

Chapter

1

Introduction to Statistics

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Meaning Of Statistics*
- *Features Of Statistics*
- *Scope of Statistics*
- *Need of Statistics*
- *Importance Of Statistics in Business*
- *Functions of Statistics*
- *Distrust of Statistics*

1.0 Introduction to Statistics

Statistics is not a new discipline, it is as old as human society itself. The word, 'Statistics' is derived from Latin word 'status' or the Italian word 'Statista' or the German word 'Statistik' each of which means 'political state'. Statistics help the businessman to take effective decisions from the available data. Statistics is needed by businessman for taking sound and logical decisions. The main purpose of statistics is to manipulate, summarize and investigate data so that the useful decisions can be executed. In ancient times statistics was confined only to the affairs of state but now it embraces almost every sphere of human activity.

1.1 Meaning of Statistics

Statistics means numerical facts systematically collected as described in oxford dictionary. Statistics involves collection and organization of data. The next step is to present the data in tabular, diagrammatic and graphic forms. The data then is summarized by calculating various numerical indices such as mean, variance etc. which defines the information thus collected.

Definition of Statistics

“Statistics are the classified facts representing the conditions of the people in a state...specially those facts which can be stated in a number or in tables of numbers or in any tabular or classified arrangement.” **Webster**

“Statistics are numerical statements of facts in any department of enquiry placed in relation to each other.” **Bowley**

“By statistics, we mean quantitative data affected to a marked extend by multiplicity of causes.” **Yule and Kendall**

“Statistics are measurement, enumerations or estimates of natural phenomenon, usually systematically arranged, analyzed and presented as to exhibit important inter-relationships among them.” **A.M.Tuttle**

“Statistics may be defined as the collection, presentation, analysis and interpretation of numerical data.” **Craxton and Cowden**

“By statistics, we mean aggregate of facts affected to a marked extent by multiplicity of causes, numerically expressed, enumerated or estimated according to reasonable standards of accuracy, collected in a systematic manner for a pre-determined purpose and placed in relation to each other.” **Horace Secrist**

1.2 Features of Statistics

Statistics can be defined in two senses i.e. singular and plural. In singular sense it may be defined as the various methods and techniques for attaining and analyzing the numerical information. Different economists have different views about statistics. According to *Boddingtons* Statistics is, “*the*

science of estimates and probabilities”. *The techniques and method means the collection of data, organization, presentation, analysis and interpretation of numerical data.* The above definition covers the following aspects of statistics:-

- i. **Collection of Data:** The collection of data is the first step of statistical investigation. It must be collected very carefully. So, the data must be covered, and if it so not covered then the conclusion will not be reliable.
- ii. **Organization:** The data may be obtained either from primary source or secondary source. If the data is to be obtained from primary source, then it needs organization. The data are organized by editing, classifying and tabulating them.
- iii. **Presentation:** After the collection and organization of data, they are presented in systematic form such as table, diagram and graphical form.
- iv. **Analysis:** After the collection, organization and presentation of data, the next step is to analyze the data. To analyze the data we use average, correction, regression, time series etc. The statistical tools of analysis depend upon the nature of data.
- v. **Interpretation:** The last step of a statistical method is the interpretation of the result obtained from the analysis. Interpretation means to draw the valid conclusion.

In plural sense, Statistics means the aggregates of numerical facts collected systematically. The most popular and acceptable definition is given by *Horace and Secrist*. According to them, “*Statistics means the aggregate of facts affected to a marked extent by multiplicity of causes, numerically expressed, enumerated or estimated according to reasonable standard of accuracy collected in a systematic manner for pre-determined purpose and placed in relation to each other.*” According to this definition Statistics in plural sense should have following features:

- i. **Aggregate of Facts:** Statistics are aggregates of facts. Single or isolated, figures are not considered to be statistics because such figures are unrelated and cannot be compared. A single figure of the boy of 26 years

would not constitute statistics. It is just a numerical statement of the fact. Statistical data are concrete numbers which represent objects

- ii. **Numerically Expressed:** Statistics are numerically expressed. All Statistics are expressed in numerical figures i.e. expressed in numbers and related to quantitative information only. Qualitative characteristics do not come under Statistics unless they are assigned certain ranks as a quantitative measure of assessment.
- iii. **Affected By Multiplicity Of Causes:** Statistics are affected to a marked extent by multiplicity of causes. The aggregate of facts and figures should be affected by a set of causes. For e.g. the unemployment rate of country has increased by 5% in the last year due to the low economic growth, political instability in civil markets etc.
- iv. **Reasonable Accuracy:** Statistics are enumerated or estimated according to a reasonable standard of accuracy.
- v. **Placed in relation to each other:** Statistics must be comparable to each other. Numerical informations must be mud related and comparable. In the absence of such a quality, the Statistics would be meaningless. For example, statistics related to number of children born, exports of the country, coal production etc. have no relevance for statistical analysis.
- vi. **Pre determined Purpose:** Statistics are collected for a predetermined purpose. The figures are collected with some goal objective in mind. Without any objective collected data will be useless. Thus, the purpose of collecting data must be decided in advance.
- vii. **Enumerated Or Estimated:** According to the feature of statistics, data can be enumerated or estimated. If the numerical statements are precise accurate, then they can be enumerated. Contrary to this, if the field of investigation is large and beyond comprehension, then the estimation procedure can be adopted.
- viii. **Collected in a Systematic Manner:** Statistics are collected in a systemic manner. A proper plan should be prepared before collecting the statistical data. Data collected in a haphazard manner would lead to false

conclusions. Therefore, data should be collected in a systematic manner. Before collecting the data, well plan of data collection should be followed because haphazard collection of data may give error.

1.3 Scope of Statistics

- i. Statistics and Planning:** Statistics is indispensable into planning in the modern age which is termed as “the age of planning”. Almost all over the world the governments are re-storing to planning for economic development.
- ii. Statistics and Economics:** Statistical data and techniques of statistical analysis have to be immensely useful in solving economical problem, such as wages, price, time series analysis, demand analysis.
- iii. Statistics and Business:** Statistics is an irresponsible tool of production control. Business executive are relying more and more on statistical techniques for studying the needs and desire of the valued customers.
- iv. Statistics and Industry:** In Industry, Statistics is widely used in quality control. In production engineering, to find out whether the product is confirming to the specifications or not the Statistical tools, such as inspection plan, control chart etc. are used.
- v. Statistics and Mathematics:** Statistical techniques are intimately related to recent advancements in the outcome of wide applications of mathematics.
- vi. Statistics and Modern Science:** In medical science the statistical tools for collection, presentation and analysis of observed facts relating to causes and incidence of diseases and the result of application of various drugs and medicine, are of great importance.
- vii. Statistics, Psychology and Education:** In education and physiology, statistics has found wide application such as, determining or to determine the reliability and validity to a test, factor analysis etc.

- ix. **Statistics and War:** In war the theory of decision function can be a great assistance to the military and personal to plan “maximum destruction with minimum effort.”

1.4 Need Of Statistics

The need of statistics arises due to following reasons:

- i. Statistical methods provide quantitative information about sale, production, finances etc. It helps the businessman to take effective decisions.
- ii. Statistics is needed by businessman to predict the effect of a large number of variables with a fair degree of accuracy.
- iii. Statistic remove the uncertainty involved in business.
- iv. Business is based on statistical analysis and control.
- v. With the help of statistics the businessman can select the optimal decisions for the direct evaluation of the payoff for each alternative course of action.
- vi. On the basis of data pertaining to income and expenditure the consumer optimum satisfaction can be determined.

1.5 Importance of Statistics in Business

The importance of statistics can be defined in different parts i.e. statistics in planning, in economics, in business etc because statistical methods are used in every economic related areas.

- i. **Statistics in Planning:** Modern age is the age of planning. Every objective plan depends upon the correct and sound statistical data. Planning is the pre-determined sets of program and policies, which is formulated in order to meet the targeted objectives,. To formulate the plan, detail study of the existing situation is needed which is possible only through the statistical tools.

- ii. **Statistics in Economics:** Statistics is very essential to develop and prove the principles and laws of economics. It has great importance to understand the economic problems like production, consumption, distribution etc. as they can be solved by using statistical data.
- iii. **Statistics in Business:** For the smooth operation of the business, statistical information is very useful. It simplifies the complex situation of a business. It helps to study market demand, supply, price etc. Without a very careful study of market it is difficult to success in business. Therefore Statistics is very essential in business sector also in the following fields:-
 - a) **Decision Making:** Statistics help businessman in business decision making process. Statistics provide logics and reasoning for decision making. When a businessman has more than one option he has to make choice. Statistics helps in choosing right option or alternative.
 - b) **Removes Uncertainty:** Uncertainty means, when outcome is not known. But statistics helps to remove and reduce uncertainty.
 - c) **Research and Development:** Statistics is very helpful in the field of research and development. Statistics is used to verify laws and phenomenon.
 - d) **Banking:** Statistic is very helpful in banking sector. It helps banks to fix rates of demand deposits, time deposits, credit etc. It is on the basis of data relating to demand and time deposits that bankers determine the credit policies. Credit policies are made on the basis of probability.
 - e) **Time and Motion Studies:** Statistics is widely used in business for production control. Business rely on statistical tools and techniques for studying the needs of consumers.
 - f) **Marketing Decisions:** Statistical analysis are frequently used in providing information for making decision in the field of marketing. It is necessary, first, to find out what can be sold and then to evolve suitable strategy, so that the goods are sold to the ultimate consumer. A skill full analysis of data on production purchasing power, man power, habits of competators, habits of consumer, transportation cost etc. should be considered while taking any attempt to establish a new market.

- g) **Investment Statistics:** Statistics greatly assists investors in making clear and valued judgment in his investment decision and in selecting securities that are safe and have the best prospects of yielding a good income.
- h) **Sales Control:** The management control process combines statistical and accounting method in making the overall budget for the coming year including sales, materials, labour and other costs and net profits and capital requirement.

1.6 Functions Of Statistics

The functions of statistics can be defined on the following points:

- i. **To present facts in a definite form:** Without a statistical study our ideas are likely to be vague, indefinite and hazy, but figures help us to represent things in their true perspective. For example, the statement that some students out of 1,400 students, who had appeared for a certain examination, were declared successful, would not give as much information as the one that 300 students out of 400 who took the examination were declared successful.
- ii. **To simplify unwieldy and complex data :** It is not easy to treat large numbers and hence they are simplified either by taking a few figures to serve as a representative sample or by taking average to give a bird's eye view of the large masses. For example, complex data may be simplified by presenting them in the form of a table, graph or diagram, or representing it through an average etc.
- iii. **To use it as a technique for making comparisons:** The significance of certain figures can be better appreciated when they are compared with others of the same type. The comparison between two different groups is best represented by certain statistical methods, such as average, coefficients, rates, ratios, etc.
- iv. **To enlarge individual experience:** An individual's knowledge is limited to what he can observe and see; and that is a very small part of the social organism. His knowledge is extended in various ways by studying

certain conclusions and results, the basis of which are numerical investigations. For example, we all have general impression that the cost of living has increased. But to know to what extent the increase has occurred, and how far the rise in prices has affected different income groups, it would be necessary to ascertain the rise in prices of articles consumed by them.

- v. **To provide guidance in the formulation of policies:** The purpose of statistics is to enable correct decisions, whether they are taken by a businessman or government. In fact statistics is a great servant of business in management, governance and development. Sampling methods are employed in industry in tackling the problem of standardization of products. Big business houses maintain a separate department for statistical intelligence, the work of which is to collect, compare and coordinate figures for formulating future policies of the firm regarding production and sales.
- vi. **To enable measurement of the magnitude of a phenomenon :** Without statistical science, it would not be possible to estimate the population of a country or to know the quantity of wheat, rice and other agricultural commodities produced in the country during any year.

1.7 Limitations of Statistics

Statistics is extremely useful in economics field but it has some limitations in itself which are as follows:

- i. **Statistics doesn't deal with the individual:** Statistics deals with aggregate of facts not with individual. Individual fact or figure is out of its scope. For e.g. if we say Ram's height is 5 feet, it is not statistics. For statistics we must say the height of Ram, Hari or any other folk is 5 ft.
- ii. **Statistics doesn't study qualitative phenomenon:** Statistics study only quantitative statement of fact, numerical numbers, such as income, production etc. It never studies qualitative statement such as intelligence, beauty etc.

- iii. **Statistical laws are not exact:** Statistics gives result only on an average. It is not 100% reliable. Therefore it is the law of average.
- iv. **Statistics is liable to be misused:** The greatest limitation of statistics is that, it must be used by experts only. If it is used by unskilled or inexperienced person, the result may occur wrong.
- v. **Statistics is only a means:** Statistics is only the means, which provide a method of studying problem. But it should not be considered as the best method because this method should be supplemented by other techniques to derive conclusion

Chapter at a Glance:

- **Meaning:** Statistics means numerical facts systematically collected, as described in Oxford dictionary. Statistics involves collection and organization of data. The next step is to present the data in tabular, diagrammatic and graphic forms. The data then is summarized by calculating various numerical indices such as mean, variance etc. which defines the information thus collected.
- **Definition in Singular Sense:** “Statistics may be defined as the collection, presentation, analysis and interpretation of numerical data.”
Craxton and Cowden
- **Definition in Plural Sense:** “By Statistics, we mean aggregate of facts affected to a marked extent by multiplicity of causes, numerically expressed, enumerated or estimated according to reasonable standards of accuracy, collected in a systematic manner for a pre-determined purpose and placed in relation to each other.” **Horace Secrist**
- **Scope of Statistics:** The scope of Statistics is very wide. It lies in psychology and education, modern science, industry business economics, planning and war
- **Need of Statistics:** The need of Statistics arises due to following reasons: Statistical methods provide quantitative information, to predict the effect of a large number of variables with a fair degree of accuracy, remove the uncertainty involved in business, analysis and

control, the optimal decisions for the direct evaluation of the payoff for each alternative course of action and on the basis of data pertaining to income and expenditure the consumer optimum satisfaction can be determined.

- **Importance of Statistics in Business:** Statistics has great relevance in the field of planning, economics and business. It is of great importance in Sales Control, Investment Statistics, Marketing Decisions, Time And Motion Studies, Banking, Research and Development, Removes Uncertainty, Decision Making
- **Functions of Statistics:** To enable measurement of the magnitude of a phenomenon, it provides guidance in the formulation of policies, to enlarge individual experience, to use it as a technique for making comparisons, to simplify unwieldy and complex data and to present facts in a definite form.
- **Limitations:** Statistics is extremely useful in economics field but it has some limitations in itself like it is only a means, is liable to be misused, laws are not exact, doesn't study qualitative phenomenon and Statistics doesn't deal with the individual.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. The data collected without any objective is called _____.
2. Statistics study only _____ data.
3. All numerical information is not _____.
4. Statistics are collected in a _____ manner.
5. Statistics must be _____ to each other.
6. Statistics are _____ or estimated according to a reasonable standard of accuracy.
7. Statistics are _____ of facts

8. A plural sense, statistics means the aggregates of numerical facts _____ systematically.
9. Statistics may be defined as the collection, presentation, _____ and interpretation of numerical data
10. By statistics, we mean quantitative data affected to a marked extent by _____ of causes

Answer key

- | | | |
|------------------|-----------------|---------------|
| 1. Numbers | 2. Quantitative | 3. Statistics |
| 4. Systematic | 5. Comparable | 6. Enumerated |
| 7. Aggregates | 8. Collected | 9. Analysis |
| 10. Multiplicity | | |

(B) State whether the following statements are True or False.

1. Statistics remove the uncertainty involved in business.
2. Statistics simplify unwieldy and complex data.
3. Statistics deal with aggregate of facts and with individual.
4. Statistics study only quantitative statement of fact, numerical numbers.
5. Statistics is not only the means but also the end, which provide a method of studying problem.
6. Statistical laws are not exact.
7. Statistical methods provide quantitative information as well as qualitative information.
8. Statistics involve collection and organization of data
9. Statistics can't be misused.
10. Statistics do not help in comparison of data.

Answer key:

- | | | | | |
|---------|----------|----------|----------|-----------|
| 1. True | 2. True | 3. False | 4. True | 5. False |
| 6. True | 7. False | 8. True | 9. False | 10. False |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. Which of the following is not correct regarding Statistics?
(A) Aggregate of facts (B) Numerically expressed
(C) Can't be misused (D) Affected by multiplicity of causes
2. Which of the following is the example of Statistics?
(A) Sita is taller than Geeta
(B) Ram has 2 friends
(C) Birth rate in India is 18 per thousand as compared to 9 per thousand in USA.
(D) Age of my son is 2 years.
3. In singular sense Statistics means:
(A) Collection of data (B) organization of data
(C) Analysis of data (D) all of these
4. Numerically expressed facts and figures are called as.
(A) Mathematics (B) Economics
(C) Statistics (D) Analysis of data
5. Which of the following is not a stage of Statistics?
(A) Collection of data (B) organization of data
(C) Presentation of data (D) none of these
6. In plural sense Statistics means:
(A) Aggregate of facts (B) only expressed in words
(C) Not affected by multiplicity of causes (D) individual study
7. Which of the following is not a feature of Statistics
(A) Collection of data (B) organization of data
(C) Analysis of data (D) none of these
8. Which of the following is not a limitation of Statistics
(A) Numerical study only (B) with reference results may prove right
(C) Results are true on average basis (D) study of aggregates only

9. The scope of statistics does not lie in
 (A) Economics (B) Price Theory
 (C) Mathematics (D) Business
10. The term “statistics” has been derived from a latin Word _____.
 (A) status (B) Statistik
 (C) Statista (D) none of these

Answer key:

- | | | | | |
|------|------|------|------|-------|
| 1. C | 2. C | 3. D | 4. C | 5. D |
| 6. A | 7. D | 8. B | 9. B | 10. A |

(D) Very Short Answer Type Questions

1. What is statistics?
2. Define statistics as singular noun.
3. Define statistics as plural noun
4. What is the limitation of statistics?
5. What is the scope of statistics?
6. Write any one definition of statistics.
7. Write any one feature of statistics.
8. Write any one function of statistics.
9. What is the importance of statistics?
10. What is the need of statistics?

2. Short Answer Type Questions

1. What do you mean by singular statistics?
2. Explain the scope of statistics.
3. Why do you study statistics?
4. Discuss any three characteristic of statistics.
5. Discuss the importance of statistics.
6. Discuss the role of statistics.
7. What is the subject matter of statistics?
8. Explain the significance of statistics in business decision-making.
9. Briefly explain the nature of statistics.

3. Long Answer Type Questions.

1. "The government and the policy makers use statistical data to formulate policies for the economic development." Discuss the concept of statistics.
2. Statistical methods are no substitute for common sense. Discuss the statement.
3. Discuss the role of statistics in managerial decision making.
4. How is singular statistics different from plural statistics?
5. What are the limitations of statistics?
6. Explain the scope of statistics.
7. "Statistical methods are dangerous weapons in the hands of unqualified person." Explain.

