run

The extent to which firms enjoy PS depends on their costs of production. Higher-cost firms have less PS than low-cost firms. By adding up all the individual firm's producer's surplus, we can find the PS for a market. In Fig. 8.11, the market PS is obtained by the area below the market price and above the market supply curve, between O and output Q*.



Producer surplus in the long run

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UNIT – IV

PRODUCTION ANALYSIS

4.1. PRODUCTION FUNCTION

4.1.1. INTRODUCTION:

Production is the result of co-operation of four factors of production viz., land, labour, capital and organization. This is evident from the fact that no single commodity can be produced without the help of any one of these four factors of production. Therefore, the producer combines all the four factors of production in a technical proportion. The aim of the producer is to maximize his profit. For this sake, he decides to maximize the production at minimum cost by means of the best combination of factors of production. The producer secures the best combination by applying the principles of equi-marginal returns and substitution. According to the principle of equi-marginal returns, any producer can have maximum production only when the marginal returns of all the factors of production are equal to one another. For instance, when the marginal product of the land is equal to that of labour, capital and organisation, the production becomes maximum.

4.1.2. MEANING OF PRODUCTION FUNCTION:

In simple words, production function refers to the functional relationship between the quantity of a good produced (output) and factors of production (inputs). In this way, production function reflects how much output we can expect if we have so much of labour and so much of capital as well as of labour etc. In other words, we can say that production function is an indicator of the physical relationship between the inputs and output of a firm. The reason behind physical relationship is that money prices do not appear in it. However, here one thing that becomes most important to quote is that like demand function a production function is for a definite period. It shows the flow of inputs resulting into a flow of output during some time. The production function of a firm depends on the state of technology. With every development in technology the production function of the firm undergoes a change.

Mathematically, such a basic relationship between inputs and outputs may be expressed as:

Q = f(L, C, N)

Where Q = Quantity of output

L = Labour

C = Capital

N = Land.

Hence, the level of output (Q), depends on the quantities of different inputs (L, C, N) available to the firm. In the simplest case, where there are only two inputs, labour (L) and capital (C) and one output (Q), the production function becomes.

Q =f (L, C)

4.1.3. DEFINITIONS:

"The relationship between inputs and outputs is summarized in what is called the production function. This is a technological relation showing for a given state of technological knowledge how much can be produced with given amounts of inputs." Prof. Richard J. Lipsey

4.1.4. FEATURES OF PRODUCTION FUNCTION:

Following are the main features of production function:

1. Substitutability:

The factors of production or inputs are substitutes of one another which make it possible to vary the total output by changing the quantity of one or a few inputs, while the quantities of all other inputs are held constant. It is the substitutability of the factors of production that gives rise to the laws of variable proportions.

2. Complementarity:

The factors of production are also complementary to one another, that is, the two or more inputs are to be used together as nothing will be produced if the quantity of either of the inputs used in the production process is zero.

The principles of returns to scale is another manifestation of complementarity of inputs as it reveals that the quantity of all inputs are to be increased simultaneously in order to attain a higher scale of total output.

3. Specificity:

It reveals that the inputs are specific to the production of a particular product. Machines and equipment's, specialized workers and raw materials are a few examples of the specificity of factors of production. The specificity may not be complete as factors may be used for production of other commodities too. This reveals that in the production process none of the factors can be ignored and in some cases ignorance to even slightest extent is not possible if the factors are perfectly specific.

Production involves time; hence, the way the inputs are combined is determined to a large extent by the time period under consideration. The greater the time period, the greater the freedom the producer has to vary the quantities of various inputs used in the production process. Production function is the mathematical representation of relationship between physical inputs and physical outputs of an organization.

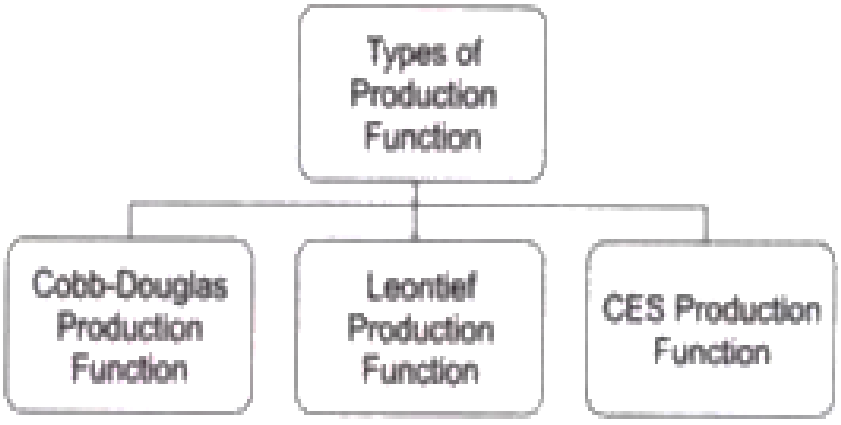
There are different types of production functions that can be classified according to the degree of substitution of one input by the other.

4.1.5. TYPES OF PRODUCTION FUNCTION:

The different types of production function as follows:

1. Cobb-Douglas Production Function:

Cobb-Douglas production function refers to the production function in which one input can be substituted by other but to a limited extent. For



example, capital and labor can be used as a substitute of each other, but to a limited extent only.

Cobb-Douglas production function can be expressed as follows:

$Q = AK^aL^b$

Where, A = positive constant

a and b = positive fractions

b = 1 – a

Therefore, Cobb- Douglas production function can also be expressed as follows:

$Q = ak^aL^{1-a}$

The characteristics of Cobb- Douglas production function are as follows:

i. Makes it possible to change the algebraic form in log linear form, represented as follows:

$$\log Q = \log A + a \log K + b \log L$$

This production function has been estimated with the help of linear regression analysis.

ii. Makes it possible to change the algebraic form in log linear form, represented as follows:

$$\log Q = \log A + a \log K + b \log L$$

This production function has been estimated with the help of linear regression analysis.

iii. Acts as a homogeneous production function, whose degree can be calculated by the value obtained after adding values of a and b. If the resultant value of a + b is 1, it implies that the degree of homogeneity is 1 and indicates the constant returns to scale.

iv. Makes use of parameters a and b, which signifies the elasticity' coefficients of output for inputs, labor and capital, respectively. Output elasticity coefficient refers to the change produced in output due to change in capital while keeping labor at constant.

v. Represents that there would be no production at zero cost.

2. Leontief Production Function:

Leontief production function uses fixed proportion of inputs having no substitutability between them. It is regarded as the limiting case for constant elasticity of substitution.

The production function can be expressed as follows:

$q = \min (z_1/a, Z_2/b)$

Where, q = quantity of output produced

Z_1 = utilized quantity of input 1

Z_2 = utilized quantity of input 2

a and b = constants

For example, tyres and steering wheels are used for producing cars. In such case, the production function can be as follows:

$Q = \min (z_1/a, Z_2/b)$

Q = min (number of tyres used, number of steering used).

3. CES Production Function:

CES stands for constant elasticity substitution. CES production function shows a constant change produced in the output due to change in input of production.

It can be represented as follows:

$Q = A [aK^{\beta} + (1-a) L^{-\beta}]^{-1/\beta}$

Or,

$Q = A [aL^{-\beta} + (1-a) K^{-\beta}]^{-1/\beta}$

CES has the homogeneity degree of 1 that implies that output would be increased with the increase in inputs. For example, labor and capital has increased by constant factor m.

In such a case, production function can be represented as follows:

$Q' = A [a (mK)^{-\beta} + (1-a) (mL)^{-\beta}]^{-1/\beta}$

$Q' = A [m^{-\beta} \{aK^{-\beta} + (1-a) L^{-\beta}\}]^{-1/\beta}$

$Q' = (m^{-\beta})^{-1/\beta} .A [aK^{-\beta} + (1-a) L^{-\beta})^{-1/\beta}$

Because, $Q = A [aK^{-\beta} + (1-a) L^{-\beta}]^{-1/\beta}$

Therefore, Q' = mQ

This implies that CES production function is homogeneous with degree one.

4.2. LAW OF VARIABLE PROPORTIONS:

Law of Variable Proportions occupies an important place in economic theory. This law is also known as Law of Proportionality. Keeping other factors fixed, the law explains the production function with one factor variable. In the short run when output of a commodity is sought to be increased, the law of variable proportions comes into operation. Therefore, when the number of one factor is increased or decreased, while other factors are constant, the

proportion between the factors is altered. For instance, there are two factors of production viz., land and labour.

Land is a fixed factor whereas labour is a variable factor. Now, suppose we have a land measuring 5 hectares. We grow wheat on it with the help of variable factor i.e., labour. Accordingly, the proportion between land and labour will be 1: 5. If the number of labourers is increased to 2, the new proportion between labour and land will be 2: 5. Due to change in the proportion of factors there will also emerge a change in total output at different rates. This tendency in the theory of production called the Law of Variable Proportion.

4.2.1. DEFINITIONS:

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

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

4.2.2. ASSUMPTIONS:

Law of variable proportions is based on following assumptions:

(i) Constant Technology:

The state of technology is assumed to be given and constant. If there is an improvement in technology the production function will move upward.

(ii) Factor Proportions are Variable:

The law assumes that factor proportions are variable. If factors of production are to be combined in a fixed proportion, the law has no validity.

(iii) Homogeneous Factor Units:

The units of variable factor are homogeneous. Each unit is identical in quality and amount with every other unit.

(iv)Short-Run:

The law operates in the short-run when it is not possible to vary all factor inputs.

4.2.3. Explanation of the Law:

In order to understand the law of variable proportions we take the example of agriculture. Suppose land and labour are the only two factors of production. By keeping land as a fixed factor, the production of variable factor i.e., labour can be shown with the help of the following table:

From the table 5.1 it is clear that there are three stages of the law of variable proportion. In the first stage average production increases as there are more and more doses of labour and capital employed with fixed factors (land). We see that total product, average product, and marginal product increases but average product and marginal product increases up to 40 units. Later on, both start decreasing because proportion of workers to land was sufficient and land is not properly used. This is the end of the first stage.

Table.4.1. Law of variable proportion

Units of Land	Units of Labour	Total Production	Average Production	Marginal Production	
10 Acres	0	–	–	–	
"	1	20	20	20	1st stage MP > AP
"	2	50	25	30	
"	3	90	30	40	
"	4	120	30	30	AP = MP
"	5	140	28	20	2nd stage MP=0 and TP Maximum
"	6	150	25	10	
"	7	150	21.3	0	
"	8	140	17.5	–10	3rd stage MP < 0

The second stage starts from where the first stage ends or where AP=MP. In this stage, average product and marginal product start falling. We should note that marginal product falls at a faster rate than the average product. Here, total product increases at a diminishing rate. It is also maximum at 70 units of labour where marginal product becomes zero while average product is never zero or negative.

The third stage begins where second stage ends. This starts from 8th unit. Here, marginal product is negative and total product falls but average product is still positive. At this stage, any additional dose leads to positive nuisance because additional dose leads to negative marginal product.

Graphic Presentation:

In fig 4.1, on OX axis, we have measured number of labourers while quantity of product is shown on OY axis. TP is total product curve. Up to point 'E', total product is increasing at increasing rate. Between points E and G it is increasing at the decreasing rate. Here marginal product has started falling. At point 'G' i.e., when 7 units of labourers are employed, total product is maximum while, marginal product is zero. Thereafter, it begins to diminish corresponding to negative marginal product. In the lower part of the figure MP is marginal product curve.

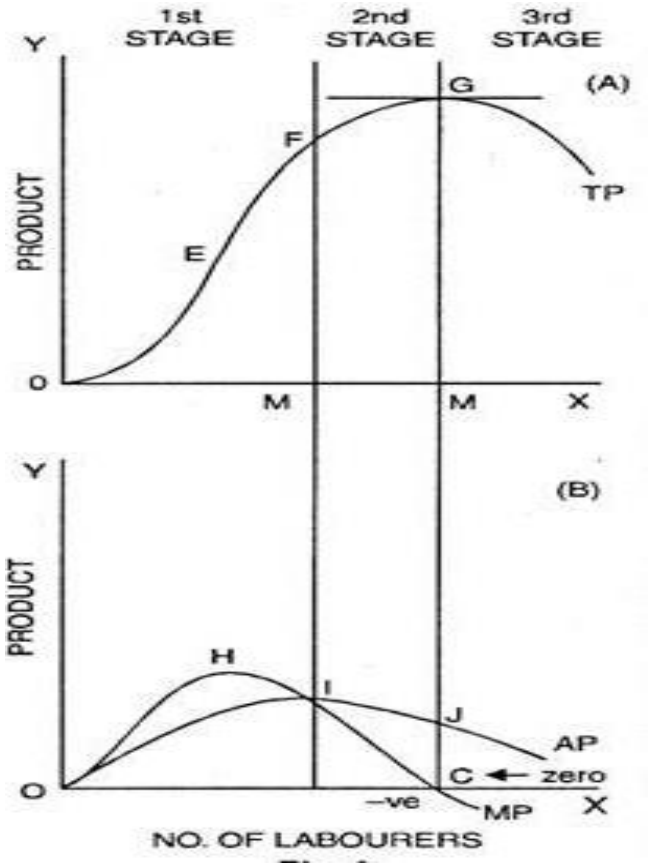


Fig. 4.1. Law of variable proportion

Up to point 'H' marginal product increases. At point 'H', i.e., when 3 units of labourers are employed, it is maximum. After that, marginal product begins to decrease. Before point 'I' marginal product becomes zero at point C and it turns negative. AP curve represents average product. Before point 'I', average product is less than marginal product. At point 'I' average product is maximum. Up to point T, average product increases but after that it starts to diminish.

Three Stages of the Law:

1. First Stage:

First stage starts from point 'O' and ends up to point F. At point F average product is maximum and is equal to marginal product. In this stage, total product increases initially at increasing rate up to point E. between 'E' and 'F' it increases at diminishing rate. Similarly marginal product also increases initially and reaches its maximum at point 'H'. Later on, it begins to diminish and becomes equal to average product at point T. In this stage, marginal product exceeds average product (MP > AP).