Chapter

2

Collection of Data

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Meaning Of Data*
- *Sources of Data*
- *Primary and Secondary Data*
- *Methods of Collecting Primary and Secondary Data*
- *K now about some important sources of secondary data*

2.0 Meaning of Data

Information in raw or unorganized form (such as alphabets, numbers, or symbols) that refer to, or represent, conditions, ideas, or objects is known as Data. Data is limitless and present everywhere in the universe. **Data** (plural) are measurements or observations that are typically numeric. Statistical data are the basic raw material of statistics. Data may relate to an activity of our interest, a phenomenon, or a problem situation under study. They derive as a result of the process of measuring, counting and/or observing. Statistical data, therefore, refer to those aspects of a problem situation that can be measured, quantified, counted, or classified. Any object, subject, phenomenon, or activity that generates data through this process is termed as a **variable**. In other words, a variable is one that shows a degree of variability when successive

measurements are recorded. In statistics, data are classified into two broad categories: (i) quantitative data and (ii) qualitative data. This classification is based on the kind of characteristics that are measured. **Data** are generally presented in summary. Typically, this means that data are presented graphically, in tabular form (in tables), or as summary statistics (e.g., an average). For example, the number of times each individual fidgeted is not all that meaningful, whereas the average (mean), middle (median), or most common (mode) number of times among all individuals is more meaningful. Tables and graphs serve a similar purpose to summarize large and small sets of data. Most often, researchers collect data from a portion of individuals in a group of interest. For example, the 50, 100, or 1,000 students in the anxiety example would not constitute all students in college. Hence, these researchers collected anxiety data from some students, not all. So researchers require statistical procedures that allow them to infer what the effects of anxiety are among all students of interest using only the portion of data they measured.

2.1 Sources of Data

For studying a problem statistically, first of all, the data relevant thereto must be collected. The numerical facts constitute the raw material of the statistical process. The interpretation of the ultimate conclusion and the decisions depend upon the accuracy with which the data are collected. Unless the data are collected with sufficient care and are as accurate as is necessary for the purposes of the inquiry, the result obtained cannot be expected to be valid or reliable. Before starting the collection of the data, it is necessary to know the sources from which the data are to be collected.

The sources of data also are classified according to the character of the data yielded by them. Thus the data which are gathered from the primary source is known as **primary data** and the one gathered from the secondary source is known as **secondary data**. When an investigator is making use of

figures which he has obtained by field enumeration, he is said to be using primary data and when he is making use of figures which he has obtained from some other source, he is said to be using secondary data. So the two types of data are:-

- i. Primary Data:** The original compiler of the data is the primary source. Primary data is collected fresh and for a first time and thus happen to be original in nature. The first hand information is called primary data. The data are primary to the source that collects and processes them for the first time. Data that has been collected from first-hand-experience is known as primary data. Primary data has not been published yet and is more reliable, authentic and objective. Primary data has not been changed or altered by human beings, therefore its validity is greater. Suppose you want to know the number of government schools in five districts of your state. For this, you will have to enquire from the District Education Officers of the five districts to collect the desired information. The data you get, is an example of Primary data.
- ii. Secondary Data:** A secondary source is the one that furnishes the data that were originally compiled by someone else. Data which have been already collected by someone else and which have already been passing through statistical process is secondary data. If the data have been collected and processed by some agency it is called secondary data. Data becomes secondary if primary data is used by someone else later on. It saves cost and time. For example, after collecting the data on the number of schools in five districts, you publish a report. If somebody uses the data collected by you for a similar study, it becomes secondary data.

2.2 Methods of Collecting Primary Data

- i. **Direct Personal Investigation:** According to this method, the investigator obtains the data by personal observation. The method is adopted when the field of inquiry is small. Since the investigator is closely connected with the collection of data, it is bound to be more accurate. In this method data are personally collected by the investigator from informants. Direct relation with informants is maintained. Thus, for example, if an inquiry is to be conducted into the family budgets of the industrial labour, the investigator himself live in the industrial area government as one of the sindustrial workers, mix with other residents and make patience and careful personal observation regarding how they spend, work and live. The data thus collected will be called data by direct personal investigation
- ii. **Indirect Oral Investigation:** In this method the information is obtained not directly from the person concerned instead it is collected orally from other persons who are expected to possess the necessary information. According to this method, the investigator interviews several persons who are either directly or indirectly in possession of the information sought to be collected. It may be distinguished from the first method in which information is collected directly from the persons who are involved in the inquiry. In the case of indirect personal observation, the persons from whom the information is being collected are known as witnesses or informants. However it should be ascertained that the informants really passes the knowledge and they are not prejudiced in favour of or against a particular view point. This method is adopted in the following situations :
 - a. Where the information to be collected is of a complete nature.
 - b. When investigation has to be made over a wide area.

c. Where the persons involved in the inquiry would be reluctant to part with the information.

This method is generally adopted by enquiry committee or commissions appointed by government.

iii. Information from Local Sources: In this method the investigator appoints local persons or correspondents at different places. They collect information in their own way and furnish the same to the investigator. Under this method certain correspondent are appointed in different parts of the field of enquiry, who submit their reports to the Central Office in their own manner. For example, estimates of agricultural wages may be periodically furnished to the Government by village school teachers. The local correspondents being on the spot of the enquiry are capable of giving reliable information. But it is not always advisable to place much reliance on correspondents, who have often got their own personal prejudices. However, by this method, a rough and approximate estimate is obtained at a very low cost. This method is also adopted by various departments of the government in such cases where regular information is to be collected from a wide area.

iv. Information through Questionnaire: This method of data collection is quite popular, particularly in case of big enquiries. The questionnaire is mailed to respondents who are expected to read and understand the questions and write down the reply in the space meant for the purpose in the questionnaire itself. The respondents have to answer the questions on their own. Under this method properly drawn up schedules or blank forms are distributed among the persons from whom the necessary figures are to be obtained. The informants would fill in the forms and return them to the officer incharge of investigation.

The Government of India issued slips for the special enumeration of scientific and technical personnel at the time of census. These slips are good examples of schedules to be filled in by the informants. The merit of this method is its simplicity and lesser degree of trouble and pain for the investigator. Its greatest drawback is that the informants may not send back the schedules duly filled in.

2.2.1 Construction of Questionnaire

A **questionnaire** is a list of questions directly or indirectly connected with the work of the enquiry. The answers to these questions would provide all the information sought. The questionnaire is put in the charge of trained investigators whose duty is to go to all persons or selected persons connected with the enquiry. This method is usually adopted in case of large inquiries. The method of collecting data is relatively cheap. Also the information obtained is that of good quality. The main drawback of this method is that the enumerator (i.e., investigator in charge of the questionnaire) may be a biased one and may not enter the answer given by the informant. Where there are many enumerators, they may interpret various terms in questionnaire according to their whims. To that extent the information supplied may be either inaccurate or inadequate or not comparable. This drawback can be removed to a great extent by training the investigators before the enquiry begins. The meaning of different questions may be explained to them so that they do not interpret them according to their whims.

Qualities of Good Questionnaire

The success of questionnaire method of collecting information depends on the proper drafting of the questionnaire. It is a highly specialized job and requires great deal of skill and experience. However, the following general principles may be helpful in framing a questionnaire:

- a. The questionnaire should not be too long.
- b. The series of questions should move from general to specific.

- c. The questions should be precise and clear.
- d. The questions should not be ambiguous. They should enable the respondents to answer quickly, correctly and clearly.
- e. The questions should not use double negatives. The questions starting with “wouldn’t you” or “don’t you” should be avoided, as they may lead to biased responses.
- f. The questions should not be a leading question, which gives clue about how the respondent should answer.
- g. The question should not indicate alternatives to the answer.
- h. The number of the questions should be kept to the minimum, fifteen to twenty five may be a fair number.
- i. The questions must be arranged in a logical order so that a natural and spontaneous reply to each is induced.
- j. The questions should be short, simple and easy to understand and they should convey one meaning.
- k. As far as possible, quotation of a personal and pecuniary nature should not be asked.
- l. As far as possible the questions should be such that they can be answered briefly in ‘Yes’ or ‘No’, or in terms of numbers, place, date, etc.
- m. The questionnaire should provide necessary instructions to the Informants. For instance, if there is a question on weight, it should be specified as to whether weight is to be indicated in lbs or kilograms.
- n. Questions should be objective type and capable of tabulation.

2.3 Sources of Secondary Data

There are number of sources from which secondary data may be obtained. They may be classified as follow. :

- i. Published sources, and**
- ii. Unpublished sources.**

i. Published Sources

The various sources of published data are:

A. Reports and official publications of:

- (a) International bodies such as the International Monetary Fund, International Finance Corporation and United Nations Organization.
- (b) Central and State Governments- such as the Report of the Patel Committee, etc.

B. Semi Official Publication: Various local bodies such as Municipal Corporation, and Districts Boards.

C. Private Publication of:

- (a) Trade and professional bodies such as the Federation of India, Chamber of Commerce and Institute of Chartered Accountants of India.
- (b) Financial and Economic Journals such as “Commerce”, ‘Capital’ etc.
- (c) Annual Reports of Joint Stock Companies.
- (d) Publication brought out by research agendas, research scholars, etc.

ii. Unpublished Sources

There are various sources of unpublished data such as records maintained by various government and private offices, studies made by research institutions, scholars, etc. Such source can also be used where necessary.

Chapter at a Glance:

- **Meaning Of Data:** Information in raw or unorganized form (such as alphabets, numbers, or symbols) that refer to, or represent, conditions, ideas, or objects.
- **Sources of Data:** The two sources of data are primary source and secondary source.
- **Primary and Secondary Data:** **Primary data:** The original compiler of the data is the primary source. Those which are collected a fresh and for a first time and thus happen to be original in nature. The first hand information is called primary data. **Secondary data:** A secondary source is the one that furnishes the data that were originally compiled by someone else. Those

which have been already collected by someone else and which have already been passing through statistical process.

- **Methods of Collecting Primary:** The main methods of data collection are:- Direct Personal Investigation, Indirect Oral Investigation, Information from Local Sources and Information through Questionnaire.
- **Methods of Collecting Secondary Data:** There are number of sources from which secondary data may be obtained. They may be classified as follow: **1. Published sources, and 2. Unpublished sources.**
- **Construction of Questionnaire:** A questionnaire is a list of questions directly or indirectly connected with the work of the enquiry. The answers to these questions would provide all the information sought. The questionnaire is put in the charge of trained investigators whose duty is to go to all persons or selected persons connected with the enquiry. This method is usually adopted in case of large inquiries.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. The data collected for the first time is called _____.
2. _____ is the method of primary data collection.
3. Less number of questions is a merit of a good _____.
4. _____ is the source of secondary data.
5. Questionnaires are filled by _____.
6. The questionnaire should not be _____.
7. The series of questions should move from general to _____.
8. The questions should be _____ and clear.
9. Questions should be _____ type.
10. Data is _____ and present everywhere in the universe.

Answer key

- 1. Primary Data 2. Direct personal investigation 3. Questionnaire
- 4. Govt. Publication 5. Informant 6. Too long
- 7. Specific. 8. Precise 9. Objective
- 10. Limitless

(B) State whether the following statements are True or false.

- 1. Data is limitless and present everywhere in the universe.
- 2. The series of questions should move from general to specific.
- 3. The questionnaire should be too long
- 4. A questionnaire is a list of questions directly or indirectly connected with the work of the enquiry.
- 5. The investigator obtains the data by personal biasness.
- 6. A secondary source is the one that furnishes the data that were originally compiled by someone else.
- 7. Data that has been collected from first-hand-experience is known as secondary data.
- 8. The original compiler of the data is the primary source.
- 9. The questions should use double negatives.
- 10. The questions should be ambiguous.

Answer key:

- 1. True 2. True 3. False 4. True 5. False
- 6. True 7. False 8. True 9. False 10. False

(C) Multiple Choice Questions: (Find the correct answer from the given)

- 1. Which of the following is not a merit of good questionnaire?
(A) Difficulty (B) less number of questions
(C) In a proper order (D) valid questions

- 2. Which of the following is the method of collection of secondary data?
(A) Direct personal investigation (B) Indirect oral investigation
(C) Government publications (D) Through questionnaire

3. Data collected for the first time is known as

(A) Secondary data	(B) internal data
(C) External data	(D) primary data

4. census of population and national income estimates are the examples of :

(A) Internal data	(B) External data
(C) Secondary data	(D) primary data

5. Which of the following is not a merit of information through local sources?

(A) Regular information	(B) economical
(C) Wide coverage	(D) personal bias

6. Which of the following is a merit of direct personal investigation?

(A) Originality	(B) less coverage
(C) Personal bias	(D) costly

7. Which of the following is not a feature of indirect oral investigation?

(A) Wide coverage	(B) less expensive
(C) Free from biasness	(D) difficult

8. Which of the following is not a limitation of indirect oral investigation?

(A) Less accurate	(B) biased
(C) Doubtful conclusions	(D) not suitable for small areas

9. The information from local sources is suitable where

(A) Area of study is small	(B) regular and continuous information is needed
(C) Less accurate information is needed	(D) general purpose information is needed

required The qualities of good questionnaire is

(A) Limited questions	(B) difficult
(C) Undesirable questions	(D) calculations

Answer key:

- | | | | | |
|------|-----|-----|-----|-------|
| 1. A | 2.C | 3.D | 4.C | 5. D |
| 6. A | 7.D | 8.B | 9.B | 10. A |

(D) Very Short Answer Type Questions

1. What is meant by data?
2. Define primary data.
3. Define secondary data.
4. What is the limitation of primary data?
5. What is the scope of secondary data?
6. Write any one advantage of primary data
7. Write any one advantage of secondary data.
8. Write any one quality of good questionnaire.
9. What is the importance of direct personal investigation?
10. What is the need of indirect oral investigation?
11. Write any two sources of secondary data.
12. Write any two sources of primary data.

2. Short Answer Type Questions

- i. What do you mean by primary source of data?
- ii. Explain the suitability of primary data.
- iii. When do we use primary data?
- iv. Discuss any three advantages of secondary data.
- v. Discuss the importance of primary data.
- vi. Discuss the role of government agencies in publishing secondary data.
- vii. What are various sources of published data?
- viii. Explain the significance of secondary data.
- ix. Briefly explain the qualities of a good questionnaire.
- x. Explain the suitability of questionnaire method.
- xi. What do you mean by direct personal investigation?
- xii. Differentiate between direct personal investigation and indirect oral investigation.
- xiii. What do you mean by information through local correspondents?

3. Long Answer Type Questions.

1. Enumerate the different methods of collecting data. Which one is the most effective? Explain its merits and demerits.
2. Define the advantages and disadvantages of secondary data.
3. What are the sources of secondary data?
4. Differentiate between primary and secondary data.
5. Under what circumstances primary and secondary data should be used?
6. Explain the scope of primary data? What are various methods of collecting primary data?
7. What is meant by secondary data? What are the various sources of secondary data?

Chapter 3

Theory of Sampling

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Concept Of Census And Sample*
- *Suitability Of Census Method*
- *Advantages and Disadvantages Of Census Method*
- *Application Of Sample Method*
- *Advantages and Disadvantages Of Sample Method*
- *Principle Techniques Of Sampling*
- *Comparison Of Census And Sample Method*

3.0 Concept of Census and Sample

The term **population** means *all* members that meet a set of specifications or a specified criterion. For example, the population of the India is defined as all people residing in the India. The population of Punjab means all people living within the state's limits or boundary. A population of inanimate objects can also exist, such as all automobiles manufactured in Ludhiana in the year 2014. A single member of any given population is referred to as an **element**. When only some elements are selected from a population, it refers to that as a **sample**; when all elements are included, it is called as **census**.

Element: An element is an object on which a measurement is made. This could be a voter in a precinct, a product as it comes off the assembly line or a plant in a field that has either bloomed or not.

Population: A population is a group of experimental data, persons, etc. A population is built up of elementary units, which cannot be further decomposed. A population is a collection of elements about which we wish to make an inference. The population must be clearly defined before the sample is taken.

Sampling Units: Sampling units are non-overlapping collections of elements from the population that cover the entire population. The sampling units are the partition of the population of same interest. The sampling units could be households or individual voters.

Frame: A frame is a list of sampling units.

Sample: A sample is a collection of sampling units drawn from a frame or frames. Data are obtained from the sample and are used to describe characteristics of the population.

There are two important techniques of Data collection, **(i) Census enquiry;** implies complete enumeration of each unit of the universe, **(ii) In a sample survey,** only a small part of the group, is considered, which is taken as representative. For example the population census in India implies the counting of each and every human being within the country. In practice sometimes it is not possible to examine every item in the population. Also many a time it is possible to obtain sufficiently accurate results by studying only a part of the “population”. For example, if the marks obtained in statistics by 10 students in an examination are selected at random, say out of 100, then the average marks obtained by 10 students will be reasonably representative of the average marks obtained by all the 100 students. In such a case, the population will be the marks of the entire group of 100 students and that of 10 students will be a sample.

3.1 Census Method

Information on population can be collected in two ways –census method and sample method. In census method every element of the population (both rural and urban) is included in the investigation. For example,

if we study the average annual income of the families of a particular village or area, and if there are 1000 families in that area, we must study the income of all 1000 families. In this method no family is left out, as each family is a unit.

“Census method is that method in which data are collected covering every item of the universe or population relating to the problem under investigation.”

Census of India is carried out in every ten years. Registrar General of India carries out a house-to-house enquiry to collect data on birth and death rates, literacy, workforce, life expectancy, size and composition of population etc. The last census of India was held in 2011 According to the Census population of India was 1.21 billion.

3.1.1 Applicability of Census Method

Census method is applicable in following conditions:

- i. Small size of population.
- ii. Items are widely diverse in population.
- iii. Detail study of different items of population is required.
- iv. Accurate and reliable information is required.

3.1.2 Advantages of Census Method

- i. As the entire ‘population’ is studied, the result obtained is correct.
- ii. In a census, information is available for each individual item of the population which is not possible in the case of a sample. Thus no information is sacrificed under the census method.
- iii. If data are to be secured only from a small fraction of the aggregate, their completeness and accuracy can be ensured only by the census method, since greater attention thereby is given to each item.
- iv. The census mass of data being taken into consideration all the characteristics of the ‘population’ is maintained in original.

3.1.3 Disadvantages of Census Method

- i. The cost of conducting enquiry by the census method is very high as the whole universe is to be investigated.
- ii. The census method is not practicable in very big enquiries due to the inconvenience of individual enumeration.
- iii. In the cases of very big enquiries, the census method can be resorted to by the government agencies only. The application of this method is limited to those who are having adequate financial resources and other facilities at their disposal.
- iv. As all the items in the universe are to be enumerated, there is a need for training of staff and investigators. Sometimes it becomes very difficult to maintain uniformity of standards, when many investigators are involved. Individual preferences and prejudices are there and it becomes very difficult to avoid bias in such type of enquiries.

3.2 Sample Method

Sampling is very often used in our daily life. For example while purchasing food grains from a shop we usually examine a handful from the bag to assess the quality of the commodity. A doctor examines a few drops of blood as sample and draws conclusion about the blood constitution of the whole body. Thus most of our investigations are based on samples.

“Sample method is that in which data is collected about the sample on a group of items taken from the population for examination and conclusions are drawn on their basis.”

Suppose you want to study the average income of people in your village, According to Census Method you are required to find out the income of every individual in your village, add them up and divide by the number of individuals to get the average income of people in your village. This method will require expenditure and lots of time. Instead, by using Sampling Method you select a few individuals, as sample and find out their income. The average

income of the selected group of individuals is used as an estimate of average income of the individuals of your village.

3.2.1 Application of Sample Method

Sampling is inevitable in the following situations:

- i. Complete enumerations are practically impossible when the population is infinite.
- ii. When the results are required in a short time.
- iii. When the area of survey is wide.
- iv. When resources for survey are limited particularly in respect of money and trained persons.
- v. When the item or unit is destroyed under investigation.