2. Second Stage:

It begins from the point F. In this stage, total product increases at diminishing rate and is at its maximum at point 'G' correspondingly marginal product diminishes rapidly and becomes 'zero' at point 'C'. Average product is maximum at point 'I' and thereafter it begins to decrease. In this stage, marginal product is less than average product (MP < AP).

3. Third Stage:

This stage begins beyond point 'G'. Here total product starts diminishing. Average product also declines. Marginal product turns negative. Law of diminishing returns firmly manifests itself. In this stage, no firm will produce anything. This happens because marginal product of the labour becomes negative. The employer will suffer losses by employing more units of labourers. However, of the three stages, a firm will like to produce up to any given point in the second stage only.

4.2.4. CONDITION OR CAUSES OF APPLICABILITY:

There are many causes which are responsible for the application of the law of variable proportions. They are as follows**:**

1. Under Utilization of Fixed Factor:

In initial stage of production, fixed factors of production like land or machine, is under-utilized. More units of variable factor, like labour, are needed for its proper utilization. As a result of employment of additional units of variable factors there is proper utilization of fixed factor. In short, increasing returns to a factor begins to manifest itself in the first stage.

2. Fixed Factors of Production.

The foremost cause of the operation of this law is that some of the factors of production are fixed during the short period. When the fixed factor is used with variable factor, then its ratio compared to variable factor falls. Production is the result of the co-operation of all factors. When an additional unit of a variable factor has to produce with the help of relatively fixed factor, then the marginal return of variable factor begins to decline.

3. Optimum Production:

After making the optimum use of a fixed factor, then the marginal return of such variable factor begins to diminish. The simple reason is that after the optimum use, the ratio of fixed and variable factors become defective. Let us suppose a machine is a fixed factor of production. It is put to optimum use when 4 labourers are employed on it. If 5 labourers are put on it, then total production increases very little and the marginal product diminishes.

4. Imperfect Substitutes:

Mrs. Joan Robinson has put the argument that imperfect substitution of factors is mainly responsible for the operation of the law of diminishing returns. One factor cannot be used in place of the other factor. After optimum use of fixed factors, variable factors are increased and the amount of fixed factor could be increased by its substitutes. Such a substitution would increase the production in the same proportion as earlier. But in real practice factors are imperfect substitutes.

Applicability of the Law of Variable Proportions:

The law of variable proportions is universal as it applies to all fields of production. This law applies to any field of production where some factors are fixed and others are variable. That is why it is called the law of universal application. The main cause of application of this law is the fixity of any one factor. Land, mines, fisheries, and house building etc. are not the only examples of fixed factors. Machines, raw materials may also become fixed in the short period. Therefore, this law holds well in all activities of production etc. agriculture, mining, manufacturing industries.

1. Application to Agriculture:

With a view of raising agricultural production, labour and capital can be increased to any extent but not the land, being fixed factor. Thus when more and more units of variable factors like labour and capital are applied to a fixed factor then their marginal product starts to diminish and this law becomes operative.

2. Application to Industries:

In order to increase production of manufactured goods, factors of production has to be increased. It can be increased as desired for a long period, being variable factors. Thus, law of increasing returns operates in industries for a long period. But, this situation arises when additional units of labour, capital and enterprise are of inferior quality or are available at higher cost. As a result, after a point, marginal product increases less proportionately than increase in the units of labour and capital. In this way, the law is equally valid in industries.

4.3. LAW OF RETURNS

The law of returns to scale explains the proportional change in output with respect to proportional change in inputs. In other words, the law of returns to scale states when there are a proportionate change in the amounts of inputs, the behaviour of output also changes. The degree of change in output varies with change in the amount of inputs. For example, an output may change by a large proportion, same proportion, or small proportion with respect to change in input.

On the basis of these possibilities, law of returns can be classified into three categories:

i. Increasing returns to scale

ii. Constant returns to scale

iii. Diminishing returns to scale

1. Increasing Returns to Scale:

If the proportional change in the output of an organization is greater than the proportional change in inputs, the production is said to reflect increasing returns to scale. For example, to produce a particular product, if the quantity of inputs is doubled and the increase in output is more than double, it is said to be an increasing returns to scale. When there is an increase in the scale of production, the average cost per unit produced is lower. This is because at this stage an organization enjoys high economies of scale.

In Figure-5.2, a movement from a to b indicates that the amount of input is doubled. Now, the combination of inputs has reached to 2K+2L from 1K+1L. However, the output has Increased from 10 to 25 (150% increase), which is more than double. Similarly, when input changes from 2K-H2L to 3K + 3L, then output changes from 25 to 50(100% increase), which is greater than change in input. This shows increasing returns to scale. There a number of factors responsible for increasing returns to scale.

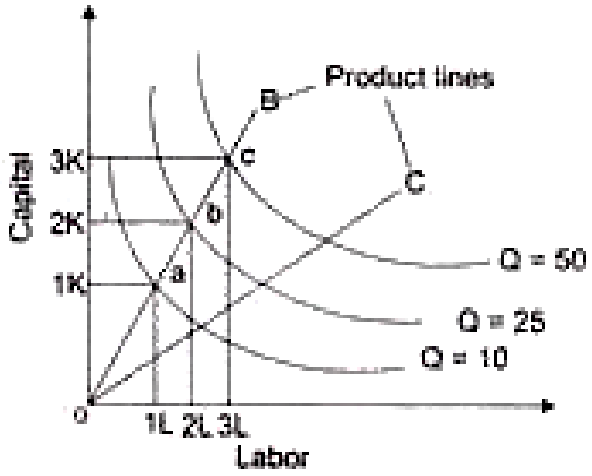


Fig. 4.2. Increasing returns to scale

Some of the factors are as follows:

i. Technical and managerial indivisibility:

Implies that there are certain inputs, such as machines and human resource, used for the production process are available in a fixed amount. These inputs cannot be divided to suit different level of production. For example, an organization cannot use the half of the turbine for small scale of

production. Similarly, the organization cannot use half of a manager to achieve small scale of production. Due to this technical and managerial indivisibility, an organization needs to employ the minimum quantity of machines and managers even in case the level of production is much less than their capacity of producing output. Therefore, when there is increase in inputs, there is exponential increase in the level of output.

ii. Specialization:

Implies that high degree of specialization of man and machinery helps in increasing the scale of production. The use of specialized labor and machinery helps in increasing the productivity of labor and capital per unit. This results in increasing returns to scale.

iii. Concept of Dimensions:

Refers to the relation of increasing returns to scale to the concept of dimensions. According to the concept of dimensions, if the length and breadth of a room increases, then its area gets more than doubled.

For example, length of a room increases from 15 to 30 and breadth increases from 10 to 20. This implies that length and breadth of room get doubled. In such a case, the area of room increases from 150 (15*10) to 600 (30*20), which is more than doubled.

2. Constant Returns to Scale:

The production is said to generate constant returns to scale when the proportionate change in input is equal to the proportionate change in output. For example, when inputs are doubled, so output should also be doubled, then it is a case of constant returns to scale. In Figure-5.3, when there is a movement from a to b, it indicates that input is doubled. Now, when the combination of inputs has reached to 2K+2L from IK+IL, then the output has increased from 10 to 20. Similarly, when input changes from 2Kt2L to 3K + 3L, then output changes from 20 to 30, which is equal to the change in input.

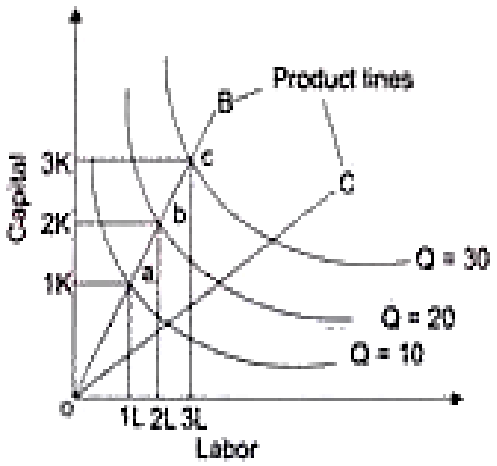


Fig. 4.3. Constant returns to scale

This shows constant returns to scale. In constant returns to scale, inputs are divisible and production function is homogeneous.

3. Diminishing Returns to Scale:

Diminishing returns to scale refers to a situation when the proportionate change in output is less than the proportionate change in input. For example, when capital and labour is doubled but the output generated is Less than doubled, the returns to scale would be termed as diminishing returns to scale.

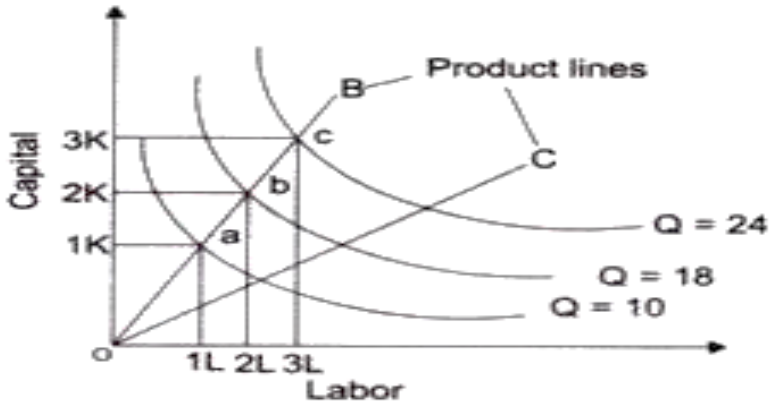


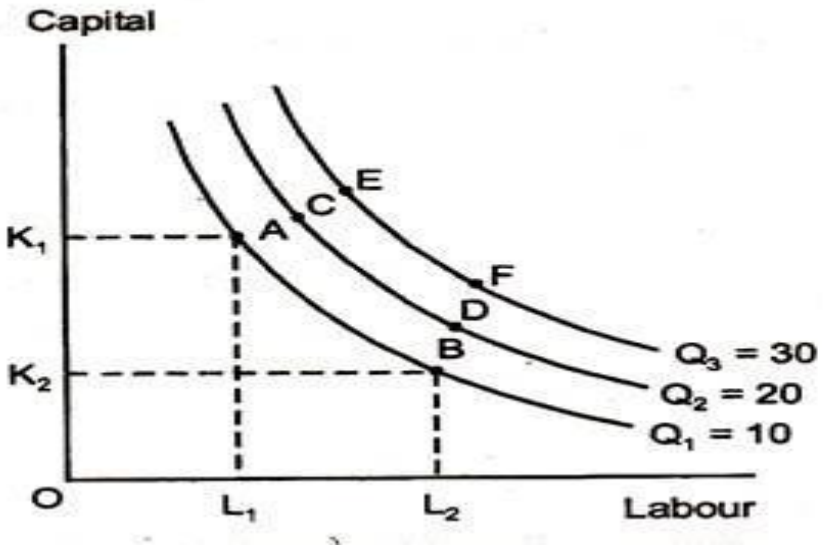
Fig. 4.4. Diminishing returns to scale

In Figure-4.4, when the combination of labor and capital moves from point a to b, it indicates that input is doubled. At point a, the combination of input is 1k+1L and at point b, the combination becomes 2K+2L. However, the output has increased from 10 to 18, which is less than change in the amount of input. Similarly, when input changes from 2K+2L to 3K + 3L, then output changes from 18 to 24, which is less than change in input. This shows the

diminishing returns to scale. Diminishing returns to scale is due to diseconomies of scale, which arises because of the managerial inefficiency.

4.4. ISO QUANTS

We consider the production of a good, X, and suppose that only two factors of production— labour and capital—are employed. Suppose also that it is always possible to substitute capital for labour and labour for capital continuously in the production process. On the basis of these assumptions, it is possible that a given quantity of good X can be produced using different combinations of labour and capital. This is shown in Fig. 6.3, where the vertical axis measures units of capital (K) and the horizontal axis measures units of labour (L).



ISOQUANTS CURVE

Point A represents just one possible combination of K and L which can be used to produce Q_1 units of output. There are, in fact, an infinite number of other points on the isoquant Q_1 all of which represent different combinations of K and L which can be used to produce Q_1 units. Output Q_2 and Q_3 can be produced using any of the combinations of K and L represented by points along the isoquants. An isoquant — or iso product — curve is a contour line which joins together the different combinations of two factors of production that are just physically able to produce a given quantity of a particular good.

For example, at A, 1 unit of labour and 3 units of capital yield $Q_1 = 10$ units of output, whereas, at D, the same output can be produced by 3

units of labour and 1 unit of capital. Similarly, $Q_2 = 20$ measures all combinations of inputs that yield 20 units of output. Q_2 produces more output than Q_1, and $Q_3 > Q_2$. An isoquant map is a family of isoquants which shows the production function for a good.

The isoquants have three important properties:

a. No two isoquants can intersect;
b. Isoquants slope downwards from left to right;
c. They are convex to the origin.

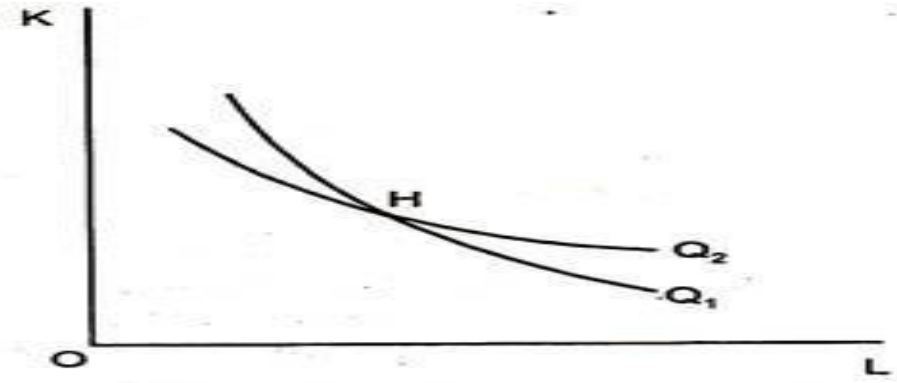
These properties are considered, in turn.