3.2.2 Advantages of Sample Method

- i. Sample method is less costly since the sample is a small fraction of the total population.
- ii. Data can be collected and summarized more quickly. This is a vital consideration when the information is urgently needed.
- iii. A sample produces more accurate results than are ordinarily practicable on a complete enumeration.
- iv. Personnel of high quality can be employed and given intensive training as the number of many personnel would not be very large.
- v. A sample method is not restricted to the Government agencies. Even private agencies can use this method as the financial burden is not heavy. It is much more economical than the census method.

3.2.3 Disadvantages of Sample Method

- i. In a census, information is available for each individual item of the population which is not possible in the case of a sample. Some information has to be sacrificed.
- ii. If data are to be secured only from a small fraction of the aggregate, their completeness and accuracy can be ensured only through the census method, since greater attention thereby is given to each item.

- iii. In using the technique of sampling, the investigator may not choose a representative sample. The aim of sampling is that it should afford a sufficiently accurate picture of a large group without the need for a complete enumeration of all the units of the group. If the sample chosen is not representative of the group, the very object of sampling is defeated.
- iv. The sampling technique is based upon the fundamental assumption that the population to be sampled is homogenous. If it is not so, the sampling method should not be adopted unless the population is first divided into groups or “strata” before the selection of the sample is made.

3.2.4 Principles of Sampling

There are two important principles on which the theory of sampling is based;

- i. Principle of Statistical Regularity, and
- ii. Principle of ‘Inertia of Large Numbers’

i. Principle of Statistical Regularity

This principle points out that if a sample is taken at random from a population, it is likely to possess almost the same characteristics as that of the population. By random selection, we mean a selection where each and every item of the population has an equal chance of being selected in the sample. In other words, the selection must not be made by deliberate exercise of one’s discretion. A sample selected in this manner would be representative of the population. For example, if one intends to make a study of the average weight of the students of Punjab University, it is not necessary to take the weight of each and every student. A few students may be selected at random from every college, their weights taken and the average weight of the University students in general may be inferred.

ii. Principle of Inertia of Large Numbers

This principle is a corollary of the principle of statistical regularity. This principle states that, other things being equal, larger the size of the sample, more accurate the results are likely to be. This is because large numbers are more stable as compared to small ones. For example, if a coin is tossed 10 times we should expect an equal number of heads and tails, i.e., 5 each. But since the experiment is tried on a small number of items it is likely that we may

not get exactly 5 heads and 5 tails. The result may be a combination of 9 heads and 1 tail or 8 heads and 2 tails or 7 heads and 3 tails etc. If the same experiment is carried out 1,000 times the chance of getting 500 heads and 500 tails would be very higher. The basic reason for such likelihood is that the experiment has been carried out a sufficiently large number of times and possibility of variations in one direction compensates for others.

iv. Principle of Validity

v. This states that the sampling methods provide valid estimates about the population units (parameters).

vi. Principle of Optimization

This principle takes into account the desirability of obtaining a sampling design which gives optimum results. This minimizes the risk or loss of the sampling design. The foremost purpose of sampling is to gather maximum information about the population under consideration at minimum cost, time and human power. This is best achieved when the sample contains all the properties of the population.

3.2.5 Techniques of Sampling

The various methods available for sampling are:

- (i) Conscious or Deliberate or Purposive Sampling
- (ii) Random Sampling or Chance Selection
- (iii) Stratified Sampling
- (iv) Systematic Sampling
- (v) Multi-stage Sampling

(i) Purposive Sampling

Purposive sampling is representative sampling by analyzing carefully the universe enquiry and selecting only those which seem to be most representatives of the characteristics of the universe. If economic conditions of people living in a state are to be studied according to this method, then a few villages and towns may be purposively selected. Thus the purposive sampling is a purposive selection by the investigator that depends on the nature and purpose of the enquiry. This method is very much exposed to the dangers of

personal prejudices. Also there is a possibility of certain wrong cases being included in the data under collection, consciously or unconsciously. However, it may be noted that this method gives a very representative sample data provided that neither bias nor prejudices influence the process of data selection.

Merits:

- a. This method is flexible.
- b. Items can be selected according to the need of study.
- c. It is a simple technique of sample selection.

Limitations:

- a. There is possibility of personal biasness in this method.
- b. Lack of reliability of results due to personal biasness.

(ii) Random Sampling

In order to avoid the danger of personal bias and prejudices, a random sample is adopted. Under this method every item in the universe is given equal chance of being included in the sample. A random sample is the simplest type of sample. For obtaining such sample, a certain number of units are selected at random from the universe. But this sampling technique is based upon the fundamental assumption that the population to be sampled is homogenous. If it is not so, then the stratified sampling is adopted.

Merits:

- a. Personal bias is eliminated as a selection depends solely on chance.
- b. A random sample is in general a representative sample for a homogenous population.
- c. There is no need for the thorough knowledge of the units of the population.
- d. The accuracy of a sample can be tested by examining another sample from the same universe when the universe is unknown.
- e. This method is also used in other methods of sampling.

Limitations:

- a. Preparing lots or using random number tables is tedious when the population is large.
- b. When there is large difference between the units of population, the simple random sampling may not be a representative sample.
- c. The size of the sample required under this method is more than that required by stratified random sampling.
- d. It is generally seen that the units of a simple random sample lie apart geographically. The cost and time of collection of data are more.

(iii) Stratified Sampling

Under this method, the population is first sub-divided into groups or “strata” before the selection of the samples is made. This is done to achieve homogeneity within each group or “stratum”. A stratified sample is nothing but a set of random samples of a number of sub-populations, each representing a single group. The major advantage of such stratification is that the several sub-divisions of the population which are relevant for purpose of inquiry are adequately represented.

Merits:

- a. It is more representative.
- b. It ensures greater accuracy.
- c. It is easy to administer as the universe is sub - divided.
- d. Greater geographical concentration reduces time and expenses.
- e. When the original population is badly skewed, this method is appropriate.
- f. For non – homogeneous population, it may field good results.

Limitations:

- a. To divide the population into homogeneous strata, it requires more money, time and statistical experience which are a difficult one.

- b. Improper stratification leads to bias, if the different strata overlap, such a sample will not be a representative one.

(iv) Systematic Sampling

This method is used where complete list of the population from which sample is to be drawn is available. The method is to select every r th item*, from the list where ' r ' refers to the sampling interval. The first item between the first and the r th is selected as random. For example, if a list of 500 students of a college is available and if we want to draw a sample of 100, we must select every fifth item (i.e., $r = 5$). The first item between one and five shall be selected at random. Suppose it comes out to be 4. Now we shall add five and obtain numbers of the desired sample. Thus the second item would be the 9th students; the third 14th students; the fourth 19 students; and so on.

Sampling interval or $r = \frac{\text{Size of the universe}}{\text{Size of the sample}}$

This method is more convenient to adopt than the random sampling or stratified sampling method. The time and work involved are relatively smaller. But the main drawback of this method is that systematic samples and not always random samples.

Merits:

- a. This method is simple and convenient.
- b. Time and work is reduced much.
- c. If proper care is taken result will be accurate.
- d. It can be used in infinite population.

Limitations:

- a. Systematic sampling may not represent the whole population.
- b. There is a chance of personal bias of the investigators.

(v) Multi-Stage Sampling

As the name implies this method refers to a sampling procedure which is carried out in several stages. At first stage, the first stage units are sampled by some statistical method, such as random sampling. Then a sample of second stage units is selected from each of the selected first units. Further stages may be added as required. This method introduces flexibility in the sampling method which is lacking in the other methods. However, a multi-stage sample is less accurate than sample containing the same numbers of final stage units which have been selected by some suitable single stage process.

3.3 Comparison of Census and Sample Method

S.No.	Basis of Difference	Census Method	Sample Method
1	Coverage	All items are covered	Some of items are covered
2	Suitability	Small are of investigation	Large are of investigation
3	Accuracy	Greater degree of accuracy	Less accurate
4	Cost	Expensive method	Less Expensive method
5	Time	More time consuming	Less time consuming
6	Nature of item	Diverse nature of items	Homogeneous items
7	Verification	Verification not possible	Verification is possible

Chapter at a Glance:

- **Concept of Census and Sample:** When only some elements are selected from a population, it refers to as a **sample**; when all elements are included, it is called as **census**.
- **Census Method:** "Census method is that method in which data are collected covering every item of the universe or population relating to the problem under investigation."
- **Suitability of Census Method:** Small size of population, Items are widely diverse in population, Detail study of different items of population is required, and Accurate and reliable information is required.

- **Advantages of Census Method:** reliable and accurate results, less biased, extensive information, study of diverse characteristics and complex investigation and indirect investigation.
- **Disadvantages of Census Method:** costly method, large manpower, not suitable for large investigation.
- **Sampling Method:** "Sample method is that in which data is collected about the sample on a group of items taken from the population for examination and conclusions are drawn on their basis."
- **Application of Sample Method:** large population, accuracy, intensive study not required, homogeneous units.
- **Advantages of Sample Method:** economical, time saving, identification of errors, large investigation, and convenience and more scientific.
- **Disadvantages of Sample Method:** partial, wrong conclusions, difficulty in sample selection, framing sample and requires specialize knowledge.
- **Principles Of Sampling:** 1. Principle of Statistical Regularity, and 2. Principle of 'Inertia of Large Numbers'
- **Techniques Of Sampling:** (i) Conscious or Deliberate or Purposive Sampling (ii) Random Sampling or Chance Selection (iii) Stratified Sampling (iv) Systematic Sampling (v) Multi-stage Sampling
- **Comparison of Census and Sample Method:** comparison between the sample and census method can be done on the basis of time involved, cost, coverage, suitability, accuracy, verification and nature of item.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. A population consisting of an unlimited number of units is called an _____ population

2. If all the units of a population are surveyed it is called _____
3. The discrepancy between a parameter and its estimate due to sampling process is known as _____
4. The list of all the items of a population is known as _____
5. Stratified sampling is appropriate when population is _____
6. When the items are perishable under investigation it is not possible to do _____
7. When the population consists of units arranged in a sequence would prefer _____ sampling
8. For a homogeneous population, _____ sampling is better than stratified random sampling.
9. In order to avoid the danger of personal bias and prejudices, a _____ is adopted.
10. A _____ is nothing but a set of random samples of a number of sub-populations, each representing a single group.

Answer key

- | | | |
|-----------------------|-----------------|-------------------------|
| 1. Infinite | 2.census | 3. Sampling error |
| 4. Sampling frame | 5.Heterogeneous | 6. Complete enumeration |
| 7. Systematic | 8.Simple random | 9.random sample |
| 10. Stratified sample | | |

(B) State whether the following statements are True or False.

1. Systematic sampling may not represent the whole population
2. Proper stratification leads to biasness.
3. A stratified sample is nothing but a set of random samples of a number of sub-populations, each representing a single group.
4. In order to avoid the danger of personal bias and prejudices, a random sample is adopted.
5. Purposive sampling is representative sampling by selecting all those which are most convenient to gather from the universe.

6. The sampling technique is based upon the fundamental assumption that the population to be sampled is homogenous.
7. A sample method is restricted to the Government agencies.
8. In the cases of very big enquiries, the census method can be resorted to by the government agencies only.
9. In a census, information is available for selected item of the population which is not possible in the case of a sample.
10. Census method is that method in which data are collected covering major items of the universe or population relating to the problem under investigation.

Answer key:

- | | | | | | |
|---------|---------|---------|------------|---------|--------|
| 1. True | 2.false | 3.True | 4.True | 5.False | 6.True |
| 7.False | 8.True | 9.False | 10. False. | | |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. Sampling is inevitable in the situations
 - (a) Blood test of a person
 - (b) When the population is infinite
 - (c) Testing of life of dry battery cells
 - (d) All the above
2. The difference between sample estimate and population parameter is termed as
 - (a) Human error
 - (b) Sampling error
 - (c) Non-sampling error
 - (d) none of the above
3. If each and every unit of population has equal chance of being included in the sample, it is known as
 - (a) Restricted sampling
 - (b) Purposive sampling
 - (c) Simple random sampling
 - (d) None of the above
4. Simple random sample can be drawn with the help of
 - (a) Slip method
 - (b) Random number table
 - (c) Calculator
 - (d) All the above
5. A selection procedure of a sample having no involvement of probability is known as
 - (a) Purposive sampling
 - (b) Judgement sampling

- (c) Subjective sampling (d) All the above
6. Five establishments are to be selected from a list of 50 establishments by systematic random sampling. If the first number is 7, the next one is
 (a) 8 (b) 16 (c) 17 (d) 21
7. Census method is suitable under which condition
 (a) The size of population is large
 (b) Diverse items of population
 (c) High degree of accuracy not needed
 (d) Intensive study of items not required
8. Random sampling provides each item of universe a _____ chance of being selected.
 (a) Equal (b) Unequal
 (c) Zero (d) None of these
9. Personal biasness is possible under which method of sampling.
 (a) Random sampling (b) Purposive sampling
 (c) Systematic sampling (d) All the above
10. Which method is used for estimation of population in the country?
 (a) Census method (b) sampling method
 (c) None of these (d) both census and sample method

Answer key:

1. D 2. B 3. C 4. D 5. D
 6. C 7. B 8. A 9. B 10. A

(D) Very Short Answer Type Questions

1. What is census method?
2. Define sample method.
3. Define purposive sampling.
4. What is the limitation of sample method
5. What is random sampling?
6. Define of stratified sampling.

7. Write any one feature of sampling.
8. Write any two method of sampling.
9. What is the importance of convenience sampling?
10. What is systematic sampling?

2. Short Answer Type Questions

1. What do you mean by census method and where it can be used?
2. Explain the scope of sample method.
3. What do you mean by sample method and where it can be used
4. Discuss any three advantages of sample method.
5. Discuss any three advantages of census method.
6. Discuss any disadvantages of sample method.
7. Discuss any three disadvantages of census method.
8. Write any two differences between census and sample method.
9. What is meant by sampling?
10. What is the main merit and demerit of random sampling?
11. Explain the significance of purposive sampling.
12. Briefly explain the difference between random sampling and systematic sampling.

3. Long Answer Type Questions.

1. Discuss in detail the census method, its application, merits and demerits.
2. Discuss in detail the sample method, its application, merits and demerits.
3. Differentiate between census and sample survey methods.
4. Which of the following methods give better results and why? a] sample b] census
5. Distinguish between random and non random sampling.
6. Discuss the various techniques of sampling with their merits and demerits.
7. What do you mean by sampling? What are the principles of sampling and what are the characteristics of a good sample.

Chapter

4

Presentation of Data

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Classification Of Data*
- *Objectives of classification*
- *Features of good classification*
- *Basis of classification*
- *Tables*
- *Bars Diagrams*
- *Histograms*
- *Ogives*

4.0 Introduction:

In this chapter, you will learn how the data, that you collected, are to be classified. The purpose of classifying raw data is to bring order in them so that they can be further used for statistical analysis.

4.1 Classification of Data

The process of arranging data into homogeneous group or classes according to some common characteristics present in the data is called classification. For example the process of sorting letter in a post office. The

letters are classified according to the cities and further arranged according to streets.

“The process of arranging things in groups or classes according to their resemblances and affinities that gives expression to the unity of attributes that may subsist amongst a diversity of individuals is called classification.”
Cannon

The raw data, collected in real situations and arranged haphazardly do not give a clear picture. Thus to locate similarities and reduce mental strain we resort to classification. Classification condenses the data by dropping out unnecessary details. It facilitates comparison between different sets of data clearly showing the different points of agreement and disagreement. It enables us to study the relationship between several characteristics and make further statistical treatment like tabulation, etc. During population census, people in the country are classified according to sex (males/females), marital status (married/unmarried), place of residence (rural/urban), Age (0–5 years, 6–10 years, 11–15 years, etc.), profession (agriculture, production, commerce, transport, doctor, others), residence in states (West Bengal, Bihar, Mumbai, Delhi, etc.), etc.

4.2 Objectives of Classification

The following are main objectives of classifying the data:

- i. It condenses the mass of data in an easily assailable form.
- ii. It eliminates unnecessary details.
- iii. It facilitates comparison and highlights the significant aspect of data.
- iv. It enables one to get a mental picture of the information and helps in drawing inferences.
- v. It helps in the statistical treatment of the information collected.

4.3 Features of Good Classification

There are no hard and fast rules for making classification of data. Technically the classification of data depends upon the nature, scope and

purpose of the study. Nonetheless, an ideal classification possesses some characteristics. Some of the characteristics are given below:

(i) Unambiguous

Classification of data must be unambiguous. Various classes should be so defined that there is no room for doubt for confusion.

(ii) Exhaustive and Mutually Exclusive

Classification should be done in such a manner that each and every item belongs to only one class. This implies that different classes should not overlap.

(iii) Suitability

Classification should conform to the object of enquiry. For example, if an enquiry is conducted to study the economic conditions of the workers of Charge Chrome project at Bhadrak it is of no use of classifying them on the basis of their caste or religion.

(iv) Stability

Data are classified generally on the basis of some criterion. Once such criterion is fixed, it should be retained for other related matters.

(v) Flexibility

A good classification should be flexible. It should have the capacity to accommodate with the new situation. Stability of classification does not mean rigidity of classes. The term stability is used in a relative sense. No classification can be stable for ever. Changes here and there become necessary with change in time and other changed circumstances. An ideal classification should be such that it can adjust itself to these changes and yet retain its stability.

4.4 Basis of Classification

There are four types of classification, viz., (i) qualitative; (ii) quantitative; (iii) temporal and (iv) spatial.

- (i) **Qualitative Classification:** It is done according to attributes or non-measurable characteristics; like social status, sex, nationality, occupation, etc. For example, the population of the whole country can be classified into four categories as married, unmarried, widowed and divorced. When only one attribute, e.g., sex, is used for classification, it is called **simple classification**. When more than one attributes, e.g., deafness, sex and religion, are used for classification, it is called **manifold classification**.
- (ii) **Quantitative Classification:** It is done according to numerical size like weights in kg or heights in cm. Here we classify the data by assigning arbitrary limits known as class-limits. The quantitative phenomenon under study is called a variable. For example, the population of the whole country may be classified according to different variables like age, income, wage, price, etc. Hence this classification is often called '**classification by variables**'.

A variable in statistics means any measurable characteristic or quantity which can assume a range of numerical values within certain limits, e.g., income, height, age, weight, wage, price, etc. A variable can be classified as either discrete or continuous.

- a. **Discrete Variable:** A variable which can take up only exact values and not any fractional values is called a 'discrete' variable. Number of workmen in a factory, members of a family, students in a class, number of births in a certain year, number of telephone calls in a month, etc., are examples of discrete-variable.
- b. **Continuous Variable:** A variable which can take up any numerical value (integral/fractional) within a certain range is called a 'continuous' variable. Height, weight, rainfall, time, temperature, etc., are examples of continuous variables. Age of students in a school is a continuous variable as it can be measured to the nearest fraction of time, i.e., years, months, days, etc.

(iii) Temporal Classification: It is done according to time, e.g., index numbers arranged over a period of time, population of a country for several decades, exports and imports of India for different five year plans, etc.

(iv) Spatial Classification: It is done with respect to space or places, e.g., production of cereals in quintals in various states, population of a country according to states, etc.

4.5 Tables

It is cumbersome to study or interpret large data without grouping it, even if it is arranged sequentially. For this, the data are usually organised into groups called classes and presented in a table which gives the frequency in each group. Such a frequency table gives a better overall view of the distribution of data and enables a person to rapidly comprehend important characteristics of the data. Tabulation may be defined as the systematic presentation of numerical data in rows or/and columns according to certain characteristics. It expresses the data in concise and attractive form which can be easily understood and used to compare numerical figures. Before drafting a table, you should be sure what you want to show and who will be the reader.