Isoquants cannot intersect:

Isoquants, are similar to the indifference curves that we used to study consumer theory. Where indifference curves order levels of satisfaction from low to high, isoquants order levels of output. However, unlike IC_s, each isoquant is associated with a specific level of output.
By contrast, higher level of utility are associated with higher IC_s, but we cannot measure the specific level of utility the way we can measure a specific level of output with an isoquant.

An isoquant map is a set of isoquants, each of which shows the maximum output that can be achieved for any set of inputs. An isoquant map is an alternative way of describing a production function, just as an indifference map is a way of describing a utility function. Each isoquant is associated with a different level of output, and the level of output increases as we move up and to the right in the figure.

Figure shows two intersecting isoquants, Q_1 and Q_2. As drawn, point H represents a combination of K and L, which, when used efficiently, can apparently produce two different quantities of good X — Q_1 units and Q_2 units. This absurd result confirms the statement that isoquants cannot intersect.



Iso quant cannot intersect

Isoquants are Negatively Sloped:

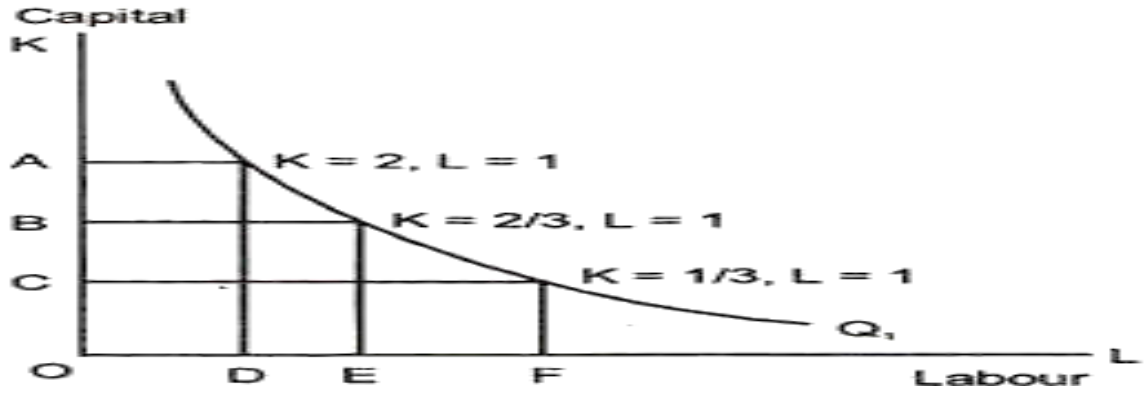
If both capital and labour have positive marginal products, then it follows that to maintain a given level of output when the quantity of one factor is reduced, the quantity of the other must be increased.

Isoquants are Convex to the Origin:

If labour and capital are substitutes for each other, then isoquants must be convex to the origin. As bigger quantities of labour and smaller quantities of capital are employed to produce a given level of output, labour becomes less and less capable of substituting for capital.

Similarly, as bigger quantities of capital and smaller quantities of labour are employed to produce the same level of output, capital becomes less and less capable of substituting for labour. We can see in Fig. 6.5 that as the quantity of capital employed is reduced by one unit from OA to OB, the quantity of labour employed must increase from OD to OE for output to remain unchanged at Q_1.

If the quantity of capital is now reduced again by one unit to OC, the quantity of labour employed must increase to OF to maintain output at Q_1: Clearly, EF is bigger than DE. Thus, as more and more units of capital are given up, successively larger quantities of labour must be hired in order to keep the output level unchanged.



ISOQUANT ARE CONVEX TO THE ORIGIN

The slope of the isoquant measures the rate at which capital can substitute for labour, keeping output constant. This slope is called the marginal rate of technical substitution of capital for labour (MRTS). Isoquants are downward-sloping and convex like indifference curves. On isoquant Q_1, the MRTS falls from 2 to 1 to 2/3 to 1/3. Isoquants are convex — the MRTS diminishes as we move down along an isoquant.

The diminishing MRTS tells us that the productivity that any one input can have is limited. As a lot of labour is added to the production process in place of capital, the productivity of labour falls. Similarly, when a lot of capital is added in place of labour, the productivity of capital falls.

Production needs a balanced mix of both inputs. The MRTS is closely related to the MP_L and MP_K We can see that adding some labour and reducing some capital keep output constant.

Additional output from increased use of labour – $MP_L \times \Delta L$

Similarly, reduction of output from decreased use of capital = $MP_K \times \Delta K$.

Since we are keeping output constant by moving along an isoquant, the total change in output must be zero. Thus,

$MP_L \times \Delta L + MP_k \times \Delta K = 0$

$\therefore MP_L/MP_K = -\Delta K/\Delta L = MRTS.$

Production with Two Variable Inputs:

Now that we have seen the production relationship, let us reconsider the firm's production technology in the long-run, where both capital (K) and labour (L) inputs are variable. We can examine the alternative ways of producing by looking at the slope of a series of isoquants.

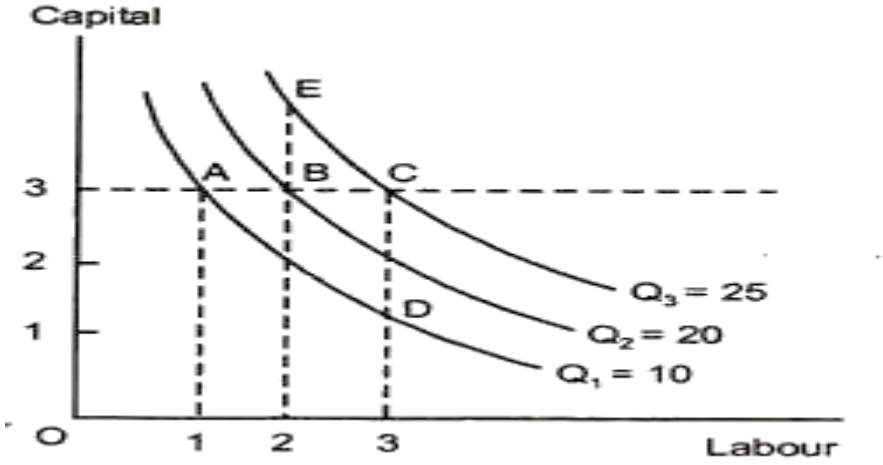
As we know, an isoquant describes all combinations of inputs that yield the same level of output. The isoquants slope downward because both labour and capital have positive marginal products. More of either input increases output; so if output is to be kept constant as more of one input is used, less of other input must be used.

Diminishing Returns:

There are diminishing return to both inputs. To see why there are diminishing returns to labour we draw a horizontal line at a particular level of capital, say 3 units. Reading the levels of output from each isoquant as labour is increased, we note that each additional unit of labour generates less and less output. For example, when labour is increased from 1 unit to 2 (from A to B), output increases by 10.

However, when labour is increased by an additional unit (from B to C), output increases by only 5. Thus, there are diminishing returns to labour—both in the long and short-run. While adding one factor keeping, the other factor constant eventually leads to lower level of output, the isoquant must become steeper, as more capital is added in place of labour, and flatter when labour is added in place of capital.

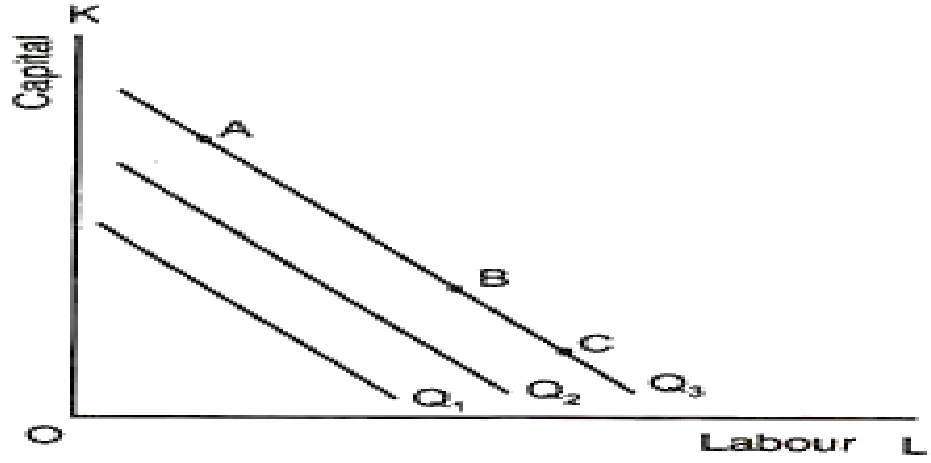
There are also diminishing returns to capital. With labour fixed, the marginal product of capital decreases as capital is increased. For example, when capital is increased from 1 to 2 units and labour is held constant at 3, the marginal product of capital is initially 10, but the marginal product falls to 5 when capital in increased from 2 to 3, as Fig. 6.6 shows.



DIMINISHING RETURNS TO BOTH FACTORS

Production Function when Inputs are perfectly substitutable:

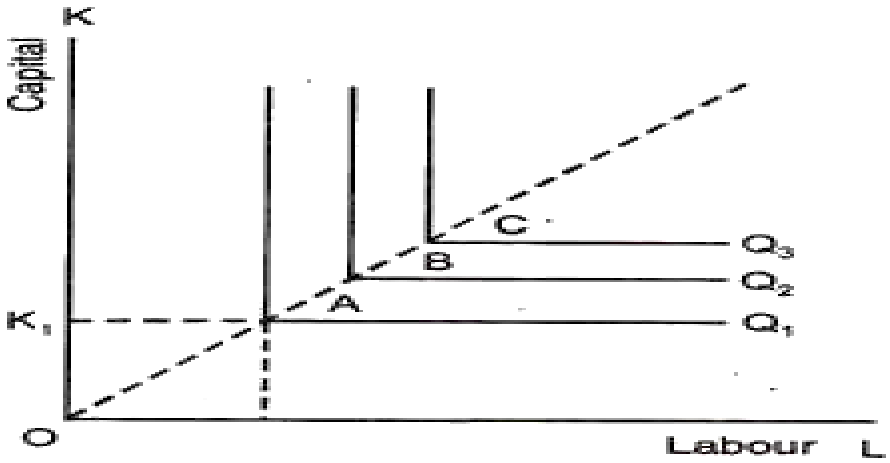
When the production isoquants are straight lines, the MRTS is constant. This means that the rate at which capital and labour can be substituted for each other is the same whatever level of inputs is being used, as Figure.



Perfect substitutable production function

Fixed-proportion Production Function:

When the production isoquants are L-shaped, only one combination of labour (L) and capital (K) can be used to produce a given output. The addition of more labour does not increase output, nor does the addition of more capital alone, which has been shown in Figure.



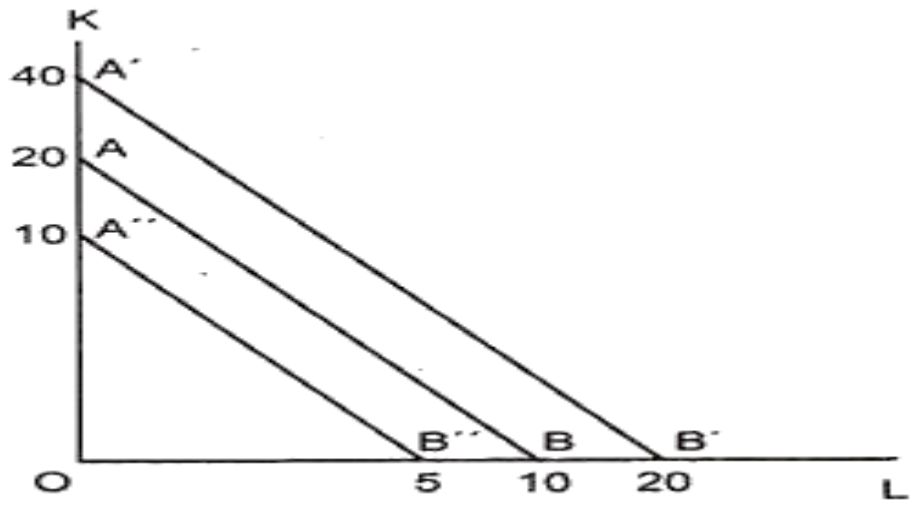
Fixed Proportion Production Function

Iso cost Lines:

An iso cost line shows all the combinations of capital and labour that can be bought for a given monetary outlay. If we draw the iso cost and the isoquant map together, this will enable us to identify the cost-minimising

combination of factors that a profit-maximising firm will employ to produce its chosen output level.

Suppose that the price of labour is £2 per unit and the price of capital is £1 per unit. Table shows the combination of the two factors that can be bought for an outlay £20. These combinations are plotted as the isocost line AB in Figure. The slope of the line (OA/OB = 2) represents the relative factor price ratio. The isocost line for an outlay of £40 is plotted A 'B' on the graph and it is parallel to AB. Similarly, the isocost line for a £10 outlay, A "B" is also parallel to AB.



Iso Cost Lines

A change in the relative factor price ratio will change the slope of the isocost lines.

Table 6.4 : Combinations of Labour and Capital for a £20 Outlay

Labour (£2 = Price)	Capital (£1 = Price)
10	0
8	4
6	8
4	12
2	16
0	20

4.5. ECONOMIES AND DISECONOMIES OF SCALE:

Economies of scale are defined as the cost advantages that an organization can achieve by expanding its production in the long run. In other words, these are the advantages of large scale production of the organization. The cost advantages are achieved in the form of lower average costs per unit. It is a long term concept. Economies of scale are achieved when there is an increase in the sales of an organization. As a result, the savings of the organization increases, which further enables the organization to obtain raw materials in bulk. This helps the organization to enjoy discounts. These benefits are called as economies of scale.

The economies of scale are divided in to internal economies and external economies discussed as follows:

i. Internal Economies:

Refer to real economies which arise from the expansion of the plant size of the organization. These economies arise from the growth of the organization itself.