Advantages

The advantages of a tabular presentation over the textual presentation are:

- (i) It is concise;
- (ii) There is no repetition of explanatory matter;
- (iii) Comparisons can be made easily;
- (iv) The important features can be highlighted; and
- (v) Errors in the data can be detected.

Components of Table

An ideal statistical table should contain the following items:

- (i) **Table Number:** A number must be allotted to the table for identification, particularly when there are many tables in a study.
- (ii) **Title:** The title should explain the contents of the table. It should be clear, brief and set in bold type on top of the table. It should also indicate the time and place to which the data refer.
- (iii) **Date:** The date of preparation of the table should be given.
- (iv) **Stubs or Row Designations:** Each row of the table should be given a brief heading. Such designations of rows are called “stubs”, or, “stub items” and the entire column is called “stub column”.
- (v) **Column Headings or Captions:** Column designation is given on top of each column to explain to what the figures in the column refer. It should be clear and precise. This is called a “caption”, or, “heading”. Columns should be numbered if there are four, or, more columns.
- (vi) **Body of the Table:** The data should be arranged in such a way that any figure can be located easily. Various types of numerical variables should be arranged in an ascending order, i.e., from left to right in rows and from top to bottom in columns. Column and row totals should be given.
- (vii) **Unit of Measurement:** If the unit of measurement is uniform throughout the table, it is stated at the top right-hand corner of the table along with the title. If different rows and columns contain figures in different units, the units may be stated along with “stubs”, or, “Captions”. Very large figures may be rounded up but the method of rounding should be explained.
- (viii) **Source:** At the bottom of the table a note should be added indicating the primary and secondary sources from which data have been collected.
- (ix) **Footnotes and References:** If any item has not been explained properly, a separate explanatory note should be added at the bottom of the table.

A table should be logical, well-balanced in length and breadth and the comparable columns should be placed side by side. Light/heavy/thick or double rulings may be used to distinguish sub columns, main columns and totals. For large data more than one table may be used.

Sorting

Sorting of data is the last process of tabulation. It is a time-consuming process when the data is too large. After classification the data may be sorted using either of the following methods:

- (i) **Manual Method:** Here the sorting is done by hand by giving tally marks for the number of times each event has occurred. Next the total tally marks are counted. The method is simple and suitable for limited data.
- (ii) **Mechanical and Electrical Method:** To reduce the sorting time mechanical devices may be used. This is described as mechanical tabulation. For electrical tabulation data should be codified first and then punched on card. For each data a separate card is used. The punched cards are checked by a machine called '**verifier**'. Next the cards are sorted out into different groups as desired by a machine called '**sorter**'. Finally, the tabulation is done by using a tabulator. The same card may be sorted out more than once for completing tables under different titles.
- (iii) **Tabulation using Electronic Computer:** It is convenient to use electronic computer for sorting when (a) data are very large; (b) data have to be sorted for future use and (c) the requirements of the table are changing. Such tabulation is less time-consuming and more accurate than the manual method.

4.6 Bars Diagrams

Bar diagrams are those diagrams in which data are presented in the form of bars or rectangles. Bars are also called column.

Types of Bar Diagram

i. Simple Bar Diagram

Simple bar diagram can be drawn either on horizontal or vertical base, but bars on horizontal base more common. Bars must be uniform width and intervening space between bars must be equal. While constructing a simple bar diagram, the scale is determined on the basis of the highest value in the series. To make the diagram attractive, the bars can be coloured. Bar diagram are used in business and economics. However, an important limitation of such diagrams is that they can present only one classification or one category of data. For example, while presenting the population for the last five decades, one can only depict the total population in the simple bar diagrams, and not its sex-wise distribution.

ii. Multiple Bar Diagram:

Multiple bar diagram is used for comparing two or more sets of statistical data. Bars are constructed side by side to represent the set of values for comparison. In order to distinguish bars, they may be either differently coloured or there should be different types of crossings or dotting, etc. An index is also prepared to identify the meaning of different colours or dotting.

iii. Sub-divided Bar Diagram:

In a sub-divided bar diagram, the bar is sub-divided into various parts in proportion to the values given in the data and the whole bar represent the total. Such diagrams are also called Component Bar diagrams. The sub divisions are distinguished by different colours or crossings or dotting. The main defect of such a diagram is that all the parts do not have a common base to enable one to compare accurately the various components of the data.

iv. Percentage bar diagram:

This is another form of component bar diagram. Here the components are not the actual values but percentages of the whole. The main difference between the sub-divided bar diagram and percentage bar diagram is that in the former the bars are of different heights since their totals may be different whereas in the latter the bars are of equal height since each bar represents 100 percent. In the case of data having sub-division, percentage bar diagram will be more appealing than sub-divided bar diagram.

4.7 Histograms

A histogram is a bar chart or graph showing the frequency of occurrence of each value of the variable being analysed. In histogram, data are plotted as a series of rectangles. Class Intervals are shown on the 'X-axis' and the frequencies on the 'Y-axis'. The height of each rectangle represents the frequency of the class interval. Each rectangle is formed with the other so as to give a continuous picture. Such a graph is also called staircase or block diagram. However, we cannot construct a histogram for distribution with open-end classes. It is also quite misleading if the distribution has unequal intervals and suitable adjustments in frequencies are not made.

4.8 Ogives

For a set of observations, we know how to construct a frequency distribution. In some cases we may require the number of observations less than a given value or more than a given value. This is obtained by accumulating (adding) the frequencies upto (or above) the give value. This accumulated frequency is called cumulative frequency. These cumulative frequencies are then listed in a table is called cumulative frequency table. The curve table is obtained by plotting cumulative frequencies is called a cumulative frequency curve or an ogive.

There are two methods of constructing ogive namely:

1. The 'less than ogive' method
2. The 'more than ogive' method.

In less than ogive method we start with the upper limits of the classes and go adding the frequencies. When these frequencies are plotted, we get a rising curve. In more than ogive method, we start with the lower limits of the classes and from the total frequencies we subtract the frequency of each class. When these frequencies are plotted we get a declining curve.

Chapter at a Glance:

- **Classification of Data:** “The process of arranging things in groups or classes according to their resemblances and affinities and gives expression to the unity of attributes that may subsist amongst a diversity of individuals is called classification.” Cannon
- **Objectives of classification:** simplification and briefness, utility, distinctiveness, comparability, scientific arrangements and attractive and effectiveness.
- **Features of good classification:** comprehensive, clarity, homogeneity, suitability, stability and elastic.
- **Basis of classification:** There are four types of classification, viz., (i) qualitative; (ii) quantitative; (iii) temporal and (iv) spatial.
- **Tables:** Tabulation may be defined as the systematic presentation of numerical data in rows or/and columns according to certain characteristics.
- **Bars Diagrams:** Bar diagrams are those diagrams in which data are presented in the form of bars or rectangles. Bars are also called column.
- **Histograms:** A histogram is a bar chart or graph showing the frequency of occurrence of each value of the variable being analysed. In histogram, data are plotted as a series of rectangles. Class Intervals are shown on the ‘X-axis’ and the frequencies on the ‘Y-axis’.
- **Ogives:** The curve table is obtained by plotting cumulative frequencies is called a cumulative frequency curve or an ogive.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. The curve table is obtained by plotting cumulative frequencies is called a _____.
2. A _____ is a bar chart or graph showing the frequency of occurrence of each value of the variable being analysed.
3. _____ are those diagrams in which data are presented in the form of bars or rectangles.
4. Bars are also called _____.
5. The systematic presentation of numerical data in rows or/and columns according to certain characteristics is called _____.
6. There are four types of classification, viz., (i) qualitative; (ii) quantitative; (iii) temporal and (iv) _____.
7. The process of arranging things in groups or classes according to their resemblances and affinities and gives expression to the unity of attributes that may subsist amongst a diversity of individuals is called _____.
8. In _____ method, we start with the lower limits of the classes and from the total frequencies we subtract the frequency of each class.
9. In _____ method we start with the upper limits of the classes and go adding the frequencies.
10. _____ Diagram is used for comparing two or more sets of statistical data.

Answer key

- | | | |
|-------------------|--------------------|--------------------|
| 1. ogive | 2. Histogram | 3. Bar diagrams |
| 4. Column | 5. Tabulation | 6. Spatial |
| 7. Classification | 8. More than ogive | 9. Less than ogive |
| 10. Multiple bar | | |

(B) State whether the following statements are True or False.

1. Sorting of data is the last process of tabulation.
2. The data should be arranged in such a way that any figure can be located easily.
3. It is easy to study or interpret large data without grouping it
4. A variable which can take up any numerical value (integral/fractional) within a certain range is called a 'continuous' variable.
5. A variable in statistics means any measurable characteristic or quantity which can assume a range of numerical values within certain limits
6. When more than one attributes, e.g., deafness, sex and religion, are used for classification, it is called manifold classification.
7. When only basic attributes are used for classification, it is called simple classification.
8. Classification should conform to the object of enquiry
9. Classification should be done in such a manner that each and every item belongs to two or more classes.
10. The raw data, collected in real situations are arranged in serial order.

Answer key:

- | | | | | |
|---------|----------|----------|----------|------------|
| 1. True | 2. True | 3. False | 4. True | 5. True |
| 6. True | 7. False | 8. True | 9. False | 10. False. |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. Which of the following is not geometric form of data presentation?
(A) Bar diagrams (B) pie diagrams
(C) Histograms (D) none of the these
2. Which of the following is incorrect?
(A) Bars may be vertical (B) Bars may be horizontal
(C) All bars have some base line (D) All bars are of same size

3. Diagrams which show simultaneously, different parts of the values of a set of data in terms of percentage are called
 (A) Simple bar diagram (B) multiple bar diagram
 (C) Sub divided bar diagram (D) percentage bar diagram
4. The bar is sub-divided into various parts in proportion to the values given in the data and the whole bar represent the total are called as.
 (A) Simple bar diagram (B) multiple bar diagram
 (C) Sub divided bar diagram (D) percentage bar diagram
5. Bars are constructed side by side to represent the set of values for comparison in _____.
 (A) Simple bar diagram (B) multiple bar diagram
 (C) Sub divided bar diagram (D) percentage bar diagram
6. An important limitation of _____ diagrams is that they can present only one classification or one category of data.
 (A) Simple bar (B) multiple bars
 (C) Sub divided bar (D) percentage bar
7. The **advantages** of a tabular presentation over the textual presentation are
 (A) It is concise (B) no repetition
 (C) Comparisons can be made easily (D) all of the above
8. A variable which can take up only exact values and not any fractional values is called a _____.
 (A) variable (B) discrete variable
 (C) continuous variable (D) finite variable

Answer key:

- | | | | |
|------|------|------|------|
| 1. C | 2. D | 3. D | 4. C |
| 5. B | 6. A | 7. D | 8. B |

(D) Very Short Answer Type Questions

1. What is variable?
2. Define discrete variable.
3. Define continuous variable.
4. What is the limitation of tabulation?
5. What is the suitability of classification?
6. Write any one definition of classification.
7. Write any one feature of good classification.
8. Write any one objective of classification.
9. What is the importance of tabulation?
10. What is the need of bar diagrams?

2. Short Answer Type Questions

1. What do you mean by bar diagrams?
2. Explain the methods of construction of bar diagrams.
3. What are various types of bar diagrams?
4. Discuss any three methods of sorting.
5. Discuss the importance of tabulation.
6. Discuss the role of classification in statistics.
7. What are various types of ogives?
8. Explain the histograms.
9. Briefly explain the difference between histogram and bar diagrams.

3. Long Answer Type Questions.

1. What are the various methods of classification of data?
2. Discuss the various types of bar diagrams?
3. What is meant by sorting and what are different ways of sorting?
4. Write a note on i) histograms and ii) ogives.

Chapter

5

Micro Economics

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Meaning of Economics*
- *Characteristics of Economics*
- *Scope and Importance of Economics*
- *Meaning of Micro Economics*
- *Scope and Importance of Micro Economics*
- *Differentiation between Micro Economics And Macro Economics*
- *Limitation of Micro Economics*

5.1 Meaning of Economics

The term “economics” has been derived from a Greek Word “Oikonomia” which means “household Management”. Economics is a social science. It is called “social” because it studies mankind of society. It deals with aspects of human behavior. It is called science since it studies social problems from a scientific point of view. The development of economics as a growing science can be traced back in the writings of Greek philosophers like Plato and Aristotle. Economics was treated as a branch of politics during early days of its development because ancient Greeks applied this term to management of city-state, which they called “Polis”. Actually economics broadened into a full fledged social science in the later half of the 18th century. Economics is that branch of knowledge which is concerned with the study of allocation of scarce resources among competing firms. Individuals, enterprises and nations all suffer with the problem of resource allocation. Economic science has developed various tools and concepts to deal with such allocation problem.

Economics is using great deal of mathematical and statistical tools to solve these resource allocation problems. Economics is the science of choice in the face of unlimited ends and scarce resources that have alternative uses. The concepts and theories of economics help us to economize i.e. to achieve maximum output by using the minimum input.

5.2 Some Definitions of Economics

Classical economists like Adam Smith, Ricardo, Mill Malthus and others; socialist economist like Karl Marx; neo-classical economists like Alfred Marshall, A.C. Pigou and Lionel Robbins and modern economists like J.M. Keynes, Samuelson and others have made considerable contribution to the development of Economics. Hence a plethora of definitions are available in connection with the subject matter of economics. These are broadly divided into

- i. Wealth Definition,
- ii. Welfare Definition,
- iii. Scarcity Definition and
- iv. Growth Definition

i. Wealth Definition

The science of economics was born in 1776, when Adam Smith published his famous book "An Enquiry into the Nature and Cause of Wealth of Nation". *He defined economics as the study of the nature and cause of national wealth.* According to him, economics is the study of wealth- How wealth is produced and distributed. He is called as "father of economics" and his definition is popularly called "Wealth Definition". But this definition was severely criticized by highlighting the points like;

- a. Too much emphasis on wealth,
- b. Restricted meaning of wealth,
- c. No consideration for human feelings,
- d. No mention for man's welfare and is silent about economic problem etc.

ii. Welfare Definition

It was Alfred Marshall who rescued the economics from the above criticisms. By his classic work "Principles of Economics", published in 1890, he

shifted the emphasis from wealth to human welfare. According to him wealth is simply a means to an end in all activities, the end being human welfare. *He adds, that economics "is on the one side a study of the wealth; and the other and more important side, a part of the study of man"*. Marshall gave primary importance to man and secondary importance to wealth. Prof. A C Pigou was also holding Marshall's view. This definition clarified the scope of economics and rescued economics from the grip of being called "Dismal science". But this definition was also criticized on the grounds that welfare cannot be measured correctly and it has ignored the valuable services like teachers, lawyers, singers etc (non-material welfare)

"A study of man's action in the ordinary business of life, it enquires how he gets his income and how it uses it. Thus, on the one side, it is a study of wealth and on the other hand more important side, a part of the study of man." **Prof. Marshall**

iii. Scarcity Definition

After Alfred Marshall, Lionel Robbins formulated his own conception of economics in his book "The Nature and Significance of Economic Science" in 1932. According to him, *"Economics is the science which studies human behavior as a relationship between ends and scarce means which have alternative uses"*. He gave importance to four fundamental characters of human existence such as:

- a. **Unlimited Wants**- In his definition "ends" refers to human wants which are boundless or unlimited.
- b. **Scarcity of Means** (Limited Resources) – The resources (time and money) at the disposal of a person to satisfy his wants are limited.
- c. **Alternate Uses of Scarce Means**- Economic resources are not only scarce but have alternative uses also. So one has to make choice of uses.
- d. **The Economic Problem** –When wants are unlimited, means are scarce and have alternate uses, the economic problem arises. Hence we need to arrange wants in the order of urgency.

The merits of Scarcity Definition are; this definition is analytical, universal in application, a positive study and it considers the concept of opportunity cost. But this definition was also criticized on the grounds that; it

is too narrow and too wide, it offers only light but not fruit, confined to micro analysis and ignores growth economics etc..

iv. Modern/Growth Definition

The credit for revolutionizing the study of economics goes to Lord J.M Keynes. *He defined economics as the “study of the administration of scarce resources and the determinants of income and employment”*. Prof. Samuelson gave a definition based on growth aspects which is known as Growth definition, *“Economics is the study of how people and society end up choosing, with or without the use of money to employ scarce productive resources that could have alternative uses to produce various commodities and distribute them for consumption, now or in the future, among various persons or groups in society. Economics analyses the costs and the benefits of improving patterns of resources use”*.

Main features of growth definition are; it is applicable even in barter economy, the inclusion of time element makes the scope of economics dynamic and it is an improvement on scarcity definition.

5.3 Characteristics of Economics

The main features of economics are as follows:

- i. Economic analysis is an aid to understand business practice in a given environment and thereby to make business decisions which are primarily economic in future.
- ii. Economics is, therefore, a valuable guide to management. The extent of guidance would depend very much on the extent of integration between abstract economic theories and real world business practices.
- iii. Economics provides concepts and theories.
- iv. Economic theories and concepts furnish as a tool and techniques.

5.4 Scope of Economics

There are two views about the subject- matter of economics :-

i. Traditional View

According to traditional view there are **four** aspects of economics

Consumption

Relates to the study of the consumer, the nature of human wants, their satisfaction and the nature of demand.

Production

The factor inputs are converted in to output. **Land, Labor, Capital** and **Management** are the four agents of production. Different combinations of these agents yield different outputs.

Exchange

Refers to transactions between producers and consumers. It examines the price and output decisions under various market conditions.

Distribution

Studies the respective shares, i.e. rent, wages, interest and profit that go to the four agents of production.

ii. Modern View

According to Modern view Economics is composed of **PRICE THEORY, INCOME AND EMPLOYMENT THEORY** and **GROWTH THEORY**.

1. Traditional View	2. Modern View
❖ Consumption	Price Theory
❖ Production	Income and Employment Theory
❖ Exchange	Growth Theory
❖ Distribution	

5.5 Importance of Economics

Economics is of great importance to managers. It helps them to perform their duties and responsibilities efficiently. Main function of managers is to allocate scarce resources of business efficiently and effectively so as to

attain maximum benefit out of it. With the use of limited resources, maximizing the benefits of organization is primary objective of manager. All the resources whether land, labour or capital are limited with the organization but the goals of organization are unlimited like maximum profit, increase in sales, least cost etc. So the task of manager is to optimize the use of these limited resources. Economics provide management with logic, tools and techniques of making optimum use of limited resources to achieve goals of business.

5.6. Branches of Economics

There are two branches of economics i) Micro Economics and ii) Macro Economics. Micro economics is the study of individual economic behaviour of a consumer, a firm, a household etc. Macro economics is the study of aggregate like national income, price level, output, employment etc. economics may be classified as positive as well as normative economics. Positive economics means general economic conditions whereas normative economics deals with how to handle the economic problems. **Microeconomics** is concerned with the determination of price, which is a function of demand and supply. All the four aspects of the traditional view are covered in micro economics. On the other hand, **Macro economics** is concerned with the economic system as a whole. It analyses the total income, expenditure, employment and growth of the entire economy.