The examples of internal economies of scale are as follows:

a. Technical economies of scale:

Occur when organizations invest in the expensive and advanced technology. This helps in lowering and controlling the costs of production of organizations. These economies are enjoyed because of the technical efficiency gained by the organizations. The advanced technology enables an organization to produce a large number of goods in short time. Thus, production costs per unit falls leading to economies of scale.

b. Marketing economies of scale:

Occur when large organizations spread their marketing budget over the large output. The marketing economies of scale are achieved in case of bulk buying, branding, and advertising. For instance, large organizations enjoy benefits on advertising costs as they cover larger audience. On the other hand, small organizations pay equal advertising expenses as large organizations, but do not enjoy such benefits on advertising costs.

c. Financial economies of scale:

Take place when large organizations borrow money at lower rate of interest. These organizations have good credibility in the market. Generally, banks prefer to grant loans to those organizations that have strong foothold in the market and have good repaying capacity.

d. Managerial economies of scale:

Occur when large organizations employ specialized workers for performing different tasks. These workers are experts in their fields and use their knowledge and experience to maximize the profits of the organization. For instance, in an organization, accounts and research department are created and managed by experienced individuals, SO that all costs and profits of the organization can be estimated properly.

e. Commercial economies:

Refer to economies in which organizations enjoy benefits of buying raw materials and selling of finished goods at lower cost. Large organizations buy raw materials in bulk; therefore, enjoy benefits in transportation charges, easy credit from banks, and prompt delivery of products to customers.

ii. External economies:

Occur outside the organization. These economies occur within the industries which benefit organizations. When an industry expands, organizations may benefit from better transportation network, infrastructure, and other facilities. This helps in decreasing the cost of an organization.

Some of the examples of external economies of scale are discussed as follows:

a. Economies of Concentration:

Refer to economies that arise from the availability of skilled labor, better credit, and transportation facilities.

b. Economies of Information:

Imply advantages that are derived from publication related to trade and business. The central research institutions are the source of information for organizations.

c. Economies of Disintegration:

Refer to the economies that arise when organizations split their processes into different processes.

Diseconomies of scale

Diseconomies of scale occur when the long run average costs of the organization increases. It may happen when an organization grows excessively large. In other words, the diseconomies of scale cause larger organizations to produce goods and services at increased costs.

There are two types of diseconomies of scale, namely, internal diseconomies and external diseconomies, discussed as follows:

i. Internal diseconomies of scale:

Refer to diseconomies that raise the cost of production of an organization. The main factors that influence the cost of production of an organization include the lack of decision, supervision, and technical difficulties.

ii. External diseconomies of scale:

Refer to diseconomies that limit the expansion of an organization or industry. The factors that act as restraint to expansion include increased cost of production, scarcity of raw materials, and low supply of skilled laborer.

There are a number of causes for diseconomies of scale.

Some of the causes which lead to diseconomies of scale are as follows:

i. Poor Communication:

Act as a major reason for diseconomies of scale. If production goals and objectives of an organization are not properly communicated to employees within the organization, it may lead to overproduction or production. This may lead to diseconomies of scale. Apart from this, if the communication process of the organization is not strong then the employees would not get adequate feedback. As a result, there would be less face-to-face interaction among employees- thus the production process would be affected.

ii. Lack of Motivation:

Leads to fall in productivity levels. In case of a large organization, workers may feel isolated and are less appreciated for their work, thus their motivation diminishes. Due to poor communication network, it is harder for

employers to interact with the employees and build a sense of belongingness. This leads to fall in the productivity levels of output owing to lack of motivation. This further leads to increase in costs of the organization.

iii. Loss of Control:

Acts as the main problem of large organizations. Monitoring and controlling the work of every employee in a large organization becomes impossible and costly. It is harder to make out that all the employees of an organization are working towards the same goal. It becomes difficult for managers to supervise the sub-ordinates in large organizations.

iv. Cannibalization:

Implies a situation when an organization faces competition from its own product. A small organization faces competition from products of other organizations, whereas sometimes large organizations find that their own products are competing with each other.

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UNIT – V

COST AND REVENUE CONCEPTS

5.1. INTRODUCTION

The organization's decision of maximizing profit depends on the behaviour of its costs and revenues. In general terms, cost refers to an amount to be paid or given up for acquiring any resource or service. In economics, cost can be defined as a monetary valuation of efforts, material, resources, time and utilities consumed, risks incurred, and opportunity forgone in the production of a good or service. An organization incurs a number of costs, such as opportunity costs, fixed costs, implicit costs, explicit costs, social costs, and replacement costs. On the other hand, revenue is the income earned by an organization from the sales of goods or services. It excludes deductions of tax, interest, and dividend paid by an organization. The level of profitability of an organization can be determined by analyzing its costs and revenue. Cost analysis involves the study of total costs incurred by an organization to acquire various resources, such as labor, raw materials, machines, land, and technology. It helps an organization to make various managerial decisions, including determination of price and level of current production. Apart from this, it enables an organization to decide whether to opt for the available alternative or not. On the other hand, revenue analysis is a process of estimating the total income earned by an organization from different' sources. An organization is said to be profitable if its total revenue is more than costs incurred by it.

Concept of Cost:

Cost, a key concept in economics, is the monetary expense incurred 'by organizations for various purposes, such as acquiring resources, producing goods and services, advertising, and hiring workers. In other words, cost can be defined as monetary expenses that are incurred by an organization for a specified tiling or activity.

According to Institute of Cost and Work Accountants (ICWA), cost implies "measurement in monetary terms of the amount of resources used for the purpose of production of goods or rendering services." In terms of manufacturing, costs refer to sum total -of monetary value of resources used

in producing or manufacturing a product. These resources can be raw material, labor, and land.

A cost comprises a number of elements, which are shown in Figure-1:

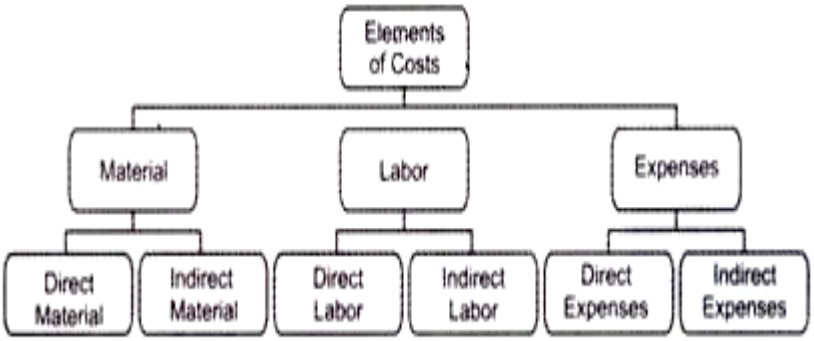


Figure-1: Different Elements of Costs

The different elements of cost (as shown in Figure-1) are explained as follows:

i. Material:

Helps in producing or manufacturing goods. Material implies a substance from which a product is made For example, an organization requires materials, such as bricks and cement for constructing a building.

Material is divided into two categories, which are as follows:

a. Direct Material:

Refers to a material that is directly related to a specific product, job, or process. Direct material becomes an integral part of the finished product.

Some of the examples of direct material are as follows:

1. Timber is raw material for making furniture
2. Sugarcane for making sugar.
3. Textile for garment industry
4. Gold for making jewellery
5. Cans for tinned food and drink

b. Indirect Material:

Refers to a material that is not directly related to a particular product or activity. Such materials cannot be easily identified with the product.

The examples of indirect material are as follows:

1. Oils for lubricating machines
2. Printing and stationary items for publishing books

3. Nails for making furniture

4. Threads for manufacturing garments

ii. Labor:

Acts as an important part of production. An organization requires labor to convert raw materials into finished goods. Labor cost is the main element of cost.

Labor can be of two types, which are discussed as follows:

a. Direct Labor:

Refers to labor that takes an active part in manufacturing a product. This type of labor is also known as process labor, productive labor, or operating labor. The costs related to direct labor are called direct labor costs. These costs vary directly with the change in the level of output, thus it is referred as a variable expense.

b. Indirect Labor:

Refers to labor that is not directly related to the manufacturing of a product. The indirect labor cost may or may not vary with the change in the volume of output. This type of labor is used in the factory, office, and selling and distribution department.

iii. Expenses:

Refer to costs that are incurred in the production of finished goods other than material costs and labor costs.

Expenses are further divided into two parts:

a. Direct Expenses:

Imply the expenses that are directly or easily allocated to a particular cost center or cost units. These expenses are called chargeable expenses. Some of the direct expenses of an organization include acquiring machinery for special processes, fees paid to architects and consultants, and costs of patents and royalties.

b. Indirect Expenses:

Refer to expenses that cannot be allocated to specific cost center or cost units. For example, rent, depreciation, insurance, and taxes of build.

5.2. COST CONCEPTS

Costs are very important in business decision-making. Cost of production provides the floor to pricing. It helps managers to take correct decisions, such as what price to quote, whether to place a particular order for inputs or not whether to abandon or add a product to the existing product line and so on. Ordinarily, costs refer to the money expenses incurred by a firm in the production process. But in economics, cost is used in a broader sense. Here, costs include imputed value of the entrepreneur's own resources and services, as well as the salary of the owner-manager. There are various concepts of cost that a firm considers relevant under various circumstances. To make a better business decision, it is essential to know the fundamental differences and uses of the main concepts of cost.

The kind of cost concept to be used in a particular situation depends upon the business decisions to be made. They are: -

1. Actual Cost and Opportunity Cost
2. Incremental Costs and Sunk Costs
3. Past Cost and Future Costs
4. Short-Run and Long-Run Costs
5. Fixed and Variable Costs
6. Direct and Indirect Costs
7. Sunk, Shutdown, and Abandonment Costs.

1. Actual Cost and Opportunity Cost:

Actual costs mean the actual expenditure incurred for acquiring or producing a good or service. In some other alternative uses, opportunity cost can be defined as the revenue forgone by not making the best alternative use. The concept of opportunity cost is more important and useful to management in making a decision among alternatives. Imputed costs are the costs which are not actually incurred but would have been incurred in the absence of employment of self-owned factors. For example, in the case of an owner-manager, very often the cost of managerial functions is ignored. An imputed cost is a real cost even though it is not recorded in account books of a company and management must not ignore it in making business decisions.

2. Incremental Costs (Differential Costs) and Sunk Costs:

Incremental cost is the additional cost due to a change in the level or nature of business activity. The change may take several forms, e.g., adding a new product line, changing the channel of distribution, adding a new machine, replacing a machine by better machine, expanding to additional markets, etc. Thus, the question of incremental or differential cost would not arise when a business is to be set up afresh. It arises only when a change is contemplated in the existing business.

Sunk cost is one which is not affected or altered by a change in the level or nature of business activity. It will remain the same whatever the level of activity is. The most important example of sunk cost is the amortization of past expenses, e.g., depreciation. The distinction between sunk cost and increment cost assumes importance in evaluating alternatives. Incremental costs will be different in the case of different alternatives. Hence incremental costs are relevant to the management in the analysis for decision making.
Sunk cost, on the other hand, will remain the same irrespective of the alternative selected. Thus, it need not be considered by the management in evaluating the alternatives as it is common to all of them. If the machine is hired, the expenses of installation, servicing and maintenance become the responsibility of the supplier of the machine. If the machine is purchased, the supplier will merely deliver the machine to the buyer.

Now let us analyze the differential costs of the two alternatives. If the machine is hired, the acquisition cost will be confined to the periodic payments of rent. But if the machine is purchased, the acquisition costs will be equal to the price of the machine. Service and maintenance costs will occur only if the machine is purchased; if it is hired, the rent would cover those costs. The operating costs and the space occupancy costs will be the same irrespective of the decision to buy or rent the machine. Thus, the differential costs would be the acquisition costs and the service and maintenance costs as they would be different under the two alternatives. On the other hand, the operating costs and the space occupancy costs are sunk costs as they would be the same under both the alternatives. And for decision making, we have to compare only the differential costs while ignoring the sunk costs.

Whether a cost is sunk cost or a differential cost is a question of fact and can be determined only in the light of the circumstances of each individual case. Thus, a particular cost of item can be a sunk cost in one case and a differential cost in another. Sometimes, differential costs are considered as synonymous with variable costs and sunk costs as synonymous with fixed costs. But this need not always be the case. For example, operating costs are variable but they are not differential costs. The price of the machine, on the other hand, is a differential cost, though it is also a fixed cost. Hence both the variable and the fixed costs must be scrutinized decision.

3. Past Cost and Future Costs:

Past costs are actual costs incurred in the past and are generally contained in the financial accounts? The measurement of past costs is essentially a record-keeping activity and an essentially passive function insofar as the management is concerned. These costs can merely be observed and evaluated in retrospect. If they are regarded as excessive, management can indulge in post-mortem, just to find out the factors responsible for the excessive costs, if any, without being able to do anything for reducing them.

Future costs are costs that are reasonably expected to be incurred in some future period or periods. Their actual incurrence is a forecast and their management is an estimate. Future costs are the only costs that matter for managerial decisions because they are the only costs subject to management control. Unlike past costs, they can be planned for and planned to be avoided. If the future costs are considered too high, the management can either plan to reduce them or find out ways and means to meet them. The major managerial uses where future costs are relevant are as follows – cost control, projection of future profit and loss statements, appraisal of capital expenditure, introduction of new products, expansion programs, and pricing.

4. Short-Run and Long-Run Costs:

Short-run costs are costs that vary with output when fixed plant and capital equipment remain the same. Long-run costs are those which vary with the output when all input factors including plant and equipment vary. Short-run costs become relevant when a firm has to decide whether or not to produce more in the immediate future. In this case setting up of a new plant

is ruled out and the firm has to manage with the given plant. Long-run costs become relevant when the firm has to decide whether to set up a new plant. Long-run costs can help the businessman in planning the best scale of plant or the best size of the firm for his purposes. Thus, long-run costs can be helpful both in the initiation of new enterprises and the expansion of existing ones.

5. Fixed and Variable Costs:

Total costs can be divided into two components – fixed costs and variable costs. Fixed costs remain constant in total regardless of changes in volume up to a certain level of output. They will have to be incurred even when output is nil. There is an inverse relationship between volume and fixed costs per unit. Thus, total fixed costs do not change with a change in volume but vary per unit of volume inversely with volume. If the total production increases, fixed costs per unit will go down and vice versa. Total variable costs vary in direct proportion to changes in volume. An increase in volume means a proportionate increase in the total variable costs and decrease in volume results in a proportionate decline in the total variable costs. There is a linear relationship between volume and total variable costs, but variable costs are constant per unit. The distinction between fixed and variable costs, however, is not a watertight one. Cost may be fixed and variable in each different management decision. Again, it may be noted that the variability of costs is in relation to output and not to the time factor, though in the long run all costs tend to be variable. What is fixed at one level of output may become variable at another level of output.