5.6.1 Micro Economics

The word 'micro' came from the greek word 'mikros' which means small. Microeconomics is concerned with the analysis behaviour of individual (specific or particular). It studies the behaviour of the individual units and small groups of such units. It is a study of particular firms, particular households, individual prices, wages, incomes, individual industries and particular commodities. Thus micro-economics gives a microscopic view of the economy. Microeconomics observes the economic variable through the microscope. In microeconomics, one assumption is made and other things remain constant/equal. It deals with decision making and resource allocation of individual and studies how individual consumer and producer behave and how

they interact with each other. *It answers the important questions of the economy like what to produce, how to produce, who will produce and how to distribute it. Micro economics is basically price theory or value theory.*

i. Scope of Micro Economics

1.6.1.1 Scope of Micro Economics

Micro economics is often called as 'Price Theory' or 'Value Theory'. The subject matter of micro economics covers the following areas:

a. Theory of Value i.e. 'Product Pricing': Price theory explains how the price of a particular commodity is determined in the commodity market by the forces of demand and supply. Price determination contains:

- a. Theory of Demand for the analysis of consumer behaviour
- b. Theory of Production and Cost for analysis of producer behaviour
- c. Theory of Product Price or Price Determination under different markets.

b. Theory of Pricing i.e. 'Factor Pricing': Other important branch of micro economics is Factor Pricing. It explains how rewards of various factors of production i.e. land; labour; capital and enterprise are calculated for their productive contribution. It is the study of phenomena of rent, wages, interest and profit as a reward for a factor of production.

c. Theory of Economic Welfare: Micro Economics deals with the optimum allocation of resources and maximization social welfare. It explains how the overall efficiency can be attained. It explains how the producer or consumer maximizes its satisfaction by allocating minimum inputs and getting maximum output. It not only deals with individual welfare but also social welfare. It provides answers to question like, 'What to produce?' "When to produce?" 'How to produce?' and 'For whom it is to be produced?'

The scope of micro economics can be discussed with the help of chart 1.1 given below:

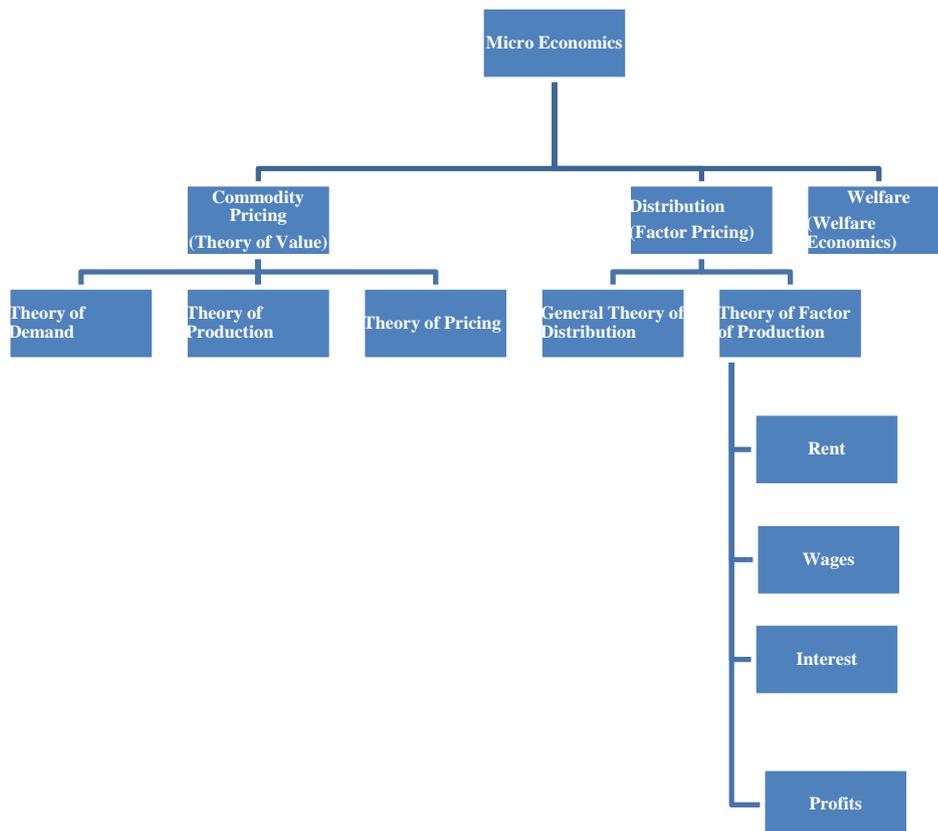


Chart 1.1 Scope Of Micro Economics

ii. Importance of Micro Economics

Microeconomics is useful to the firm to make the prediction. The tools of Microeconomics are useful in preparing the expansion. Microeconomics provides an understanding of the working of market mechanism in free economy. Price Productivity Theory is helpful to the manager to estimate the

demand and to estimate the supply. Distribution Theory helps the manager to determine the cost of production. It is of great theoretical and practical significance. Some of them are discussed below.

- a. **Price Determination and Resource Allocation:** Micro economics explains the phenomenon of price determination and resource allocation. It explains the working of market mechanism in capitalist and free enterprise economy.
- b. **Decision Making:** Micro economics helps in business decision making. It helps businessmen to determine the price policy. It also helps in optimal allocation of scarce resources to achieve maximum production and profit.
- c. **Production Planning:** Micro economics tools helps business in making its expansion plans and investment decisions.
- d. **Forecasting:** It helps business to make conditional predictions. Demand forecasting depends upon the law of demand.
- e. **Art of Economizing:** Micro economics helps to allocate scarce resources efficiently so as to gain maximum out of minimum. So it is the art of economizing. It is the art of getting maximum out of minimum.
- f. **Economic Policies:** Micro economics tools helps government in deciding tax policy rationally and desirably. It also helps government to decide price policy for public enterprises.
- g. **Welfare economics:** Micro economics serves as basis for welfare economics. It helps in examining the subjective satisfaction that individuals get from consuming goods and services from enjoying leisure.
- h. **International Trade:** It also explains the phenomena of international trade. Theories of micro economics explain the aspect of international trade like exchange rate determination, impact of tariffs on prices

iii. Differentiation between Micro Economics and Macro Economics

Micro economics is the study of individual economic behaviour of a consumer, a firm, a household etc. Macro economics examines the economy as a whole to explain broad aggregates. Macro economics is the study of aggregate like national income, price level, output, employment etc. It also studies effects of monetary fiscal policy.

Basis Of Difference	Micro Economics	Macro Economics
Nature	It is study of behaviour of individual units, in particular, consumers, firms and producers.	It is the study of the behaviour of the economy as a whole.
Methodology	It is individualistic in methodological approach.	It is aggregate in methodological approach.
Economic Variables	Micro economics is concerned with the behaviour of micro variables such as individual demand, supply, wages etc.	Macro economics is concerned with the behaviour of macro variables such as national income, price levels, national output, etc.
Field Of Interest	It deals with the problems of pricing and income distribution.	It deals with the problems of the size of national income, economic growth and the general price level.

Outlook And Scope	Scope of micro economics is limited to individual units. So its scope is limited.	Scope of macro economics is broad and related to economy as whole.
Area Of Study	Theory of value and theory of economic welfare are the major areas of study of micro economics.	Income, employment and monetary theory are the major areas of study of macro economics.

iv. **Limitation of Micro Economics**

Micro economics is a significant branch of economic science and its immense usefulness in explaining economic behaviour of individual units, still suffers from inherent limitations. These limitations are discussed below:

- a. **Concept of Marginalism:** Most of the microeconomic theories are abstract. Theories are based on principle of marginalism. Marginal changes are referred as relevant phenomena. While in practice it is not possible to realize this marginalism approach.
- b. **Unrealistic Assumptions:** Most of the micro economic theories are static. These theories are based on ceteris paribus, i.e. others things being equal. Most of the micro economic theories have unrealistic assumptions like the assumption of full employment even in short term, which is unrealistic. Theories are over simplified by unrealistic assumptions.
- c. **Pure Capital Model:** Micro economic theories are based on pure capitalism or laissez-faire policy which doesn't exist in today's world. Therefore most of theories have no significance in practice.
- d. **Incomplete Explanation and Misleading Generalization:** Micro economics is misleading when it generalize from the individual

behaviour. It is not right to portrait the character and behaviour of aggregate from the behaviour of individual.

It can be concluded that microeconomics have certain inherent limitations like theories are abstract, static, assumes pure capitalism. It studies only a part of economic system not the whole economic system. It over simplifies theories by generalizing the individual behaviour to aggregate behaviour. It has many unrealistic assumptions.

Chapter at a glance:

- **Introduction to Economics:** Economics is a social science. It is called social because it deals with human behaviour. It is also called science because it deals with social problems of choice from scientific viewpoint.
- **Meaning of Economics:** Economics is that branch of knowledge which is concerned with the study of allocation of scarce resources among competing firms.
- **Definitions of Economics:** “Economics is the study of how people and society end up choosing, with or without the use of money to employ scarce productive resources that could have alternative uses to produce various commodities and distribute them for consumption, now or in the future, among various persons or groups in society. Economics analyses the costs and the benefits of improving patterns of resources use” **Prof. Samuelson**
- **Characteristics of Economics:** Economics provides concepts and theories. Economic theories and concepts furnish as a tool and techniques.
- **Scope of Economics:** Economics is composed of **PRICE THEORY, INCOME AND EMPLOYMENT THEORY** and **GROWTH THEORY**. Microeconomics is concerned with the determination of price, which is a function of demand and supply. All the four aspects of the traditional view are covered in micro economics. On the other hand, macro economics is concerned with the economic system as a whole. It analyses the total income, expenditure, employment and growth of the entire economy.

- **Importance of Economics:** Economics provide management with logic, tools and techniques of making optimum use of limited resources to achieve goals of business.
- **Meaning of Micro Economics:** Micro economics deals with decision making and resource allocation of individual. It studies how individual consumer and producer behave and how they interact with each other.
- **Scope of Micro Economics:** Micro economics is often called as 'Price Theory' or 'Value Theory'. The subject matter of micro economics covers the following areas:
 - Theory of Value i.e. 'Product Pricing'**
 - Theory of Pricing i.e. 'Factor Pricing'**
 - Theory of Economic Welfare**
- **Importance of Micro Economics:** Microeconomics is useful to the firm to make the prediction. The tools of Microeconomics are useful in preparing the expansion. Microeconomics provides an understanding of the working of market mechanism in free economy. Price productivity theory is helpful to the manager to estimate the demand and to estimate the supply. Distribution theory helps the manager to determine the cost of production. It is of great theoretical and practical significance.
- **Differentiation between Micro Economics and Macro Economics:** Micro economics is the study of individual economic behaviour of a consumer, a firm, a household etc. macro economics is the study of aggregate like national income, price level, output, employment etc.
- **Limitation of Micro Economics:** Micro economics is a significant branch of economic science and its immense usefulness in explaining economic behaviour of individual units, still suffers from inherent limitations.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. Micro and _____ are two main branches of traditional economics.
2. Economics is a _____ science.
3. Micro economics studies _____ behaviour.
4. Micro economics is also referred as _____ theory.
5. The term micro economics was first used by _____.
6. Micro economics is the _____ study of whole economics.
7. The word micro is coined from the greek word _____.
8. Micro economics deals with the study of _____.
9. Micro economics is often called as _____.
10. The term "economics" has been derived from a Greek Word _____.
11. _____ is called as "father of economics".
12. Economics is the study of administration of _____ and of the determinants of income and employment.
13. _____ is the study of the behaviour of the economy as a whole.
14. Micro economics explains the phenomenon of price determination and _____.
15. _____ explains how the producer or consumer maximizes its satisfaction by allocating minimum inputs and getting maximum output.

Answer key

- | | | |
|---------------------|--------------------------|--------------------------------|
| 1. Macro | 2. Social | 3. Individual |
| 4. Price | 5. Ragner Frisch | 6. Microscopic |
| 7. Mikros | 8. Individual Units | 9. Price Theory |
| 10. Oikonomia | 11. Adam Smith | 12. Scarce Resources |
| 13. Macro Economics | 14. Resource Allocation. | 15. Theory of Economic Welfare |

(B) State whether the following statements are True or false.

1. The word 'micro' came from the greek word 'mikros' which means small.
2. Micro economics studies of individual behaviour.
3. Micro economics is the study of aggregates.
4. Micro economics doesn't deal with national problems like poverty, inflation etc.
5. Micro economics adopts general equilibrium approach.
6. Micro economics is also called price theory.
7. Scarcity of resources occurs only in poor countries.
8. Subject matter of economics is divided into two parts; micro and macro economics.
9. Problems of a nation are studied in micro economics.
10. Price theory is the base of macro economics.

Answer key:

- | | | | | |
|---------|----------|----------|----------|------------|
| 1. True | 2. True | 3. False | 4. True | 5. False |
| 6. True | 7. False | 8. True | 9. False | 10. False. |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. Micro and _____ are two main branches of traditional economics.
(A) Political (B) Macro
(C) General (D) Public
2. Economics is a _____ science.
(A) Behavioural (B) Human
(C) Social (D) Political
3. Micro economics studies _____ behaviour.
(A) Group (B) Individual
(C) Social (D) Human

4. Micro economics is also referred as _____ theory.
 (A) Price (B) Demand
 (C) Income (D) Principles
5. The term micro economics was first used by _____.
 (A) Ragnar Frisch (B) Lord J.M. Keynes
 (C) Adam Smith (D) Prof. Samuelson
6. Micro economics is the _____ study of whole economics.
 (A) Unrealistic (B) Microscopic
 (C) General (D) Particular
7. The word micro is coined from the greek word _____.
 (A) Polis (B) Makros
 (C) Oikonomia (D) Mikros
8. Micro economics deals with the study of _____.
 (A) Price (B) Units
 (C) Aggregate (D) Whole
9. Micro economics is often called as _____.
 (A) Demand Theory (B) Price Theory
 (C) Supply Theory (D) Product Theory
10. The term "economics" has been derived from a Greek Word _____.
 (A) Polis (B) Makros
 (C) Oikonomia (D) Mikros
11. _____ is called as "father of economics".
 (A) Ragnar Frisch (B) Lord J. M. Keynes
 (C) Adam Smith (D) Prof. Samuelson
12. Economics is the study of administration of _____ and of the determinants of income and employment.
 (A) Scarce Resources (B) Unlimited Wants
 (C) Limited Wants (D) Unlimited Resources
13. _____ is the study of the behaviour of the economy as a whole.
 (A) Micro Economics (B) Economics
 (C) Macro Economics (D) Political Science
14. Micro economics explains the phenomenon of price determination and _____.
 (A) Resource Allocation (B) Income

(C) Demand

(D) Distribution

15. _____ explains how the producer or consumer maximizes its satisfaction by allocating minimum inputs and getting maximum output.

(A) Micro Economics

(B) Welfare Economics

(C) Macro Economics

(D) Political Science

Answer key:

1. B

2. C

3. B

4. A

5. A

6. B

7. D

8. B

9. B

10. C

11. C

12. A

13. C

14. A

15. B

(D) Very Short Answer Type Questions

1. What is economics?
2. What is Macro Economics?
3. What is Micro Economics?
4. Write any one difference between Micro economics and Macro Economics.
5. Name the four agents of production and their rewards.
6. Write any one wealth definition of economics.
7. Write any one welfare definition of economics.
8. Write any one scarcity definition of economics.
9. Write any one importance of Micro Economics.
10. What is limitation of Micro Economics? Give any one.

2. Short Answer Type Questions

1. What do you mean by Economics?
2. Explain the scope of Economics.
3. Why do you study Economics?
4. Discuss any three characteristic of Economics.

5. Discuss the importance of Economics.
6. Give any three differences between micro economics and macro Economics.
7. Discuss the role of Micro Economics.
8. What is the subject matter of Micro Economics?
9. Explain the significance of Micro Economics in business decision-making.
10. Briefly explain the nature of Micro Economics.
11. How Welfare Economics differs from Wealth Economics?

3. Long Answer Type Questions.

1. "Economics is much more than merely a theory of value or resource allocation." Discuss the concept of modern economics.
2. Define Economics and give its nature, scope.
3. Discuss the role of economics in managerial decision making.
4. How is micro economics different from macro economics?
5. What is micro economics? What are the limitations of micro economics?
6. "An enquiry into the nature and causes of wealth of nations." Discuss in light of wealth definitions of economics.
7. "Economics is the science which studies human behavior as a relationship between ends and scarce means which have alternative uses". Discuss.
8. "Economics is the study of administration of scarce resources and of the determinants of income and employment." Discuss the statement.

Chapter

6

MANAGERIAL ECONOMICS

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Introduction to Managerial Economics*
- *Meaning and Characteristics of Managerial Economics*
- *Differentiation between Managerial Economics and Economics*
- *Scope of Managerial Economics*
- *Relationship of Managerial Economics with Other Disciplines*
- *Objectives and Uses of Managerial Economics*
- *Role and Responsibilities of Managerial Economist*
- *Uses of Managerial Economics*

6.0 Introduction

The present business world has become very dynamic, complex, uncertain and risky. Therefore taking appropriate, correct and timely decision has become a challenging and tedious task. The existence/survival and growth of business basically depends on such decisions. Due to three reasons **Managerial Economics** emerged as a separate discipline. These are; a) complex nature of business decisions, b) increased use of economic theory and principles in business decision making and c) business need for trained and professionally expert human resource. All these factors lead to creation of a separate branch of study 'Managerial Economics'. It is usually a combination of traditional economic theory and the practical economics seen every day in the business environment.

Managerial Economics is also called as business economics. Managerial Economics is the application of economic theory, principles & quantitative methods to business decisions. It is the integration of economic theory with the business practices. Managerial Economics involves the analysis of scarce economic resources available to a firm among its business activities. So it is use of economics in business decision making.

6.1 Meaning of Managerial Economics

Managerial Economics is the combination of two words a) Managerial and b) Economics. **Managerial** which means management has two primary functions which are planning for future and making decisions. Planning for future in advance is called as forward planning. And other is decision making which refers to choose best alternative from the available options. Decisions can be made using various mathematical, statistical and other quantitative tools and techniques. Management wants optimal solutions for its problems and has to take decisions based on analysis of various alternatives available. **Economics** is the study of optimal use of scarce resources to satisfy human needs and wants. Human beings have unlimited wants but limited means to satisfy these wants. Human beings have to make choice to use their scarce means to satisfy their unlimited wants in such a manner to attain maximum satisfaction. Economics is divided into two broad categories: 1) Micro Economics and 2) Macro Economics. Micro Economics is that part of economics which deals with the problems of an individual; it may be individual consumer, producer or market. Micro Economics deals with problem related to demand, cost, production etc. Macro economics deals with the problems of the economy as a whole. Macro economics deals with national income, total employment, general price level etc.

*Managerial Economics is a form of economics that focuses on the application of economic analysis and statistics for business or management decisions.. Managerial Economics provides users with a more quantitative analysis of business situations through the use of mathematical formulas and other calculations, including risk analysis, production analysis, pricing analysis and capital budgeting. Most businesses use some form of Managerial Economics in their business operations. Managerial Economics is an **applied***

economics in the sphere of business management. It is an application of economic theory and methodology to decision-making problems faced by the business firms. Thus, it is the economics of business or managerial decisions or it is the process of application of principles, concepts and techniques and tools of economics to solve the managerial problems of business organizations.

Some Definitions

Managerial Economics has been defined differently by different scholars. Some of the popular definitions of Managerial Economics are given as below:

“Managerial Economics is economics applied in decision-making. It is a special branch of economics bridging the gap between the economic theory and managerial practice. Its stress is on the use of the tools of economic analysis in clarifying problems in organizing and evaluating information and in comparing alternative courses of action.”

W. W. Haynes

“Managerial Economics is the integration of economic theory with business practice for the purpose of facilitating decision-making and forward planning by management.”

Spencer & Siegelman

“The purpose of Managerial Economics is to show how economic analysis can be used in formulating business policies.”

Joel Dean

“Managerial Economics is concerned with the ways in which managers should make decisions in order to maximize the effectiveness or performance of the organizations they manage.”

Edwin Mansfield

“Managerial Economics is a fundamental academic subject which seeks to understand and to analyze the problems of managerial decision-making.”

D.C.Hauge

“Managerial Economics is concerned with the application of economic principles and methodologies to the decision making process within the firm or organization under the conditions of uncertainty.”

Prof. Even Douglas

“Managerial Economics is the synthesis of microeconomic theory and quantitative methods to find optimal solutions to managerial decision making problems.” **T.J.Wehster**

“Managerial Economics applies economic theory and methods to business and administrative decision making.” **Hirschey and Pappas**

“Managerial Economics is the analysis of major management decisions using the tools of economics.” **Samuelson and Marks**

Managerial Economics is the study of economic theories, logic, concepts and tools of economic analysis that are used in the process of business decision-making by the business managers in taking rational, correct and timely decisions. Managerial Economics is that part of economic theory which, in general, is concerned with business activities and in particular, concerned with providing solutions to problems arising in decision-making of business organizations. Indeed, it is **an integration of economic theory and business practices**. Therefore, Managerial Economics lies on the borderline of Economics and Business Management act as complementarily and bridge between Economics and Management. Managerial Economics is that branch of knowledge in which the concepts, methods and tools of economic analysis are used for analyzing and solving the practical managerial problems with the purpose of formulating rational and appropriate business policies.

6.2 Characteristics of Managerial Economics

Managerial Economics is concerned with the business firm and the economic problems that every business management need to solve. Spencer and Siegelman pointed to the fact that “Managerial Economics is the integration of economic theory and managerial practice for the purpose of facilitating decision – making and forward planning by management.” The nature of economic theory is considered relevant for managerial decision making. Following are the main characteristics of Managerial Economics:

- i. **Micro Economics:** Managerial Economics deals with problems of individual whether it is consumer, producer or firm, so it is micro-economic in nature. It does not deal with problems of economy as whole instead it studies an

individual business unit. In the case of Managerial Economics, micro-economics helps in studying what is going on within the firm, how best to use the available scarce resources between various activities of the firm, how to be technically as well as economically efficient, etc. Managerial Economics is micro-economic in character. This is because the unit of study is a firm and its problems. Managerial Economics does not deal with the entire economy as a unit of study.

- ii. **Use of Macro Economics:** Managerial Economics also study the macro environment to adjust the business operation according to the environment in which business runs. Environmental issues relate to general environment in which business operates. They are related to overall economic, social and political environment of the country. Managerial Economics is concrete and realistic. It avoids difficult abstract issues of economic theory. But it also involves complications ignored in economic theory in order to face the overall situation in which decisions are made. Economic theory ignores the variety of backgrounds and training found in individual firms. Conversely, Managerial Economics is concerned more with the particular environment that influences decision-making. Macroeconomics is also useful to Managerial Economics since it provides an intelligent understanding of the business environment. This understanding enables a business executive to adjust with the external forces that are beyond the management's control but which play a crucial role in the well being of the firm.
- iii. **Pragmatic:** Managerial Economics is pragmatic in nature. It does not deal with complicated and difficult abstract issues of the economic theory. It generalizes the situations.
- iv. **Normative:** Managerial Economics is normative in characteristic rather than positive economics. Managerial Economics tells what to do but not why to do. Therefore it is prescriptive rather than descriptive. Managerial Economics belongs to normative economics rather than positive economics. Normative economy is the branch of economics in which judgments about the desirability of various policies are made. Positive economics describes how the economy behaves and predicts how it might

change. In other words, Managerial Economics is prescriptive rather than descriptive. It remains confined to descriptive hypothesis.

- v. **Conceptual:** Managerial Economics is both conceptual and metrical and it helps the decision maker by providing measurement of various economic variables and their interrelationships
- vi. **Theory of Firm:** Managerial Economics largely uses that body of economic concepts and principles, which is known as Theory of the Firm or Economics of the Firm. In addition, it also seeks to apply profit theory, which forms part of distribution theories in economics.
- vii. **Wise Choices:** It is a science of decision making. It concentrates on decision making process, decision models and decision variables and their relationships and helps to make wise choices. Managers face problems related to scarcity and therefore need to make choices. Managerial Economics helps the manager to allocate these scarce means to various activities of firm and achieve its goal.
- viii. **Multi-Disciplinary:** Managerial Economics is a science as well as art. Managers work better by using organized knowledge about management. Organized knowledge underlying the practice may be referred to as "Science". Science and art are not mutually exclusive, they are complementary. As the science improves so shall art as has happened in the physical and biological environment. Managerial Economics involves various other disciplines like statistics, management, operations research, mathematics and psychology. So study of Managerial Economics is multidisciplinary.

6.3 Differentiation between Managerial Economics and Economics

Basis of difference	Economics	Managerial Economics
Character	It includes both micro and macro economics	It includes only micro economics
Nature	It is both positive and normative science.	It is normative in nature.
Theoretical	It deals with theoretical	It deals with practical

	aspect	aspect
Type of problem	It deals with only economic problems	It deals with both economic and non economic problems
Principles	Economics studies the principles of rent, wage, interest and profits.	Managerial Economics study mainly the principles of profit only.
Scope	Scope of economics is wide	Scope of Managerial Economics is limited.
Influencing factors	Economic theory is less affected by technological, human behavior, environmental factors.	Managerial Economics is affected by technological and environmental factors, human and behavioral considerations.
Study	Economics study both the firm and individual.	Managerial Economics study the problems of firm only.

6.4 Scope of Managerial Economics

Managerial Economics is a developing subject. The scope of Managerial Economics refers to its area of study. Managerial Economics has its roots in economic theory. The empirical nature of Managerial Economics makes its scope wider. Managerial Economics provides management with strategic planning tools that can be used to get a clear perspective of the way the business world works and what can be done to maintain profitability in an ever changing environment.

i. Demand Analysis and Forecasting:

A firm is an economic organization which transforms inputs into output that is to be sold in a market. Accurate estimation of demand, by analyzing the forces acting on demand of the product produced by the firm, forms the vital issue in taking effective decision at the firm level. A major part of managerial decision making depends on accurate estimates of demand. When demand is estimated, the manager does not stop at the stage of assessing the current demand but estimates future demand as well. This is what is meant by demand forecasting. This forecast can also serve as a guide to management for

maintaining or strengthening market position and enlarging profit. Demand analysis helps in identifying the various factors influencing the demand for a firm's product and thus provides guidelines to manipulate demand. The main topics covered are: Demand Determinants, Demand Distinctions and Demand Forecasting.

ii. Cost and Production Analysis:

Cost analysis is yet another function of Managerial Economics. In decision making, cost estimates are very essential. The factors causing variation in costs must be recognized and allowed for if management is to arrive at cost estimates which are significant for planning purposes. The determinants of estimating costs, the relationship between cost and output, the forecast of cost and profit are very vital to a firm. An element of cost uncertainty exists because all the factors determining costs are not always known or controllable. Managerial Economics touches these aspects of cost analysis as an effective knowledge and the application of which is corner stone for the success of a firm. Production analysis frequently proceeds in physical terms. Inputs play a vital role in the economics of production. The factors of production otherwise called inputs may be combined in a particular way to yield the maximum output.

Alternatively, when the price of inputs increases, a firm is forced to work out a combination of inputs so as to ensure that this combination becomes the least cost combination. The main topics covered under cost and production analysis are production function, least cost combination of factor inputs, factor productiveness, returns to scale, cost concepts and classification, cost-output relationship and linear programming.

iii. Inventory Management:

An inventory refers to a stock of raw materials which a firm keeps. Now the problem is how much of the inventory is the ideal stock. If it is high, capital is unproductively tied up. If the level of inventory is low, production will be affected. Therefore, quality of the Managerial Economics will use such methods as Economic Order Quantity (EOQ) approach, ABC analysis with a view to minimizing the inventory cost. It also goes deeper into such aspects, as motives of holding inventory, cost of holding inventory, inventory control, and the main methods of inventory control and management.

iv. Advertising:

To produce a commodity is one thing and to market it is another. Yet the message about the product should reach the consumer before he thinks of buying it. Therefore, advertising forms an integral part of decision making and forward planning. Expenditure on advertising and related types of promotional activities is called selling costs by economists. There are different methods for setting advertising budget: Percentage of Sales Approach, All You can Afford Approach, Competitive Parity Approach, Objective and Task Approach and Return on Investment Approach.

v. Pricing Decision, Policies and Practices:

Pricing is very important area of Managerial Economics. The control function of an enterprise is not only productions but pricing as well. While pricing a commodity, the cost of production has to be taken into account. Business decisions are greatly influenced by pervading market structure and the structure of markets that has been evolved by the nature of competition existing in the market. Pricing is actually guided by consideration of cost plan pricing and the policies of public enterprises. The knowledge of the pricing of a product under conditions of oligopoly is also essential. The price system guides the manager to take valid and profitable decision.

vi. Profit Management:

A business firm is an organization designed to make profits. Profits are acid tests of the individual firm's performance. In appraising a company, we must first understand how profit arises. The concept of profit maximization is very useful in selecting the alternatives in making a decision at the firm level. Profit forecasting is an essential function of any management. It relates to projection of future earnings and involves the analysis of actual and expected behaviour of firms, the sales volume, prices and competitor's strategies, etc. The main aspects covered under this area are the nature and measurement of profit, and profit policies of special significance to managerial decision-making.

Managerial Economics tries to find out the cause and effect relationship by factual study and logical reasoning. For example, the statement that profits are at a maximum when marginal revenue is equal to marginal cost, a substantial part of economic analysis of this deductive proposition attempts to reach specific conclusions about what should be done. The logic of linear

programming is deduction of mathematical form. In fine, Managerial Economics is a branch of normative economics that draws from descriptive economics and from well established deductive patterns of logic.

vii. Capital Management:

Planning and control of capital expenditures is the basic executive function. The managerial problem of planning and control of capital is examined from an economic stand point. The capital budgeting process takes different forms in different industries. It involves the equi-marginal principle. The objective is to assure the most profitable use of funds, which means that funds must not be applied when the managerial returns are less than in other uses. The main topics dealt with are: Cost of Capital, Rate of Return and Selection of Projects.

Thus a firm has uncertainties to rock on with. Therefore, it can be concluded that the subject matter of Managerial Economics consists of applying economic principles and concepts towards adjusting with these uncertainties of the firm. In recent years, there is a trend towards integration of Managerial Economics and Operation Research. Hence, techniques such as linear Programming, Inventory Models, Waiting Line Models, Bidding Models, Theory of Games, etc. have also come to be regarded as a part of Managerial Economics.

6.5 Relationship of Managerial Economics with Other Disciplines

A useful method of throwing light on the nature and scope of Managerial Economics is to examine its relationship with other disciplines. To classify the scope of a field of study is to discuss its relation to other subjects. Managerial Economics has a close linkage with other disciplines and fields of study. The subject has gained by the interaction with economics, mathematics and statistics and has drawn upon management theory and accounting concepts. The Managerial Economics integrates concepts and methods from these disciplines and bringing them to bear on managerial problems.

i. Managerial Economics and Operations Research:

In general, the relation between Managerial Economics is concerned with taking effective decisions. Given the firm's objectives, both are concerned

with what is the best way of achieving them. The difference, however, is: Managerial Economics is a fundamental academic subject which seeks to understand and to analyze the problems of business decision-taking, while operations research is an activity carried out by functional specialists

ii. Managerial Economics and Traditional Economics:

In general the relation between Managerial Economics and Economic Theory is very much like the relation of engineering to physics & machine to biology. It is in fact the relation of an applied field to its more fundamental & conceptual counter part. Economics provides certain basic concepts and analytical tools which are applied suitably to a business situation. Further, while economists mainly concentrate on the study of types of markets, Managerial Economists are concerned more with problems like the impacts of market or technological changes on a competitive position of the firm and the likely reactions of their own in the market. But Managerial Economist can get answers of the questions regarding the working of market mechanism only when they analyze the problems from a broader perspective of an economist. Thus, the two main contributions of economics to managerial economies are.

- a) To help in understanding the market & the general environment within which firm operates.
- b) To provide a philosophy for understandings & analyzing resource – allocation problems.

iii. Managerial Economics and Mathematics:

Mathematics provides a set of tools which help in the derivation and exposition of economic analysis. Mathematics is closely related to Managerial Economics. This is mainly because the Managerial Economics, besides conceptual, is also metrical. It derives its metrical property from the set fact that an individual function of Managerial Economics is to estimate and predict the relevant economic factors for decision making and forward planning.

iv. Managerial Economics and Statistics:

Statistics is widely used by Managerial Economists. Managerial Economics aims at quantifying the past economics activity as well as to predict

its future course. This is needed for a correct judgment and decision-making. Statistics is important to Managerial Economics. It provides the basis for the empirical testing of theory. Statistics is important in providing the individual firm with measures of the appropriate functional relationship involved in decision making. Statistics is a very useful science for business executives because business runs on estimates and probabilities. Statistics supplies many tools to Managerial Economics.

v. Managerial Economics and the Theory of Decision-Making:

The theory of decision-making is relatively a new subject that has significance for Managerial Economics. Much of economic theory is based on the assumption of a single goal maximization of profit for the firm or maximization of utility of a consumer. In the entire process of management and in each of the management activities such as planning, organizing, leading and controlling, decision making is always essential. In fact, decision making is an integral part of today's business management. A manager faces a number of problems connected with his business such as production, inventory, cost, marketing, pricing, investment and personnel. Economists are interested in the efficient use of scarce resources, hence they are naturally interested in business decision problems and they apply economics in management of business problems. Hence Managerial Economics is economics applied in decision making.

vi. Managerial Economics and Accounting:

Managerial Economics is closely related to accounting. It is concerned with recording the financial operation of a business firm. A business is started with the main aim of earning profit. Capital is invested it is employed for purchasing properties such as building, furniture, etc and for meeting the current expenses of the business. Management accounting provides the accounting data for taking business decisions. The accounting techniques are very essential for the success of the firm because profit maximization is the major objective of the firm.

6.6 Objectives and Importance of Managerial Economics

i. Objectives: The basic objective of Managerial Economics is to analyze the economic problems faced by the business. The other objectives are:

- a. To integrate economic theory with business practice.
- b. To apply economic concepts and principles to solve business problems.
- c. To allocate the scarce resources in the optimal manner.
- d. To make all-round development of a firm.
- e. To minimize risk and uncertainty
- f. To help in demand and sales forecasting.
- g. To help in profit maximization.
- h. To help achieve the other objectives of the firm like industry leadership, expansion implementation of policies etc.

ii. Importance: In order to solve the problems of decision making, data are to be collected and analyzed in the light of business objectives. Managerial Economics provides help in this area. The importance of Managerial Economics may rely in the following points:

- a. It provides tools and techniques for managerial decision making.
- b. It gives answers to the basic problems of business management.
- c. It supplies data for analysis and forecasting.
- d. It provides tools for demand forecasting and profit planning.
- e. It guides the Managerial Economist.
- f. It helps in formulating business policies.
- g. It assists the management to know internal and external factors which influence the business.

6.7 Role of Managerial Economics

Decision making is an integral part of today's business management. Making a decision is one of the most difficult tasks faced by a professional manager. A manager has to take several decisions in the management of business. Managerial decisions are based on the flow of information. *Decision*

making is both a managerial function and an organizational process. Once the decision is taken it is implemented within the minimum time and cost. A study of the principles of business decisions will enable managers to understand business problems in a better perspective and increase their ability to solve business problems faced by them in the management of business. Executives take many types of decisions connected with the business such as production, inventory, cost, marketing, pricing, investment and personnel. In the long-run, application of principles of business decisions will result in successful outcomes. A good decision is one that is based on logic, considers all available data and possible alternatives and applies the quantitative approach.

After conducting a survey of British Industry, Alexander and Kemp concluded the following roles of Managerial Economics

- Demand Forecasting
- Production Scheduling
- Economic Analysis of the Industry
- Investment Appraisal
- Security Management Analysis
- Advice on Foreign Exchange Management
- Advice on trade
- Pricing and Related decisions
- Analyzing and forecasting environmental factors

6.8 Functions and Responsibilities of Managerial Economist

A Managerial Economist can play an important role by assisting the management to solve the difficult problems of decision making and forward planning. Managerial Economists have to study external and internal factors influencing the business while taking the decisions. The important questions to be answered by the Managerial Economists include:

- i. Is competition likely to increase or decrease?

- ii. What are the population shifts and their influence on purchasing power?
- iii. Will the price of raw materials increase or decrease?
- iv. Managerial Economist can also help the management in taking decisions regarding internal operation of the firm.

Functions of Managerial Economist

Following are the important **specific functions** of Managerial Economist;

- i. Sales forecasting.
- ii. Market research.
- iii. Production scheduling
- iv. Economic analysis of competing industry.
- v. Investment appraisal.
- vi. Security management analysis.
- vii. Advise on foreign exchange management.
- viii. Advice on trade.
- ix. Environmental forecasting.
- x. Economic analysis of agriculture Sales forecasting

Responsibilities of Managerial Economist

A Managerial Economist can serve management best only if he always keeps in mind the main objective of his business, viz., to make a profit on its invested capital. His academic training and the critical comments from people outside the business may lead a Managerial Economist to adopt an apologetic or defensive attitude towards profits. Once management notices this, his effectiveness is almost sure to be lost. In fact, he cannot expect to succeed in serving management unless he has a strong personal conviction that profits are essential and that his chief obligation is to help enhance the ability of the firm to make profits.

The **responsibilities** of Managerial Economists are:

- i. To bring reasonable profit to the company.
- ii. To make accurate forecast.
- iii. To establish and maintain contact with individual and data sources.
- iv. To keep the management informed of all the possible economic trends.
- v. To prepare speeches for business executives.
- vi. To participate in public debates.
- vii. To earn full status in the business team.
- viii. Better management of scarce resources of the business
- ix. To provide management with the additional information through his personal contacts and other sources.
- x. He is responsible for conducting research for the business benefits.
- xi. To take up the challenges and special assignments with seriousness and earnestly.

Managerial Economist plays a vital role in decision making and forward planning. He needs to understand the responsibilities and obligations of the firm to do his work efficiently and effectively. Managerial Economists are appointed by big corporate houses to make scientific analysis of various economic problems faced by them in today's scenario.

Chapter at a Glance:

- ***Introduction to Managerial Economics:*** Managerial Economics is the application of economic theory, principles & quantitative methods to business decisions. It is the integration of economic theory with the business practices.

- **Meaning of Managerial Economics:** Managerial Economics is a form of economics that focuses on the application of economic analysis and statistics for business or management decisions. It is usually a combination of traditional economic theory and the practical economics seen every day in the business environment.
- **Definition:** “Managerial Economics is the integration of economic theory with business practice for the purpose of facilitating decision-making and forward planning by management.” **Spencer & Siegelman**
- **Characteristics of Managerial Economics:** the main characteristics of Managerial Economics are; It is basically micro economics; it is pragmatic; It is normative in nature; It is conceptual; It studies theory of firm; It helps to make wise choices; It is a multidisciplinary subject.
- **Differentiation between Managerial Economics and Economics:** Managerial Economics is the application of economic theory into practice while economics is study of theories and concepts. Managerial Economics is mainly concerned with micro-economics while economics is study of both micro and macro economics. Therefore the concept of Managerial Economics has a limited scope whereas economics has a wide scope.
- **Scope of Managerial Economics:** scope of Managerial Economics involves theory of demand analysis and forecasting, production decisions, cost analysis, profit analysis, profit management and inventory management.
- **Relationship of Managerial Economics with Other Disciplines:** Managerial Economics is the combination of various disciplines. It uses the logics of economics; mathematics and statistics to provide effective ways of thinking for making decisions of business.
- **Objectives and Uses of Managerial Economics:** The basic objective of Managerial Economics is to analyze the economic problems faced by the business.