6. Direct and Indirect Costs:

A direct or traceable cost is one which can be identified easily and indisputably with a unit of operation (costing unit/cost centre). Common or indirect costs are those that are not traceable to any plant, department or operation, or to any individual final product. To take an example, the salary of a divisional manager, when division is a costing unit, will be a direct cost. The monthly salary of the general manager, when one of the divisions is a costing unit, will be an indirect cost. The salary of the manager of the other division is neither a direct nor an indirect cost. Thus, whether a specific cost

is direct or indirect depends upon the costing unit under consideration. The concepts of direct and indirect costs are meaningless without identification of the relevant costing unit.

Common Production Costs (Costs of Multiple Products):

In some manufacturing enterprises, two or more different products emerge from a single, common production process and a single raw material. A familiar example is the variety of petroleum products derived from the refining of crude oil. So also in a shoe factory, the same piece of leather may be used for men's, women's, and children's shoes.

However, for managerial analysis, these costs need not be identified with individual products unless it is meaningful and useful to identify them.

7. Sunk, Shutdown, and Abandonment Costs:

A past cost resulting from a decision which can no more be revised is called a sunk cost. In other words, sunk cost is a cost once incurred but cannot be retrieved. It is usually associated with the commitment of funds to specialized equipment or other facilities not readily adaptable to present or future use, e.g., brewery plant in times of prohibition. Shutdown costs may be defined as those costs which would be incurred in the event of suspension of the plant operation and which would be saved if the operations are continued. Examples of such costs are the costs of sheltering the plant and equipment and construction of sheds for storing exposed property. Further, additional expenses may have to be incurred when operations are restarted. For example, re-employment of workers may involve cost of recruitment and training. Abandonment costs are the costs of retiring altogether a plant from service. Abandonment arises when there is a complete cessation of activities and creates a problem as to the disposal of assets; for example, the costs involved in the discontinuance of tram services in Bombay and Delhi. These costs become important when management is faced with the alternative of either continuing the existing plant or suspending its operations or abandoning it altogether.

5.3. FIXED COST AND VARIABLE COST:

The short run, there are some factors which are fixed, while others are variable. Similarly, short run costs are also divided into two kinds of costs:

(i) Fixed Costs

(ii) Variable Costs

The sum total of fixed cost and variable cost is equal to total cost. Let us discuss the short run costs in detail.

Total Fixed Cost (TFC) or Fixed Cost (FC):

Fixed Costs refer to those costs which do not vary directly with the level of output. For example, rent of premises, interest on loan, salary of permanent staff, insurance premium, etc. Fixed Cost is also known as:

(i) Supplementary Cost; or

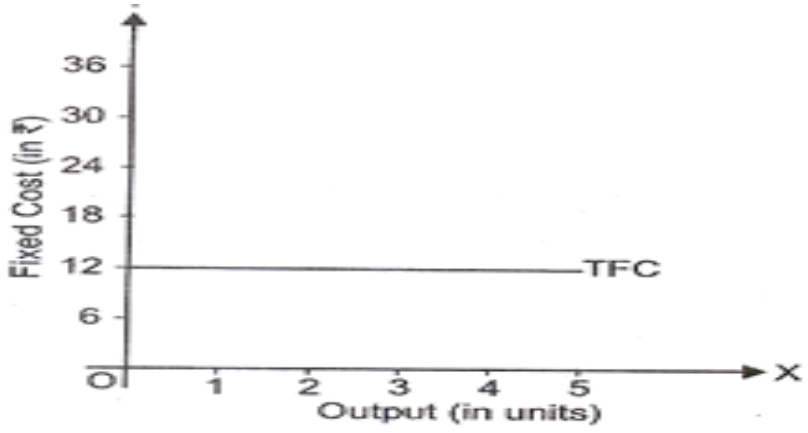
(ii) Overhead Cost; or

(iii) Indirect Cost; or

(iv) General Cost; or

(v) Unavoidable Cost.

Fixed cost is incurred on fixed factors like machinery, land, building, etc., which cannot be changed in the short run. The payment to these factors remains fixed irrespective of the level of output, i.e. fixed cost remains the same, whether output is large, small or even zero. TFC curve is a horizontal straight line parallel to X-axis showing that total fixed costs remain same (Rs. 12) at all levels of output. Fixed costs are diagrammatically shown in Fig. 1.1. Units of output are measured along the X-axis and fixed costs along the Y-axis. The curve makes an intercept on the Y-axis, which is equal to the fixed cost of Rs. 12. TFC curve is a horizontal straight line parallel to the X-axis because TFC remains same at all levels of output, even if the output is zero.



Total Fixed Cost Curve

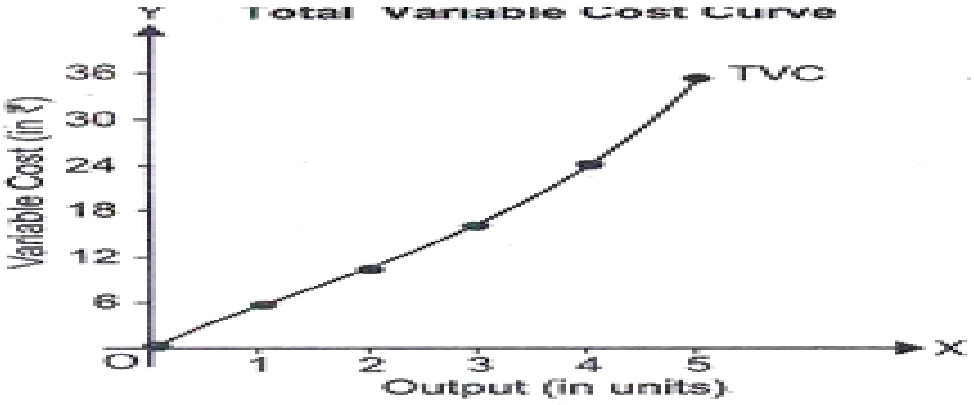
Total Variable Cost (TVC) or Variable Cost (VC):

Variable costs refer to those costs which vary directly with the level of output. For example, payment for raw material, power, fuel, wages of casual labour, etc. Variable costs are incurred on variable factors like raw material, direct labour, power, etc., which changes with change in level of output. It means, variable costs rise with increase in the output and fall with decrease in the output. Such costs are incurred till there is production and become zero at zero level of output. Variable cost is also known as 'Prime Cost', 'Direct Cost' or 'Avoidable Cost'. In Fig. 1.2, units of output are measured along the X-axis and variable cost along the Y-axis. As seen in the diagram, TVC curve starts from the origin indicating that when output is zero, variable cost is also zero. TVC is an inversely S-shaped curve due to the Law of Variable Proportions.

Total Cost (TC):

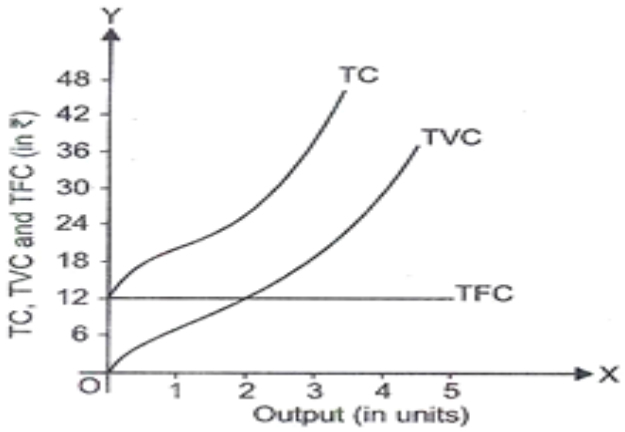
Total Cost (TC) is the total expenditure incurred by a firm on the factors of production required for the production of a commodity. TC is the sum of total fixed cost (TFC) and total variable cost (TVC) at various levels of output.

TC = TFC + TVC



Total Variable Cost Curve

Since TFC remains same at all levels of output, the change in TC is entirely due to TVC.



Total cost

i. TC curve is also inversely S-shaped as TC derive its shape from TVC.

ii. TC is equal to TFC (Rs. 12) at zero output.

iii. TC and TVC curves are parallel to each other as vertical distance between them is TFC, which remains constant at all output levels.

At 1 unit of output, TFC remains same at Rs. 12, but TVC increases to t 6. As a result, TC becomes 12 + 6 = Rs. 18. Similarly, other values of TC have been calculated. In Fig. 1.3, TC curve is obtained by summation of TVC and TFC curve. The change in TC curve is entirely due to TVC as TFC remains constant. By adding TFC to TVC curve, we get the TC curve. The vertical distance between TC and TVC always remains the same due to constant TFC. Like TVC curve, TC curve is also inversely S-shaped, due to the Law of Variable Proportions. The change in TC is entirely due to TVC as TFC is constant at all levels of output, TC = TFC at zero output as variable cost is zero. With increase in output, TC also increases by the extent of increase in TVC.

5.4 AVERAGE COST AND MARGINAL COST

Introduction

The relationship between marginal cost and average cost.

The three cost curves TC, AC and MC describe the same physical data and are, therefore, related mathematically. Let TC (q) be the total cost of output q, AC (q), is defined as the total cost divided by the amount produced, or

$$AC(q) = TC(q)/q \ldots. (1)$$

Marginal cost, MC (q), is defined, precisely enough for our purposes, as the increase in total cost imposed by a unit increase in output.

Therefore:

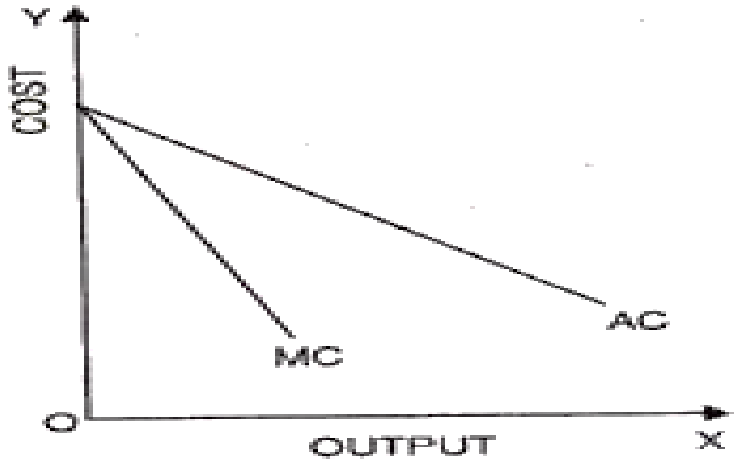
MC (q) = TC (q + 1) – TC (q) … (2)

The relationship between average cost and marginal cost can also be studied in the context of laws of return.

It can be explained as under:

(i) Law of Increasing Returns or the Law of Diminishing Costs:

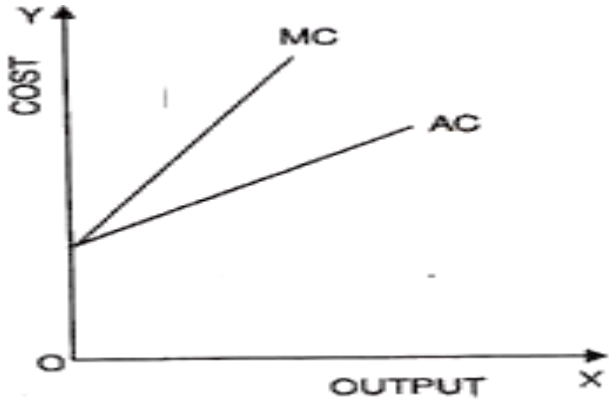
When a firm produces under the law of increasing returns, it means that as it employs more and more factors of production, its output increases at an increasing rate. In such a situation both the average cost and marginal cost slope downward, but the downward slope of MC curve is more than that of AC curve. From Figure 1.4 it becomes clear that when due to the operation of the law of increasing returns, average cost falls, marginal cost also falls. The fall in marginal cost is much more than the average cost, so the marginal cost remains below the average cost.



Law of increasing returns

(ii) Law of Diminishing Returns or Increasing Costs:

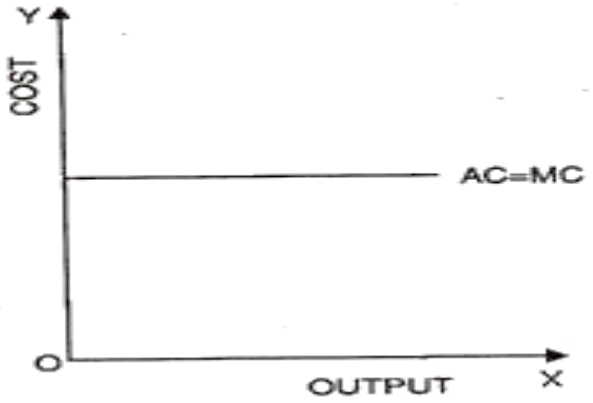
If a firm operates under the law of diminishing returns, it means its output increases at diminishing rate as it employs more and more units of factors of production. In this case, if AC increases MC also increases. The increase in MC will be much more than the increase in AC. It can be shown with the help of figure 1.5. The Figure depicts that as AC increases MC also increases at a faster rate than the AC. Therefore, the curve MC remains above the curve AC.



Law of diminishing returns

(iii) Law of Constant Returns or Constant Costs:

According to the law of constant returns when a firm employs more and more factors, output increases at a constant rate. Therefore, the average cost curve as well as marginal cost curve remains parallel to horizontal axis. This can be made clear with the help of diagram 1.6. In the diagram output has been measured on OX- axis while costs on OY-axis. Here, we see that AC = MC and both are parallel to X-axis.