- **Role and Responsibilities of Managerial Economist:** a Managerial Economist is one who is specialized in basic economic theory and with this knowledge; he applies it to business prosperity. The two primary tasks of Managerial Economist are: decision making and information processing. He is responsible for better management of scarce resources, forecasting, providing management with additional information, to maximize profit, to act as a researcher for business.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. Micro and _____ are two main branches of traditional economics.
2. Human needs are _____.
3. Means to satisfy human needs are _____.
4. Managerial Economics is application of _____ theory into practice.
5. Managerial Economics is also called as _____ economics.
6. Management has two primary functions which are planning for future and _____.
7. Managerial Economics deals with problems of _____.
8. Managerial Economics is _____ in character rather than positive economics.
9. The Managerial Economics integrates concepts and methods from _____.
10. Economics deals with both micro and macro economics whereas managerial economics deals with _____ only.
11. Scope of managerial economics is _____.
12. Economics is theoretical concept while managerial economics is _____ concept.
13. A business firm is an organization designed to make _____

14. Micro economics studies behaviour of a _____.
15. Economics is a _____ science.

Answer key

- | | | |
|---------------|----------------|----------------------|
| 1. Macro | 2. Unlimited | 3. Limited |
| 4. Economic | 5. Business | 6. Decision Making |
| 7. Individual | 8. Normative | 9. Multi disciplines |
| 10. Micro | 11. Limited | 12. Practical |
| 13. Profits | 14. Individual | 15. Social |

(B) State whether the following statements are True or False.

1. Economics is a social science.
2. Managerial economics deals with both micro and macro economics.
3. Scope of managerial economics is wide and scope of economics is limited.
4. Micro economics studies individual unit whether consumer, producer or firm.
5. Managerial economist plays a vital role in providing information to management.
6. Managerial economics is multidisciplinary.
7. Managerial economics studies whole economy.
8. Managerial economics is the application of economic theory into practice.
9. Managerial economist needs to study only internal factors which influence business.
10. Managerial economics doesn't balance between human needs and means.

Answer key:

- | | | | | |
|---------|----------|----------|----------|-----------|
| 1. True | 2. False | 3. False | 4. True | 5. True |
| 6. True | 7. False | 8. True | 9. False | 10. False |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. Managerial economics refers to the integration of economic theory with business

(A) Practice	(B) Decision
(C) Planning	(D) Principles

2. Every nation has resources which are

(A) Limited	(B) Unlimited
(C) Abundant	(D) Vast.

3. Managerial economics is also referred as

(A) Economic Science	(B) Applied Science
(C) Social Science	(D) Justice Economics
4. Scope of managerial economics consists:

(A) Theory of Firm	(B) Demand Analysis
(C) Cost Analysis	(D) All of These
5. Which is not the subject of the managerial economics

(A) Accounting Theory	(B) Profit Management
(C) Capital Management	(D) Pricing Decision
6. Which is the main function of managerial economist?

(A) Economic Analysis	(B) Industrial Market Research
(C) Sales Forecasting	(D) All Of These
7. Traditional fields of economics consists:

(A) Agricultural Economics	(B) Labour Economics
(C) Public Economics	(D) All of These
8. The emphasis of managerial economics is on

(A) Accounting Theory	(B) Normative Theory
(C) System Theory	(D) Bonus Theory
9. Micro economics includes

(A) Theory of Demand	(B) Product Pricing
(C) Determination of Product Pricing	(D) All of These
10. Which of the following statement is not an objective of managerial economics

(A) To integrate economic theory with business practice.	(B) To apply economic concepts and principles to solve business problems.
(C) To allocate the scarce resources in the optimal manner.	(D) To provide information about the personal assets, liabilities and capital of the business

Answer key:

- | | | | | |
|------|------|------|------|-------|
| 1. A | 2. A | 3. B | 4. D | 5. A |
| 6. D | 7. D | 8. B | 9. D | 10. D |

(D) Very Short Answer Type Questions.

1. What is economics?
2. Mention any one objective of Managerial Economics.
3. Write any one role of Managerial Economist.
4. Write any one difference between economics and Managerial Economics.
5. Mention any one discipline used in Managerial Economics.
6. What is decision making?
7. Give any one example of intangible asset.
8. What is forward planning?
9. What is the use of Managerial Economics?
10. What is responsibility of Managerial Economist?

2. Short Answer Type Questions.

1. What do you mean by Managerial Economics?
2. Explain the nature of Managerial Economics.
3. Why do you study Managerial Economics?
4. Discuss any three characteristic of Managerial Economics.
5. Discuss the scope of Managerial Economics.
6. Differentiate between economics and Managerial Economics.
7. Discuss the role of Managerial Economist.
8. What is the responsibility of Managerial Economist?
9. Explain the significance of Managerial Economics in business decision-making.
10. Briefly explain the nature of Managerial Economics.
11. How is Managerial Economics related to traditional economics?

12. What do you mean by decision making?
13. Discuss any two function of Managerial Economist.

3. Long Answer Type Questions.

1. "Managerial Economics is a study of the behavior of the firms in theory and practice." Discuss
2. Define Managerial Economics and give its nature, scope.
3. Discuss the role of managerial economics in managerial decision.
4. How is managerial economics different from traditional economics?
5. What are the other related topics than micro economics theories in managerial economics? How do they contribute to managerial economics?
6. "Managerial Economics bridges the gap between economic theory and managerial practice." Discuss
7. Discuss the relationship of managerial economics with other disciplines in detail.
8. Managerial economics is essentially the application of micro economic theory of business decision making. Discuss the statement.

Chapter

7

Consumer Equilibrium

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Introduction*
- *Meaning Of Utility*
- *Features of Utility*
- *Types Of Utility*
- *Law Of Diminishing Marginal Utility*
- *Importance Of Law*
- *Consumer's Equilibrium*
- *Criticism of Utility Analysis*

7.0 Introduction

A consumer is said to be the king of the market, and consumer consumes any product due to its utility. *Utility is the want satisfying capacity of any product.* Any product which gives satisfaction to the consumer is consumed by him. Consumer is rational, as he consumes that product which gives him maximum satisfaction with his given income and price of the product. *Consumer's optimization behaviour is that behaviour which relates to purchase of those goods and services which provide him maximum satisfaction from his limited*

income. Rational consumer will attempt to maximize the total satisfaction or utility that he derives from the purchase of a commodity.

7.1 Meaning of Utility

Consumers demand a commodity because they get utility from the consumption of that commodity. *Utility means want satisfying capacity of a commodity*. Utility is the psychological feeling of satisfaction, pleasure, happiness or well-being, which consumer gets by the consumption or use of a commodity. Every commodity has a utility. For example, a car has its own utility irrespective of the fact whether the person knows to drive the car or not. Another important attribute is that utility is the post consumption phenomenon as one derives satisfaction only when he uses the product. For one person car may be of great utility but for other person it may not be. Here it is a subjective or relative concept.

Some Definitions

“Utility is the quality of a good to satisfy a want.” **Hibdon**

“Utility is the power of a commodity or service to satisfy human wants.” **M.M.Bobber**

7.2 Features of Utility

The main features of utility are as under:

- i. **Subjective:** Utility is a subjective concept, and satisfaction from a product may differ from person to person. For example, a mango lover will get maximum satisfaction from consumption of mango but a person who is a kiwi lover will not derive maximum satisfaction from consumption of mango.
- ii. **Relative:** Utility of a product not always remains the same but it varies from place to place and time to time. For example, in winters, water heaters have utility but not in summers. Coolers have utility in summers but not in winters.

- iii. **May Not Be Always Useful:** Every product has utility but every product is not always useful. For example, liquor, cigarettes, tobacco etc are not useful products but still they satisfy the needs of some individuals.
- v. **Not Always Moral:** Utility of product has anything to do with morality. Alcohol, cigarette, tobacco consumption is considered immoral but it has nothing to do with their users.

7.3 Types of Utility

On the basis of consumption of commodity, there are three concepts of utility:

- i. **Initial Utility:** The utility derived from the first unit of a commodity is called initial utility. For example utility derived from the first chapatti is called initial utility. It is always positive.
- ii. **Total Utility:** Total utility is the sum of utility derived from the consumption of various units of commodity. In other words, it is the total utility derived by a person from consumption of all units of commodity. It is the utility derived from the total number of units consumed by him.

Definition:

“Total utility refers to the entire amount of satisfaction obtained from consuming various quantities of a commodity.” **Leftwitch**

Formula

$$TU_n = U_1 + U_2 + U_3 + \dots + U_n$$

Herein, TU_n = total utility, U_1 = utility from first unit, U_n = utility from nth unit

- iii. **Marginal Utility:** Marginal utility is the addition to a person’s total utility brought through the consumption of an additional unit of the commodity. Or in simple words marginal utility is the utility derived from the additional one unit consumed. It can also be defined as the addition to the total utility resulting from the consumption of one additional unit.

Definition:

“Marginal utility is the addition made to total utility by consuming one more unit of commodity.” **Lipsey**

“The marginal utility is the increase in total utility which results from a unit increase in consumption.” **Boulding**

Formula

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

Or

$$MU = \frac{\Delta TU}{\Delta Q}$$

Herein, TU_n = Total Utility of N Unit, TU_{n-1} = Total Utility From (N-1) Units

ΔTU = Change In Total Utility, ΔQ = Change In Quantity

Types of Marginal Utility

- a) **Positive Marginal Utility:** If by consuming additional unit of commodity, total utility increases then the marginal utility is positive.
- b) **Zero Marginal Utility:** If by the consumption of an additional unit the total utility remains same and doesn't increase then the marginal utility is zero.
- c) **Negative Marginal Utility:** If by the consumption of an additional unit of a commodity causes decrease in total utility then the marginal utility is negative.

Example

All the three types of marginal utility can be explained with the help of an example given below in table 7.1

Quantity	Total Utility	Marginal Utility	Details
0	0	Nil	Positive marginal utility
1	9	$9 - 0 = 9$	
2	15	$15 - 9 = 6$	
3	19	$19 - 15 = 4$	
4	21	$21 - 19 = 2$	Zero Marginal Utility
5	21	$21 - 21 = 0$	
6	19	$19 - 21 = - 2$	Negative Marginal Utility

Table 3.1 Total utility and Marginal Utility

7.4 Law of Diminishing Marginal Utility

Law of Diminishing Marginal Utility is based on the fact that as a person consumes or uses more and more of a commodity its utility goes on decreasing. This law is fundamental law of utility analysis. It explains the relation between utility and quantity of a commodity. The law of diminishing marginal utility states that, on other things being constant, the marginal utility of commodity diminishes as more of it is consumed in a given time period.

Definition

“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.” **Marshall**

“As a consumer increases the consumption of any one commodity, keeping constant the consumption of all other commodities, the marginal utility of the variable commodity must eventually decline.”

Boulding

“The law of diminishing marginal utility states that ceteris paribus as the amount of a good consumed increases, the marginal utility of that good diminishes.” **Samuelson**

“The more we have of a thing the less we want additional increments of it or the more we want not to have additional increments of it.”

Chapman

i. Assumptions

The law of diminishing marginal utility is based on certain assumptions, which are as under:

- a. Utility can be measured in cardinal numbers.
- b. Marginal utility of money remains the same.
- c. Every commodity has independent utility.
- d. All the units of commodity are homogeneous.
- e. Consumption of commodity is continuous.
- f. Commodity is consumed in standard units.
- g. Consumer is a rational consumer; he wants to maximize his satisfaction.
- h. No change in the income of consumer.

- i. No change in the taste and preference of consumer.
- j. All goods are divisible.
- k. Goods consumed by consumer are normal goods.

ii. Explanation

Law of diminishing marginal utility can be explained with the help of Table >.2 and Figure 1. The table shows that as the first chocolate is consumed the marginal utility is 4 utils but as more and more chocolate units are consumed the marginal utility goes on decreasing as in case of second, third and fourth unit. But in case of fifth unit marginal utility becomes zero and with additional consumption of sixth unit it goes to negative and become -1.

Chocolate Consumed	Marginal Utility
First	4
Second	3
Third	2
Fourth	1
Fifth	0
Sixth	-1

Table 7.2 Diminishing Marginal Utility

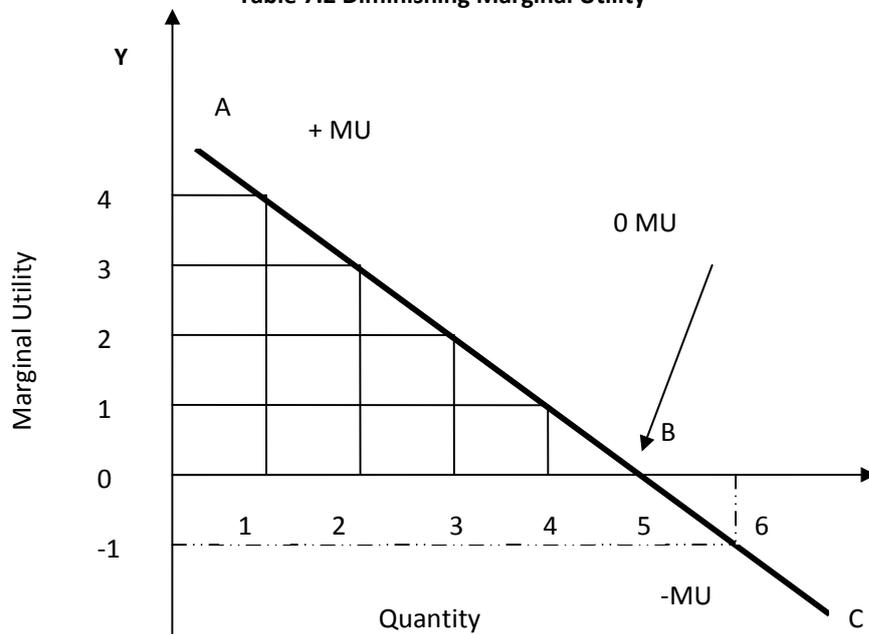


Figure 7.1 Marginal Utility Curve

In figure 7.1, quantity is shown on OX – axis and marginal utility on OY- axis. AC is marginal utility curve sloping downward from left to right. It indicates as more and more units of commodity are consumed the marginal utility starts diminishing. At point B it becomes zero. It is positive from Point A to Point B. After point B it is negative. Now the consumer has reached its saturation point. AC curves goes below the OX- Axis.

iii. Exceptions

There are certain exceptions to this law. It means that the law doesn't apply under following circumstances.

- a. **Initial Units:** When the additional units are consumed in small quantities, then the marginal utility from the additional units goes on increasing.
- b. **Misers:** The law does not hold good for misers as misers are out to acquire more and more wealth. Their desire for wealth is non-satisfactory.
- c. **Rare and Curious Things:** The law even doesn't hold well on rare and curious things. Those people who are fond of old coins, stamps, paintings etc. derive increasing marginal utility from each additional collection of coin, stamp or painting.
- d. **Good Books or Poem:** Good books or poems are considered to have increasing marginal utility as reading good book again and again gives more pleasure than before.
- e. **Drunkards:** For drunkards more and more quantity of liquor gives them increasing marginal utility. So the drunkards are regarded as exception to this law.
- f. **Large Number of Consumers:** As the number of users start increasing the marginal utility also starts increasing.

iv. Importance of Law

The law of diminishing marginal utility is important in every sphere of life. This law has theoretical as well as practical importance. The main benefits of law of diminishing marginal utility are as under:

- a. **Basis For Various Laws:** Law of diminishing marginal utility is basis for many other laws of economics like law of consumption, law of demand, consumer's surplus
- b. **Importance for Consumer:** Law of diminishing marginal utility explains the consumer to plan his expenditure according to utility derived from each additional unit of same commodity.
- c. **Importance for Producer:** Law of diminishing marginal utility helps the producer to plan his production plan. So producer has to plan variety of production due to continuous consumption of same commodity leads to diminishing marginal utility. Producer brings variety of changes in his product whether in design, colour, shape packaging etc.
- d. **Important for Price Determination:** Law of diminishing marginal utility helps in price fixation of a commodity. Depending on the nature of marginal utility prices can be fixed higher or lower as the case may be.
- e. **Importance for Socialism:** Law of diminishing marginal utility explains that the utility of money to rich man is not as great as to a poor man. The socialist, therefore support equality of national income on the reality that the money foregone by rich is much more relevant to the poor who receives that money. They are of opinion that an equitable distribution of national wealth will increase the total welfare in a country.
- vi. **Importance for Government:** Law of diminishing marginal utility helps the government in fixation of progressive taxation policy which means higher tax rates for the higher income group and lower taxation rates

for lower income group. Because marginal utility of money is less for rich but greater for poor.

7.5. Consumer's Equilibrium

Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure. The consumer has to pay a price for each unit of the commodity. So, he cannot buy or consume unlimited quantity. As per the Law of Diminishing Marginal Utility, utility derived from each successive unit goes on decreasing. At the same time, his income also decreases with purchase of more and more units of a commodity. So, a rational consumer aims to balance his expenditure in such a manner that he gets maximum satisfaction with minimum expenditure. When he does so, he is said to be in equilibrium. After reaching the point of equilibrium, there is no further incentive to make any change in the quantity of the commodity purchased. It is assumed that the consumer knows the different goods on which his income can be spent and the utility that he is likely to get out of such consumption. It means that the consumer has perfect knowledge of the various choices available to him. When consumers make choices about the quantity of goods and services to consume, it is presumed that their objective is to maximize total utility. In maximizing total utility, the consumer faces a number of constraints, the most important of which are the consumer's income and the prices of the goods and services that the consumer wishes to consume. The consumer's effort to maximize total utility, subject to these constraints, is referred to as the consumer's problem. The solution to the consumer's problem, which entails decisions about how much the consumer will consume of a number of goods and services, is referred to as consumer equilibrium.

"A consumer is in equilibrium when he regards his actual behaviour as the best possible under the circumstances and feels no urge to change his behaviour as long as the best remain unchanged." Tiber Scitovsky

1.Assumptions

The concept of consumer's equilibrium through utility approach is based on the following assumptions:-

- a. The consumer is rational.
- b. Cardinal measurement of utility is possible.
- c. Marginal utility of money remains constant.
- d. The law of diminishing marginal utility operates.
- e. Prices of commodities are given and remain constant.
- f. Taste and preference of consumer remains the same.
- g. Consumer has perfect knowledge about different goods he can buy from his given income and utility derived from each good.

7.5.1 Determination of Consumer's Equilibrium

Consumer's equilibrium through utility analysis can be explained under three circumstances. These are explained as under:

- i. **Single Commodity:** A consumer purchasing a single commodity will be at equilibrium, when he is buying such a quantity of that commodity, which gives him maximum satisfaction. The number of units to be consumed of the given commodity by a consumer depends on two factors:
 - a. Price of the given commodity;
 - b. Expected utility (Marginal utility) from each successive unit.

To determine the equilibrium point, consumer compares the price (or cost) of the given commodity with its utility (satisfaction or benefit). Being a rational consumer, he will be at equilibrium when marginal utility is equal to price paid for the commodity. *Marginal utility is expressed in **utils** and price is expressed in terms of **money**.* However, marginal utility and price can be

effectively compared only when both are stated in the same units. Therefore, marginal utility in utils is expressed in terms of money.