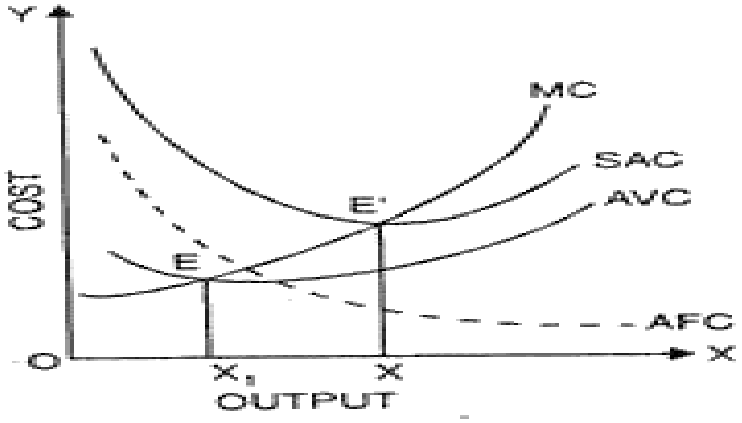


Law of Constant returns

Relationship of Different Cost Curves in Short Period:

In Figure, the relationship between different cost curves can be explained with the help of figure 1.7. In Fig. AFC is the average fixed cost curve which slopes downward. It indicates that as production increases, AFC goes on falling. In the beginning, it slopes steeply but later on rate of fall slows down. AVC is the average variable cost. It falls up to point E and then rises upward. SAC is the short run average cost curve having U-shape. The minimum point E of AVC occurs earlier than the minimum point E' of SAC. MC passes from the

minimum points of both AVC and SAC through the points E and E' respectively.



Short period

Costs in Long Run Period:

Long-run is a period in which there is sufficient time to alter the equipment and the scale or organization with a view to produce different quantities of output. In other words, if we want to change output, it can be done by changing all the factors. It is due to the reason that in the long-run, all the factors are variable. According to Koutsoyiannis, "In the long-run, all the factors of production are assumed to be variable."

Long Run Total Cost:

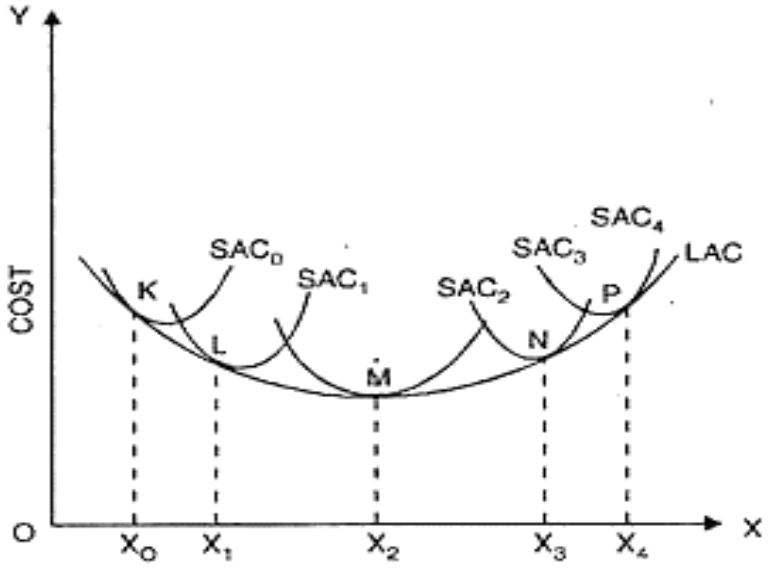
Long run total cost is always less than or equal to short run total cost, but it is never more than short run total cost. Long run total cost curve represents the least cost of different quantities of output. Therefore, it is tangent to any given point, on short run total cost. There are three different types of long run total cost curves are shown. LTC_1 has been drawn on the assumption that as output is increased, cost at first rises at diminishing rate and then at increasing rate. LTC_1 has been drawn on the assumption that increase in output is followed by rise in cost at constant rate. LTC_3 has been drawn on the assumption that as output increases, cost rises at diminishing rate. Long run cost curve always begins from the point of origin while short run cost curve begins from any point on OY-axis. It means that all costs in long run are variable when quantity of output is zero, total costs also reduced to zero.

Long-Run Average Cost Curve:

Long-run average cost is the long run total cost divided by the level of output.

LAC = LTC / Q

Similarly, J.S. Bain has defined the long-run average cost as, "The long-run average cost curve shows for each possible output, the lowest cost of producing that output in the long run." Moreover, in the long-run, each firm can make use of different sizes of plants. A given level of output can be had from a special plant to which it is appropriated. If, such a plant is put to operation, goods will be produced at the lowest average cost. Thus, a rational producer in the long- run will choose to produce with the help of such a plant. Now, the question is how to find out this long-run average cost curve. The answer is very simple. We can derive the LAC from the short-run average cost curves.



Long run average cost curve

In Figure 1.8 long-run average cost has been shown. The long- run average cost curve is tangent to different short run average cost curves. In order to produce OX_0 level of output, the corresponding point on LAC is K at which it 1S tangent to SAC_0. Therefore, if a firm is willing to produce OX_0 level of output, it will construct a plant corresponding to SAC_0 and will operate on this curve at point K.

Different Names of LAC:

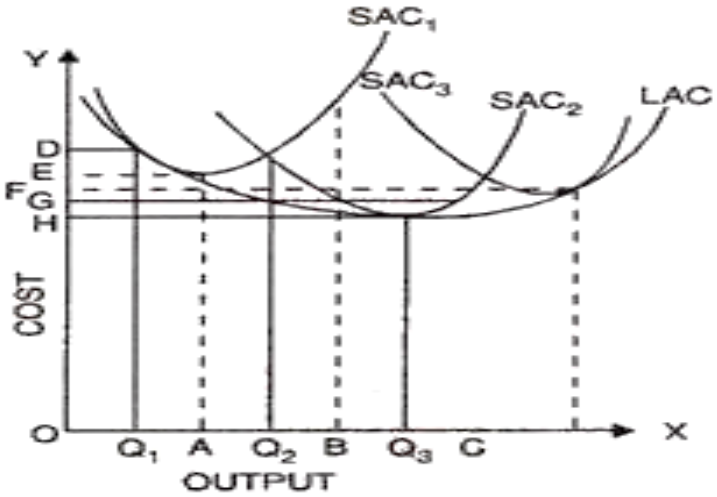
LAC is also known by the following names:

(i) Envelope curve:

LAC is also known as envelope curve because it envelopes all the SAC curves. It indicates that LAC cannot exceed SAC. As in the long-run indivisible factors can be used to their full capacity, therefore, LAC curve will be surrounding the SAC. It will not cut SAC curves or rise upward.

(ii) Planning curve:

LAC is also known as planning curve. With its help, a firm can plan as to which plant; it should use to produce different quantities of output so that production is obtained at minimum cost. This fact can also be explained with the help of fig.



Short run average cost curve

In the Fig. 1.9, short-run average cost curves of all the three types of plants have been shown. If the firm has to produce OQ_1 output, it will select small plant. If it wants to produce OQ3 level of output, it will select the large output plant. If the firm begins production with the small plant and demand for its product rises slowly, it will produce at minimum cost up to OA quantity of output. After OA amount of output its cost begins to rise. In case, demand for the product of the firm increases to OB then the firm will produce either with small or medium plant.

Relationship between LAC and SAC:

The relationship between LAC and SAC can be explained with the help of Fig. 1.10

(1) Representation:

SAC represents the costs of a single plant, whereas LAC represents the costs of different plants.

(2) Shape:

Like SAC, LAC is also U-shaped but it is relatively flatter. The U-shape of LAC is less pronounced as compared to SAC. It indicates that in the long run, increase or decrease in costs is relatively less. It is so because LAC represents the minimum average cost of different quantities of output so there exists less possibilities of fluctuations.

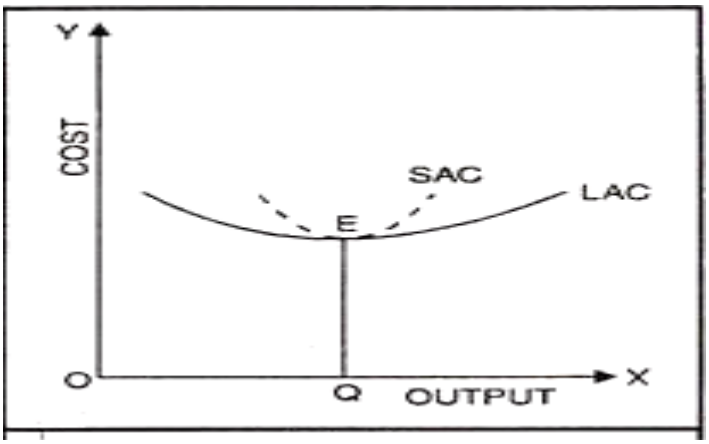


Fig.1.10. LAC and SAC

(3) LAC does not Exceed SAC:

LAC cannot be more than SAC. It is so because LAC is tangent to SAC

(4) LAC Not Tangent to all SAC at their minimum points:

Except to one SAC curve, LAC is not tangent to SAC curve at their minimum point. It will be tangent to that SAC curve at its minimum point which coincides with the minimum point of LAC.

Long-Run Marginal Cost:

Long-run marginal cost shows the change in total cost due to the production of one more unit of commodity. According to Robert, "Long-run marginal cost curve is that which shows the extra cost incurred in producing one more unit of output when all inputs can be changed."

$LMC = \Delta LTC / \Delta Q$

Where

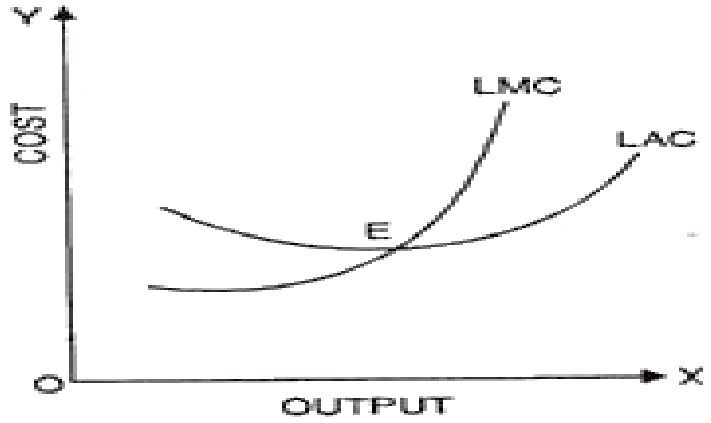
LMC = Long run Marginal Cost

ΔLTC = Change in Long-Run Total Cost

ΔQ = Change in Output

Relation between LMC and LAC:

Generally, the relation between long-run marginal cost and long run average cost is similar to that of what it is in short run AC and MC. But the only difference in LAC and LMC is that long run marginal and average costs are more flat than that of SAC and SMC. It is so because in the long run all factors are variable. It can be shown with the help of a figure 1.11.

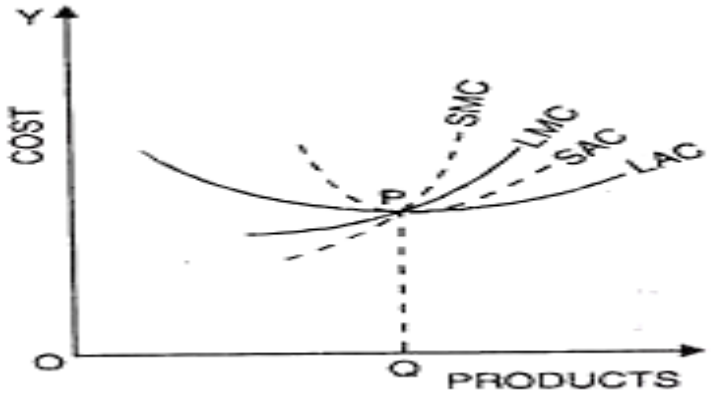


LMC and LAC

In Figure 1.11 when LAC is falling, LMC also falls but the fall in LMC is greater than that of LAC. At a minimum point i.e. E, LMC is equal to LAC. In the same fashion when LAC raises LMC also rises. But the increase in LMC is more than the increase in LAC.

Relation between LMC and SMC:

SMC refers to the effect on total cost due to the production of one more unit of output on account of change in variable factors. LMC refers to change in total cost due to production of one more or less unit of output due to change in all factors. When a firm selects a proper scale of plant in order to produce a given quantity of output then at this level of output short run and long run marginal cost curves are equal. This can be shown with the help of fig. 1.12.



LMC and SMC

In Fig. 1.12. OQ is the optimum level of output SMC = LMC. If output is less than the optimum level OQ, then SMC will be less while LMC will be relatively more. On the other hand, if output is more than the optimum level, SMC will be more while LMC will be relatively less.

5.5 MODERN THEORY OF COST CURVES:

Modern theories of costs have been provided by economists like Stigler, Andrews, Sargent, Florence and Friedman etc. According to traditional theory of costs, costs are of U-shape. But according to modern economists, in real life cost curves are L-shaped.

Modern Theory of Short Run Cost Curves:

Like traditional theory modern theory also studies four types of short run cost curves as Average fixed cost, Average variable cost, average cost & marginal cost.

Average Fixed Costs:

This is the cost of indirect factors, that is, the cost of the physical and personal organization of the firm.

The fixed costs include costs on account of:

(1) The salaries and other expenses of administrative staff;

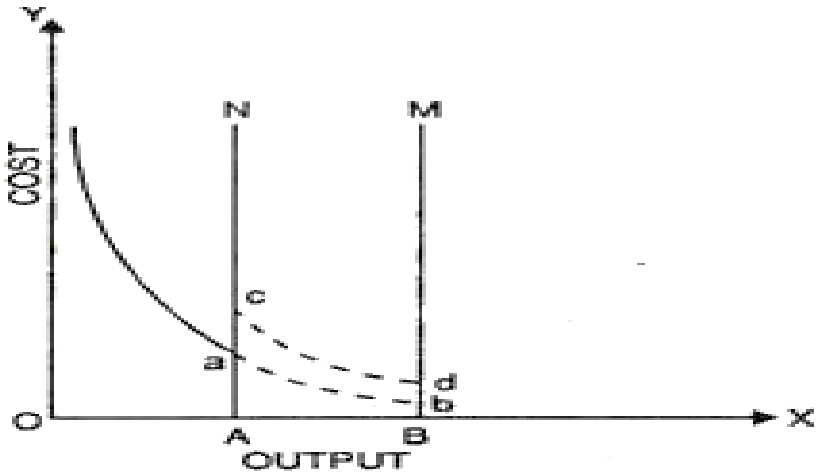
(2) Salaries of staff involved directly in production but paid on a fixed-term basis;

(3) The depreciation of machinery;

(4) Expenses on account of the maintenance of the factory-buildings;

(5) Expenses connected with the maintenance of land on which the plant is installed and operated.

The average fixed cost curve, under these circumstances will be as shown in Figure the firm has some largest capacity units of machinery which set an absolute limit to expansion of output in the short run. This is indicated by boundary line M in the diagram. The firm also has some small sized machinery which set a limit to expansion. This is shown by the boundary line N.N, however, is not an absolute limit because the firm can expand its short run output up to M by paying overtime to labour for working longer hours. In this case, the AFC is shown by the dotted line ab. The firm can also expand output by purchasing some additional small-sized machinery. In this case, the AFC shifts upwards and starts falling again, as shown by the dotted line CD.

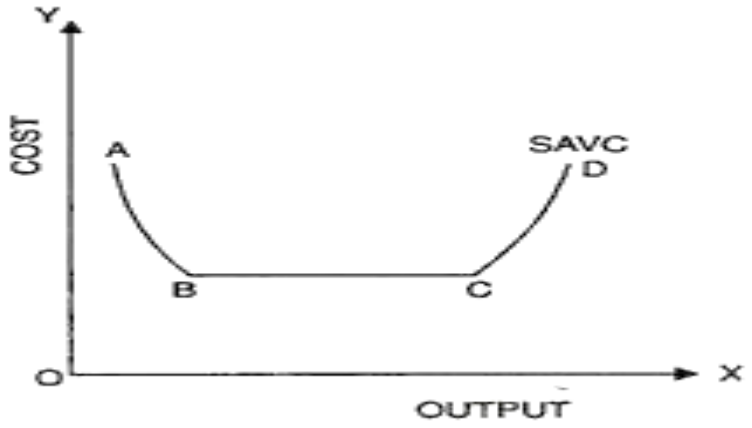


Average Fixed Cost Curve

Average Variable Cost:

In modern economics, the average variable cost includes wages of labour employed, cost of raw- material, and running expenses of machinery. The short run average variable cost curve in modern-micro economic theory is saucer-shaped, that is, it is broadly U-shaped but has a flat stretch over a range of output. This flat stretch represents the built-in reserve capacity of the plant. Over this flat stretch, the SAVC is equal to the MC, both being constant per unit of output. To the left of the flat stretch, MC lies below the SAVC, while to the right of the flat stretch; marginal cost rises above the SAVC. The falling portion of the SAVC shows reduction in costs due to better utilization of the fixed factor like machinery and also due to improvement in the skill and efficiency of labour. Better efficiency of labour helps in reducing

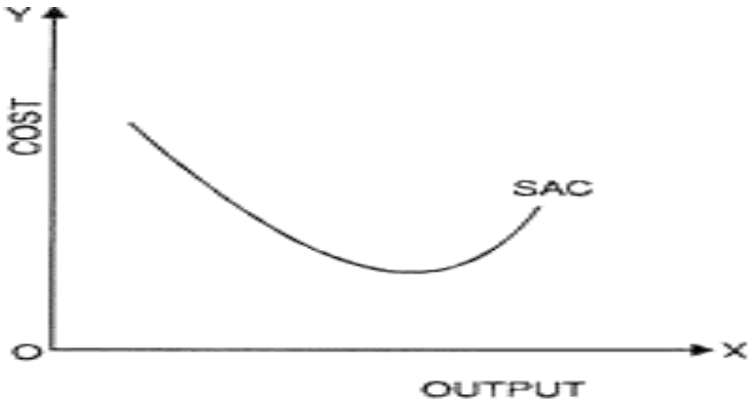
wastage of raw-material and achieving better utilization of the whole plant. On the other hand, rising portion of the SAVC curve indicates declining labour efficiency due to longer hours of work, rising costs due to payment of over-time wages, frequent breakdown of machinery, and wastage of raw-materials. This has been shown in Figure.



Average Variable Cost

Short Run Average Cost Curve:

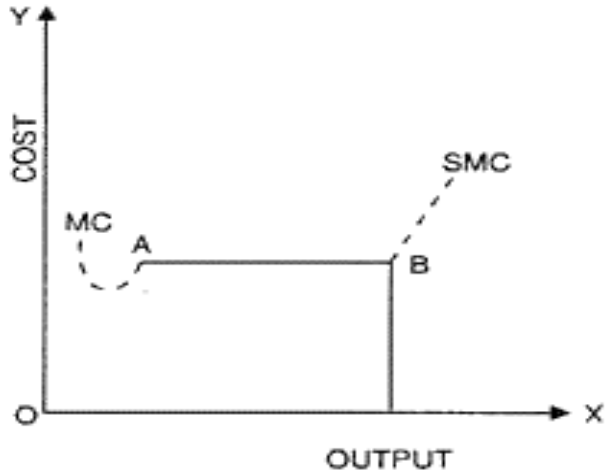
According to modern economists, short run average cost curve is continuously falling up to a given level of output. This given level of output represents reserved capacity output. Thereafter, average cost curve rising upward meaning thereby that average cost will rise rapidly if output is increased beyond reserved capacity. This is shown with the help of figure.



Short run Average Cost Curve

Short Run Marginal Cost Curve:

In the initial stages, SMC, to modem economist's falls, from point A to B it becomes horizontal. Moreover, from A to B marginal cost is equal to average variable-cost. In this situation, production takes place under reserved capacity as shown in Figure.



Short Run Marginal Cost Curve

Reasons for U shaped curve:

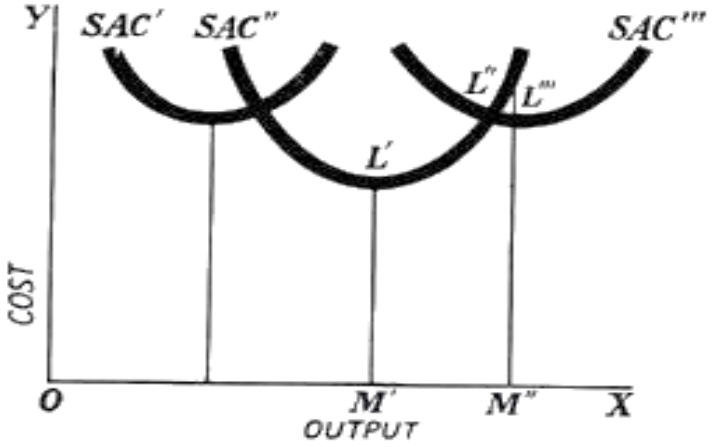
Short-run is meant that period of time within which a firm can vary its output by varying only the amount of variable factors, such as labour and raw material. In the short-run period, the fixed factors such as capital equipment, management personnel, the factory buildings, etc., cannot be altered. If, therefore, a firm wants to increase production in the short-run, it can do so only by hiring more workers or buying and using more raw materials. It cannot, in the short-run, enlarge the size of the existing plant or build a new plant of a bigger capacity. Thus, in the short-run, only variable factors can be varied, while the fixed factors remain the same. On the other hand, long-run is a period of time during which the quantities of all factors, variable as well as fixed, can be adjusted. Thus, in the long-run, output can be increased by increasing capital equipment or by increasing the size of the existing plant or by installing a new plant of bigger capacity.

5.6. Short-run Fixed and Variable Costs:

We have already drawn a distinction between prime (or variable) costs and supplementary (or fixed) costs. During the short period, only the prime costs relating to labour and raw materials can be varied, whereas the fixed costs remain the same. But, during the long period, even the fixed costs relating to plant and machinery, staff salaries, etc., can be varied. That is, in the long run, all costs are variable, and no costs are fixed.

Short-run Cost Curves:

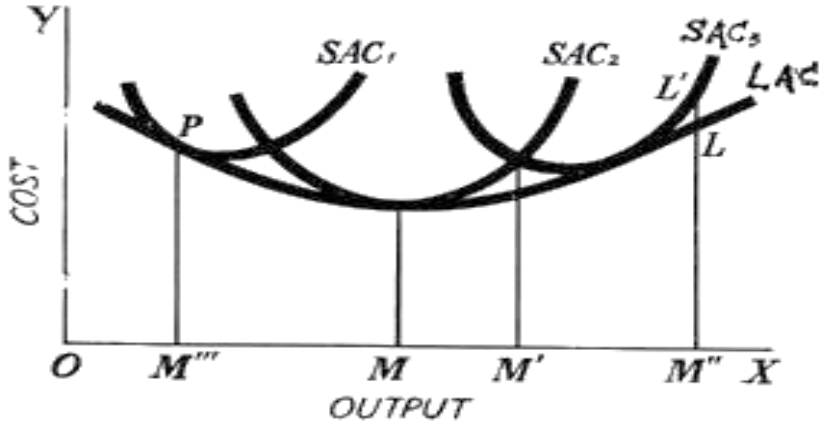
We may repeat that, in the short-run, a firm will adjust output to demand by varying the variable factors. If all the factors of production can be used in varying proportions, it means that the scale of operations of the firm can be changed. Each time, the scale of operations is changed, a new short-run cost curve will have to be drawn for the firm such as SAC', SAC" and SAC" in the next diagram (Fig. 1.17).



Short run cost curves

To begin with, let us suppose that the firm has the short-run cost curve SAC. In this case, the optimum output will be OM'. Now, if it is desired to increase the output to OM" in the short-run, it can be obtained at the average cost M"L" along the short-run cost curve SAC", because in the short-run, the scale of operations is fixed. But, in the long run, a new and bigger plant can be built on which OM" is the optimum output. That is, the firm has now a short-run average cost curve SAC "', and by increasing the scale of its operations, the firm can produce the OM" output at a cost of M "L" 'instead of M "L".

Thus, it will be seen that, at any scale of operations in the short-run, a firm will have regions of rising and falling costs. But, in the long-run, the firm can produce on a completely different cost curves to the left (i.e., SAC') or righ **LAC**



LAC Curve : An Envelope

(i.e., SAC"') of the original cost curve (i.e., SAC"). For each different scale represented by a different short-run cost curve, there will be an output where the average cost is the minimum. This is the optimum output.

Long-run Average Cost Curve:

In the diagram, SAC, SAC, and SAC, are the short-run cost curves corresponding to the different scales of operations. In each case, the firm in question will be producing the desired output at the lowest cost. For example, OM"' output is produced at PM"' in the scale of operations represented by the curve SAC OM will be produced on SAC, and so on.

It should be clearly understood that only in the long-run can the scale of operations be altered; in the short-run, it will be fixed, and the average cost of output above or below the optimum level will necessarily rise along the short-run cost curve in question, whether it be SAC,, SAC $_2$ and SAC_3. A long-run average cost will show what the long-run cost of producing each output will be. It will be seen, in the Figure that the short-run average cost curve SAC, has a lower minimum point than either the curves SAC, and SAC_3. The optimum output of the firm is obtained at OM.

The long-run average cost curve LAC is a tangent to all the short-run cost curves SAC, SAC_2 and SAC. The LAC curve will, therefore, be U-shaped like the short-run cost curves, but its U-shape will be less pronounced than that of the short-run cost curves. It will be flatter. That is why the long-run cost curve is called an 'Envelope', because it envelops all the short-run cost

curves. The cost curves, whether short-run or long-run, are U-shaped because the cost of production first starts falling as output is increased owing to the various economies of scale. But after touching the lowest point at the optimum output level, it starts rising, and goes on rising if production is continued beyond the optimum level.

This obviously makes a U-shape. But, as we have said already, the U-shape of the long-run cost curves is less pronounced. In other words, the long-run average costs are flatter than the short-run curves. The longer the period to which the curve relates, the less pronounced will be the U-shape of the cost curves. By the long period, we mean the period during which the size and organisation of the firm can be altered to meet the changed conditions.

Why is the Long-run Cost Curves Flatter? The answer can be given in terms of fixed and variable costs. We have said before that no costs are fixed in the long-run, i.e., in the long run all costs are variable. In other words, the longer the period, the fewer costs will be fixed and the more costs will be variable. That is, in the long period, the total fixed costs can be varied, whereas in the short period, this amount is fixed absolutely.

In the short-run, if output is reduced, average cost will rise because the fixed costs will work out at a higher figure. But, in the long-run, fixed costs can be reduced if the output is continued at the low level. Hence, average fixed cost will be lower in the long than in the short run. The variable costs will not rise as sharply in the long-run as in the short-run, because in the long-run, the size of the firm can be increased to deal more economically with an increased output. Thus, LAC curves are flatter than the short-run cost curves, because, in the long-run, the average fixed cost will be lower, and variable costs will not rise to sharply as in the short period.

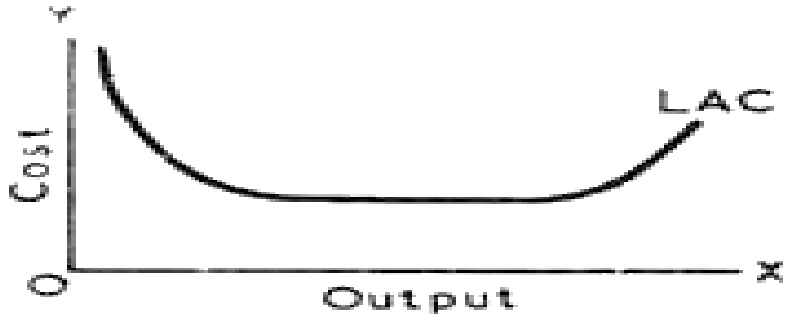
Why Are Long-Run Cost Curves U-Shaped?

We have explained above that the long-run cost-curves are U-Shaped. That is, as output is increased, the cost per unit falls, then it reaches a minimum after which it starts ascending so that it takes the shape of U. How do we account for this U-shape? The reason is that the cost curve falls on account of the various economies of scale. But when the firm has expanded too much, economies are changed into diseconomies and the cost curve starts rising.

Dish-Shaped Cost Curves:

Empirical studies have further revealed that there is relatively very large flat portion or a large horizontal region in the centre of the long-run average cost curve. This means that for a considerable range of production, the long-run average cost remains the same and then it moves up at the right and making a sort of dish or saucer.

This means that the economies of scale are exhausted at some scale of operation, but diseconomies do not occur yet. But after the scale is enlarged

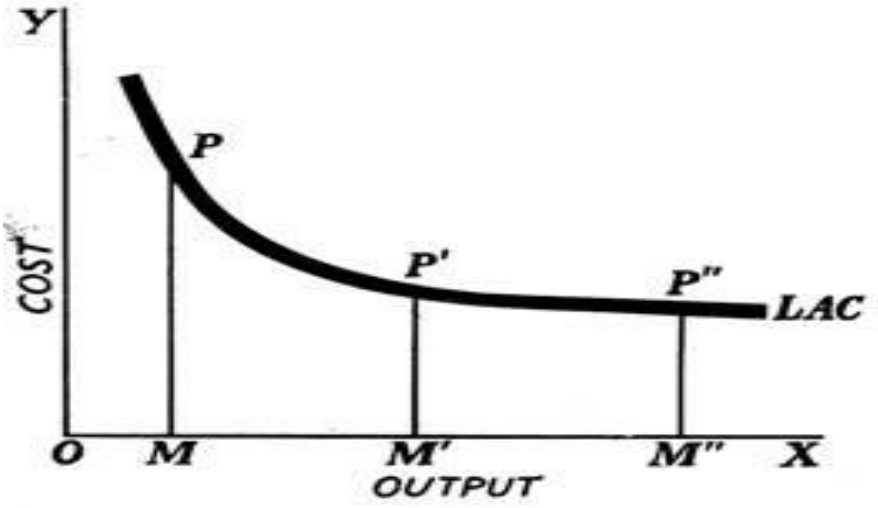


Dish-Shaped LAC Curve

beyond a point, dis-economies emerge and bring about a rise in the long-run average cost and thus give the curve a saucer or dish shape.

L-shaped Cost Curves:

Recently some economists have put forward the view based on recent empirical studies that the cost curves take the shape of 'L' and not 'U'. According to them, the shape of the long-run cost curve will be something as is given in Fig. 1.18. In this diagram, first OM is output produced and PM is the average cost of production including both the fixed and variable costs. When the output is expanded to OM", the cost is P'M', and when output is further increased to OM", the cost is P"M" which is almost equal to P'M'. From this point onwards, the cost per unit is stabilized so that, whatever the output,



the cost per unit remains practically the same and the LAC comes to have L-shape. This means that the cost first falls over a range of output, and then it neither rises nor falls but remains flat.

The following two reasons are given in support of the L-shape:

(i) Rapid technical progress brings about a sharp decline in unit cost up to a certain point and then stabilizes it.

(ii) With lapse of time the producer learns to produce at lower cost.

5.7. REVENUE CONCEPTS:

Revenue refers to the amount received by a firm from the sale of a given quantity of a commodity in the market. Revenue is a very important concept in economic analysis. It is directly influenced by sales level, i.e., as sales increases, revenue also increases.

5.7.1. Revenue Types: Total, Average and Marginal Revenue

The term revenue refers to the income obtained by a firm through the sale of goods at different prices. In the words of Dooley, 'the revenue of a firm is its sales, receipts or income'. The revenue concepts are concerned with Total Revenue, Average Revenue and Marginal Revenue.

1. Total Revenue:

The income earned by a seller or producer after selling the output is called the total revenue. In fact, total revenue is the multiple of price and output. The behaviour of total revenue depends on the market where the firm produces or sells. "Total revenue is the sum of all sales, receipts or income of a firm." - Dooley

"Total revenue at any output is equal to price per unit multiplied by quantity sold."- Stonier and Hague

Thus,

$$TR = AR \times Q$$

where TR = Total Revenue
AR = Average Revenue or Price per Unit
Q = Output

For example if the price of a commodity is Rs. 100 and total units sold are 20 in that case total revenue will be

$$TR = 100 \times 20 = 200$$
$$TR = 2000$$

2. Average Revenue:

Average revenue refers to the revenue obtained by the seller by selling the per unit commodity. It is obtained by dividing the total revenue by total output. "The average revenue curve shows that the price of the firm's product is the same at each level of output." Stonier and Hague.

Thus :

$$AR = \frac{TR}{Q}$$

where AR = Average Revenue
TR = Total Revenue
Q = Output

According to **McDonnell**, "Average Revenue is the per unit revenue received from the sale of one unit of a commodity."

$$TR = \text{Price} \times \text{Output}$$
$$TR = Pq$$
$$AR = \frac{Pq}{q} = P$$

and $P = f(Q)$ is an average curve which shows that price is a function of quantity demanded. It is also a demand curve.

3. Marginal Revenue:

Marginal revenue is the net revenue obtained by selling an additional unit of the commodity. "Marginal revenue is the change in total revenue which results from the sale of one more or one less unit of output." Ferguson. Thus, marginal revenue is the addition made to the total revenue by selling one more unit of the good. In algebraic terms, marginal revenue is the net addition to the total revenue by selling n units of a commodity instead of n – 1.

Total Revenue, Average Revenue and Marginal Revenue:

The relation of total revenue, average revenue and marginal revenue can be explained with the help of table and fig.

Table Representation:

The relationship between TR, AR and MR can be expressed with the help of a table.

Table 1

Unit (q)	TR/q AR or Price	(Pq) TR	($TR_n - TR_{n-1}$) MR
1	10	10	10
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	– 2
8	3	24	– 4
9	2	18	– 6
10	1	10	– 8

From the table we can draw the idea that as the price falls from Rs. 10 to Re. 1, the output sold increases from 1 to 10. Total revenue increases from 10 to 30, at 5 units. However, at 6th unit it becomes constant and ultimately starts falling at next unit i.e. 7th. In the same way, when AR falls, MR falls more and becomes zero at 6th unit and then negative. Therefore, it is clear that when AR falls, MR also falls more than that of AR: TR increases initially at a diminishing rate, it reaches maximum and then starts falling.

The formula to calculate TR, AR and MR is as under:

$TR = P \times q$

Or $TR = MR_1 + MR_2 + MR_3 + MR_3 + \ldots\ldots MR_{„}$

TR

$AR = TR/q$ $MR = TR_n - TR_{n\_x}$

In fig. 1.20 (A) and (B) three concepts of revenue have been explained. The units of output have been shown on horizontal axis while revenue on vertical axis. Here TR, AR, MR are total revenue, average revenue and marginal revenue curves respectively.

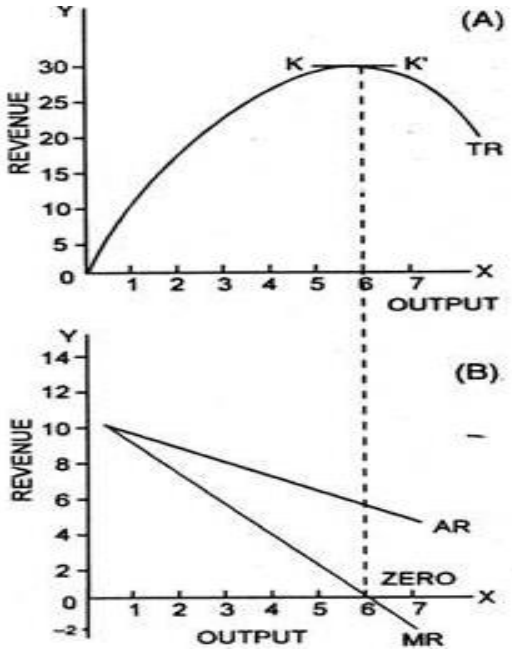


Fig.1.20 (A) and (B)

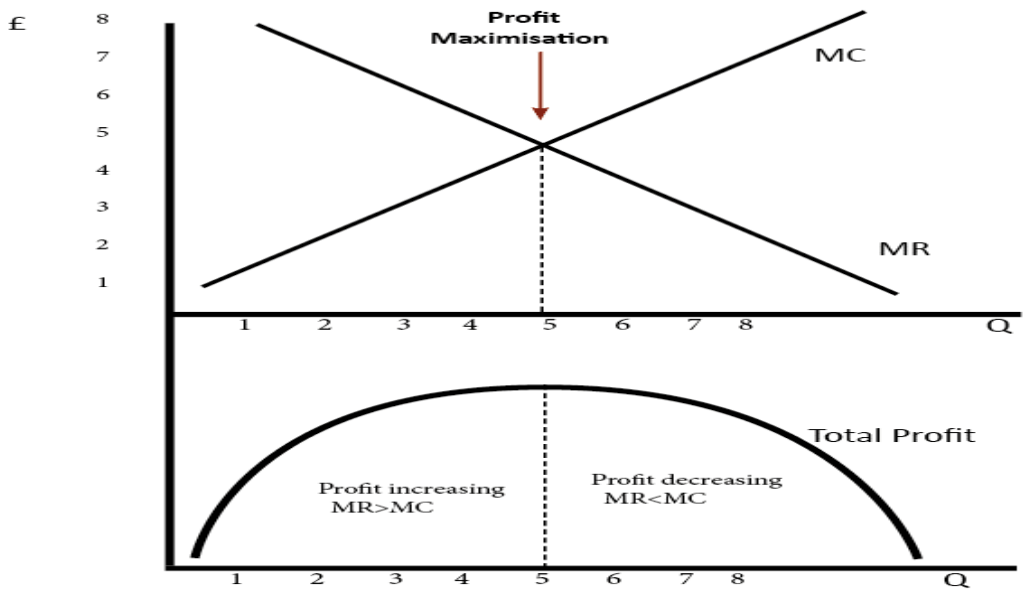
In figure 1.20 (A), a total revenue curve is sloping upward from the origin to point K. From point K to K' total revenue is constant. But at point K' total revenue is maximum and begins to fall. It means even by selling more units total revenue is falling. In such a situation, marginal revenue becomes negative. Similarly, in the figure 1.20 (B) average revenue curves are sloping downward. It means average revenue falls as more and more units are sold. In fig. 1.20 (B) MR is the marginal revenue curve which slopes downward. It signifies the fact that MR with the sale of every additional unit tends to diminish. Moreover, it is also clear from the fig. that when both AR and MR are falling, MR is less than AR. MR can be zero, positive or negative but AR is always positive.

5.8. PROFIT MAXIMIZATION RULE

An assumption in classical economics is that firms seek to maximise profits.

Profit = Total Revenue (TR) – Total Costs (TC). Therefore, profit maximisation occurs at the biggest gap between total revenue and total costs. A firm can maximise profits if it produces at an output where marginal revenue (MR) = marginal cost (MC)

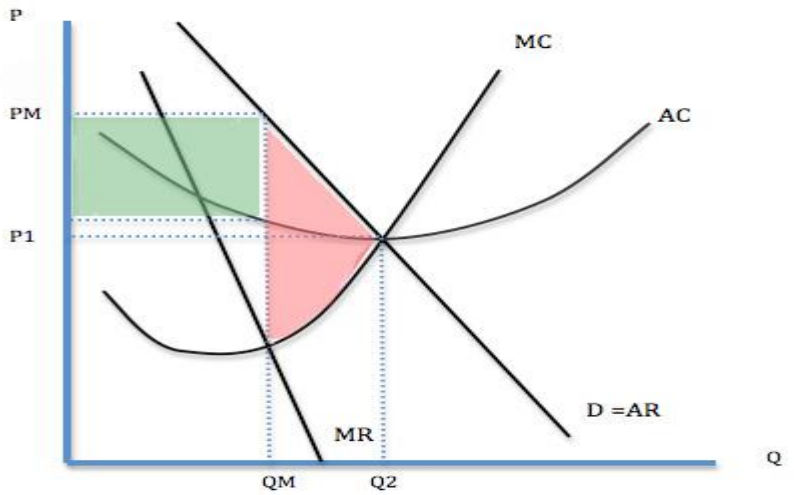
Diagram of Profit Maximisation



To understand this principle look at the above diagram.

If the firm produces less than Output of 5, MR is greater than MC. Therefore, for this extra output, the firm is gaining more revenue than it is paying in costs, and total profit will increase. At an output of 4, MR is only just greater than MC; therefore, there is only a small increase in profit, but profit is still rising. However, after the output of 5, the marginal cost of the output is greater than the marginal revenue. This means the firm will see a fall in its profit level because the cost of these extra units is greater than revenue.

Profit maximisation for a monopoly



In this diagram, the monopoly maximises profit where MR=MC – at Qm. This enables the firm to make supernormal profits (green area). Note, the firm could produce more and still make normal profit. But, to maximise profit, it involves setting a higher price and lower quantity than a competitive market.

Note, the firm could produce more and still make a normal profit. But, to maximise profit, it involves setting a higher price and lower quantity than a competitive market. Therefore, in a monopoly profit maximisation involves selling a lower quantity and at a higher price. In perfect competition, the same rule for profit maximisation still applies. The firm maximises profit

Limitations of Profit Maximisation

a) In the real world, it is not so easy to know exactly your marginal revenue and the marginal cost of last goods sold. For example, it is difficult for firms to know the price elasticity of demand for their good – which determines the MR.
b) It also depends on how other firms react. If they increase the price, and other firms follow, demand may be inelastic. But, if they are the only firm to increase the price, demand will be elastic (see: kinked demand curve and game theory.)
c) However, firms can make a best estimation. Many firms may have to seek profit maximisation through trial and error. e.g. if they see increasing price leads to a smaller % fall in demand they will try to increase price as much as they can before demand becomes elastic
d) It is difficult to isolate the effect of changing the price on demand. Demand may change due to many other factors apart from price. Firms may also have other objectives and considerations. For example, increasing the price to maximise profits in the short run could encourage more firms to enter the market; therefore firms may decide to make less than maximum profits and pursue a higher market share.
e) Firms may also have other social objectives such as running the firm like a cooperative – to maximise the welfare of stakeholders (consumers, workers, suppliers) and not just the profit of owners.
f) Profit satisficing. This occurs when there is a separation of ownership and control and where managers do enough to keep owners happy but then maximise other objectives such as enjoying work.

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