Marginal Utility in terms of Money = Marginal Utility in utils/ Marginal Utility of one rupee (MU_M)

Equilibrium Condition:

Consumer in consumption of single commodity (say, x) will be at equilibrium when: Marginal Utility (MU_x) is equal to Price (P_x) paid for the commodity; i.e. $MU = \text{Price}$

a. If $MU_x > P_x$, then consumer is not at equilibrium and he goes on buying because benefit is greater than cost.

b Similarly, when $MU_x < P_x$, then also consumer is not at equilibrium as he will have to reduce consumption of commodity x to raise his total satisfaction till MU becomes equal to price.

Suppose a consumer wants to buy a good. Further suppose that price of goods is Rs. 20 per unit. Let the utility be expressed in utils which are measured in rupees. In table 7.3 the marginal utility schedule of the consumer is given.

Quantity (a)	Utility (b)	Price (c)	Marginal Utility (a-b) = (d)
1	50	20	30
2	40	20	20
3	30	20	10
4	20	20	0
5	10	20	-10

Table 7.3 Consumer Equilibrium In Case Of Single Commodity

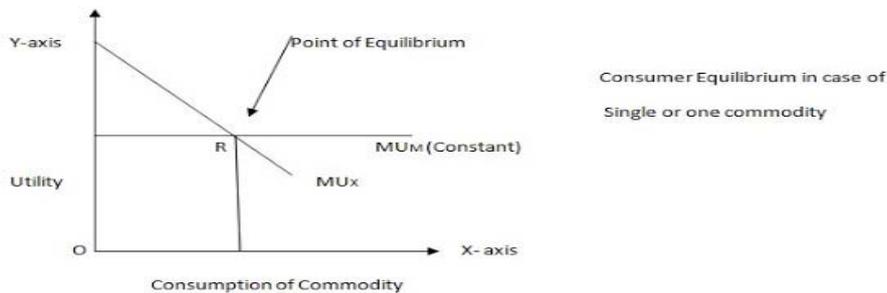


Figure 7.2 Consumer Equilibrium In Case Of Single Commodity

ii. Single Commodity with Several Uses: If a single commodity has several uses then a consumer will be in equilibrium if he distributes units of commodity in such a way that he gets equal marginal utility from each use.

$$MU_x \text{ Use} = MU_y \text{ Use}$$

This means the marginal utility from x use is equal to marginal utility from use y

Quantity of Electricity	M.U of Electricity in Cooler	M.U of electricity in A.C
1	12	10
2	10	8
3	8	6
4	6	4
5	4	2

Table 7.4 Consumer Equilibrium in Case Of Single Commodity with Several Uses

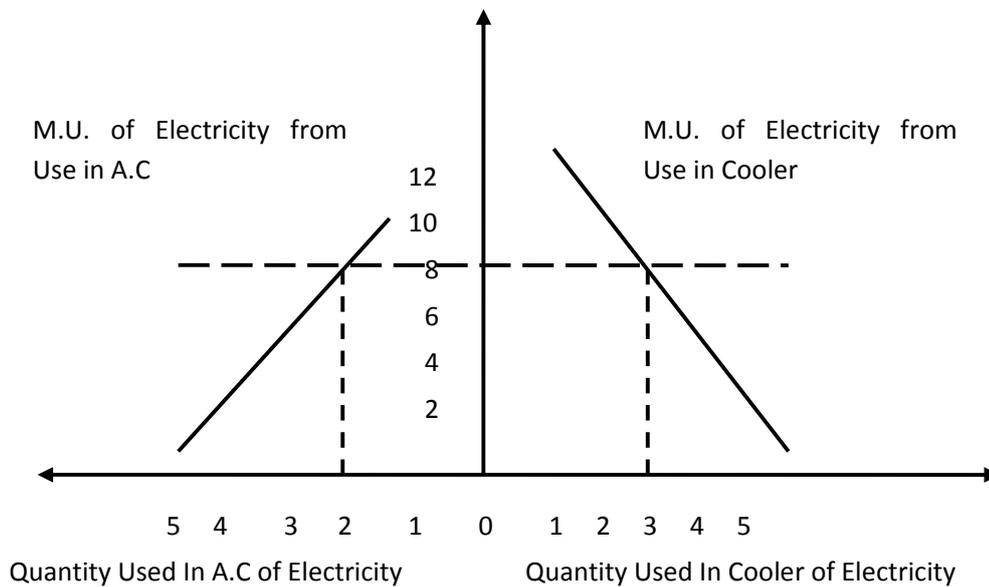


Figure 7.3 Consumer Equilibrium In Case Of Single Commodity with Several Uses

iii. Several Commodities: Consumer will be in equilibrium if he allocates his expenditure so that the utility gain from the last rupee spent on each commodity is

equal. Law of DMU is extended to many goods because he buys many goods which the consumer buys with his income.

“A consumer with a fixed income and facing given market prices of goods will achieve maximum satisfaction or utility when the marginal utility of the last dollar spent on each good is exactly the same as the marginal utility of the last dollar spent on the other good.” Samuelson

$$MU_a = MU_b = MU \text{ of Money}$$

Quantity of Commodity	M.U of Commodity A	M.U of Commodity B
1	14	12
2	12	10
3	10	8
4	8	6
5	6	4

Table 7.5 Consumer Equilibrium In Case Of Several commodities

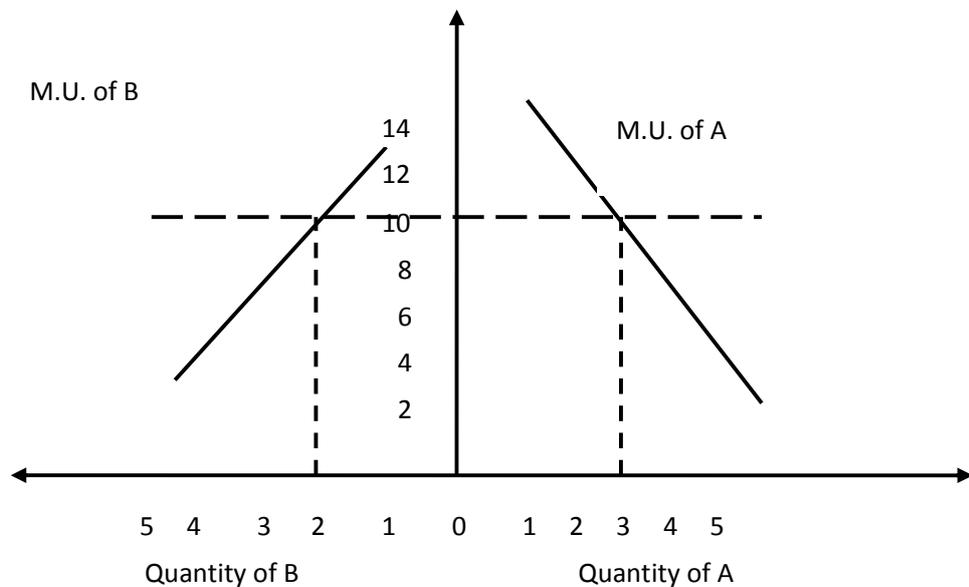


Figure 7.4 Consumer Equilibrium In Case Of Several Commodities

If in above example price of commodity A is P_a and that of B is P_b , then consumer's equilibrium is

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = MU \text{ of Money}$$

7.6 Criticism of Utility Analysis

Following are the main criticism of cardinal utility analysis:

1. Utility cannot be cardinally measured. Hence, the assumption that utility derived from the consumption of various commodities can be measured and expressed in quantitative terms is very unrealistic.
2. As income increases the marginal utility of money changes. Hence the assumption of constant marginal utility of money is not realistic.
3. Law of diminishing marginal utility is a psychological law, which cannot be empirically established and has to be taken for granted.
4. Utility is a subjective concept.
5. Utility of one commodity is dependent on the utility of other commodity.
6. Marginal utility of money does not remain same always.
7. This analysis is based on too many assumptions.
8. Consumer is regarded as a computer that he always count and calculate the utility.

Chapter at a Glance:

- **Introduction:** Utility is the want satisfying capacity of any product. Any product which gives satisfaction to consumer is consumed by him. Consumer is rational, as he consumes that product which gives him maximum satisfaction with his given income and price of the product.
- **Meaning of Utility:** Utility means want satisfying capacity of a commodity. Utility is the psychological feeling of satisfaction, pleasure, happiness or well-being, which consumer gets by the consumption or use of a commodity.
- **Definition:** "Utility is the quality of a good to satisfy a want." **Hibdon**
- **Features of Utility:** Utility is a subjective concept. Utility of a product not always remains the same. It varies from place to place and time to time. Every product has utility but every product is not always useful. Utility of product has anything to do with morality.
- **Types of Utility:** **Initial Utility:** The utility derived from the first unit of a commodity is called initial utility. **Total Utility:** Total utility is the sum of utility derived from the consumption of various units of commodity. **Marginal Utility:** Marginal utility is the addition to a person's total utility brought through the consumption of an additional unit of the commodity.
- **Law of Diminishing Marginal Utility:** "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." **Marshall**

- **Importance Of Law:** Law of diminishing marginal utility is basis for many other laws of economics like law of consumption, law of demand, consumer's surplus etc.; Law of diminishing marginal utility explains the consumer to plan his expenditure according to utility derived from each additional unit of same commodity. It **helps** the producer to plan his production plan; **it** helps in price fixation of a commodity; it explains that the utility of money to rich man is not as great as to a poor man. The socialist, therefore support equality of national income on the reality that the money foregone by rich is much more relevant to poor receiving that money. Law of diminishing marginal utility helps the government in fixation of progressive taxation policy which means higher tax rates for the higher income group and lower taxation rates for lower income group.
- **Consumer's Equilibrium:** Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure.
- **Criticism of Utility Analysis:** Utility cannot be cardinally measured. Law of diminishing marginal utility is a psychological law, which cannot be empirically established and has to be taken for granted. Utility is a subjective concept. Utility of one commodity is dependent on the utility of other commodity. Marginal utility of money does not remain same always. This analysis is based on too many assumptions. Consumer is regarded as a computer that he always count and calculate the utility.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. The law of diminishing marginal utility states that ceteris paribus as the amount of a good consumed _____, the marginal utility of that good diminishes.
2. When the additional units are consumed in _____ quantities, then the marginal utility from the additional units goes on increasing
3. Good books or poems are considered to have _____ marginal utility

4. Law of _____ marginal utility helps the producer to plan his production plan.
5. Law of diminishing marginal utility helps the government in fixation of _____ taxation policy
6. Consumer's Equilibrium refers to the situation when a consumer is having maximum satisfaction with _____ income and has no tendency to change his way of existing expenditure.
7. A consumer is in equilibrium when he regards his actual behaviour as the best possible under the circumstances and feels no urge to change his behaviour as long as the best remain _____.
8. A consumer purchasing a single commodity will be at _____, when he is buying such a quantity of that commodity, which gives him maximum satisfaction.
9. Utility is the quality of a good to _____ a want
10. Utility is a _____ concept
11. Utility of product has anything to do with _____.
12. The utility derived from the _____ unit of a commodity is called initial utility.
13. _____ utility is the sum of utility derived from the consumption of various units of commodity
14. _____ Utility is the addition to a person's total utility brought through the consumption of an additional unit of the commodity.
15. If by the consumption of an additional unit of a commodity causes decrease in total utility then the marginal utility is _____.

Answer key

- | | | |
|----------------|----------------|---------------|
| 1. Increases | 2. Small | 3. Increasing |
| 4. Diminishing | 5. Progressive | 6. Limited |
| 7. Unchanged | 8. Equilibrium | 9. Satisfy |
| 10. Subjective | 11. Morality | 12. First |
| 13. Total | 14. Marginal | 15. Negative |

5. The sum of utility derived from the consumption of various units of commodity is
 (A) Total utility (B) Marginal utility
 (C) Initial utility (D) All of These
6. The addition to a person's total utility brought through the consumption of an additional unit of the commodity is
 (A) Total utility (B) Marginal utility
 (C) Initial utility (D) All of These
7. If by consuming additional unit of commodity, total utility increases then the marginal utility is
 (A) Negative (B) positive
 (C) Zero (D) none of these
8. If by the consumption of an additional unit of a commodity causes decrease in total utility then the marginal utility is
 (A) Negative (B) positive
 (C) Zero (D) none of these
9. If by the consumption of an additional unit the total utility remains same and doesn't increase then the marginal utility is
 (A) Negative (B) positive
 (C) Zero (D) none of these
10. The situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure.
 (A) Law of equi-marginal utility (B) Law of diminishing marginal utility
 (C) Law of demand (D) Consumer equilibrium

Answer Key:

- | | | | | |
|------|------|------|------|-------|
| 1. A | 2. A | 3. D | 4. C | 5. A |
| 6. B | 7. B | 8. A | 9. C | 10. D |

(D) Very Short Answer Type Questions.

1. Define utility?
2. Mention any one feature of utility analysis.
3. Write any one assumption of law of diminishing marginal utility.
4. Write any one difference between positive utility and negative utility.
5. Mention any one exception of law of diminishing marginal utility.
6. What is total utility?
7. What is initial utility?

8. What is the importance of law of diminishing marginal utility for consumers.
9. What is the importance of diminishing marginal utility to government?

2. Short Answer Type Questions.

1. What do you mean by utility?
2. What is the difference between Initial Utility and Marginal Utility.
3. What do you mean by Zero Marginal Utility?
4. What do you mean by Positive Marginal Utility?
5. What are the various Types of Marginal Utility?
6. What do you mean by Marginal Utility? How does it differ from Total Utility.
7. What is consumer equilibrium?
8. Explain the law of diminishing marginal utility with an example.
9. Briefly explain the features of utility.
10. What are the various assumptions of utility analysis?
11. What is the importance of law of diminishing marginal utility?
12. Discuss any two criticism of utility analysis.

3. Long Answer Type Questions.

1. Write a note on consumer equilibrium with the help of utility analysis.
2. Critically examine the law of diminishing marginal utility.
3. What is meant by utility analysis? Give its main criticism.
4. State and explain the law of diminishing marginal utility. Discuss its importance and limitations.
5. Define consumer equilibrium with the help of utility analysis.

Chapter

8

Demand

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Meaning of Demand*
- *Types of Demand*
- *Determinants of Demand*
- *Demand Function*
- *Demand Schedule*
- *Demand Curve*
- *Law of Demand*
- *Movement along Demand Curve*
- *Shifts in Demand Curve*

8.0 Introduction

Demand is one of the most important economic decision variables. The analysis of demand for a firm's product plays a crucial role in business decision-making. Demand determines the size and pattern of market. All business activities are mostly demand driven. The demand is the mother of all economic activities. The firm's production planning, sales and profit targeting, revenue maximization, pricing policies, inventory management, advertisement and marketing strategy all are dependent on the demand of its product. Not only is this, the survival and growth of a firm also depends on the demand for its product.

8.1 Meaning of Demand

In economic terminology the term demand conveys a wider and definite meaning than in the ordinary language. *Ordinarily demand means a desire, whereas in economic sense it is something more than a desire. It is interpreted as a want backed up by the purchasing power.* Further demand is per unit of time such as per day, per week etc. Moreover it is meaningless to mention demand without reference to price. Demand is a technical economic concept. It is a different and broader concept than the 'desire' and "want". The following **five elements are inclusive** in it:

- i. Desire to have a product
- ii. Purchasing power to buy product,
- iii. Willingness to spend on product,
- iv. Given/particular price, and
- v. Given/particular time period.

The presence of **first three elements constitutes the 'want'**. Thus, it is evident that **without reference to specific price and time period, demand has no meaning**. For instance, Amrik desires to buy a tractor, but he does not have sufficient money to buy tractor, So it can't be termed as demand because he does not have sufficient purchasing power to buy a tractor. Suppose, Ram has sufficient money to buy Mercedes, but he does not want to spend on Mercedes, -Even in such a situation, the desire of Ram for a Mercedes will remain a desire. For example Sumit is hungry and he wishes to eat burger. He has sufficient purchasing power but at same time he is miser. Even then it is not demand. Until and unless all the five elements are present, this would remain as wish or desire. *What is required for being a demand is sufficient purchasing power and willingness to spend on that product for which he has desire to acquire.* Not only this, the demand for a product must be expressed in reference to certain given price and time period, otherwise it won't be a demand. Thus, the **concept of demand has following characteristics:**

1. It is effective desire / want,
2. It is related with certain price, and
3. It is related with specific time period.

Some Definitions

“The demand for anything, at a given price, is the amount of it which will be bought per unit of time at that price.” **Benhour**

“The demand for a good is a schedule of the amount that buyers would be willing to purchase at all possible prices at any one instant of time.” **Prof. Meyers**

“Demand is defined as the amount of commodity or service bought per unit of time at a given price.” **Edward**

“The demand for a particular good is the amount that will be purchased at a given price and at a given time.” **Veera Anstey**

“Demand refers to the quantities of a commodity that the consumers are able and willing to buy at each possible price during a given period of time, other things being equal.” **Ferguson**

“Demand is the ability and willingness to buy specific quantity of a good at alternative prices in a given time period, ceteris paribus.” **B.R. Schiller**

8.2 Types of Demand

i. Direct and Derived Demand: *Direct demand refers to the demand for goods meant for final consumption.* It is the demand for consumer goods such as Sugar, Milk, Tea, Food items etc. *On the contrary, derived demand refers to the demand for those goods which are needed for further production of a particular good.* For instance, the demand for cotton for producing cotton textiles is a case of derived demand. Indeed, derived demand is the demand for producer’s goods; i.e., the demand for raw materials, intermediate goods and machine tools and equipments.

ii. Domestic and Industrial Demand: The distinction between domestic and industrial demand is very important from the pricing and distribution point of view of a product. For instance, the price of water, electricity, coal etc. is deliberately kept low for domestic use as compared to their price for industrial use.

iii. Perishable and Durable Goods Demand: Perishable goods are also known as non-durable /single use goods, while durable goods are also known as non-perishable/ repeated use goods. Bread, butter, ice-Cream etc are the example of perishable goods, while mobiles, television, refrigerator, Bikes are the good examples of durable goods. Both 'consumers' and 'producers' goods may be of perishable and non-perishable nature. *Perishable goods are used for meeting immediate demand, while durable goods are meant for current as well as future demand.*

iv. New and Replacement Demand: *New demand is meant for an addition to stock, while replacement demand is meant for maintaining the old stock of capital/asset intact.* The demand for spare parts of a machine is a good example of replacement demand, but the demand for new models of a particular item say computer or machine is a fine example of new demand.

v. Final and Intermediate Demand: The demand for semi-finished goods and raw materials is derived and induced demand as it is dependent on the demand for final goods. The demand for final goods is a direct demand. This type of distinction is based on types of goods- final or intermediate and is often employed in the context of input-output models.

vi. Short Run and Long Run Demand: The distinction between these two types of demand is made with specific reference to time element. Short- run demand is immediate demand based on available technology, products improvement and promotional measures and such other factors. Price-income fluctuations are more relevant in case of short- run demand, while changes in consumption pattern, urbanization and work culture etc. do have significant influence on long –run demand. Generally, long-run demand is for future consumption.

vii. Autonomous and Induced Demand: The demand for complementary goods such as bread and butter, pen and ink, tea, sugar milk illustrate the case

of induced demand. *In case of induced demand, the demand for a product is dependent on the demand/purchase of some main products.* For instance, the demand for sugar is induced by the demand for tea. Autonomous demand for a product is totally independent of the use of other product, which is rarely found in the present world of dependence. These days we all consume bundles of commodities. Even then, all direct demands may be called autonomous.

viii. Individual and Market Demand: *The demand of an individual for a product over a period of time is called as an individual demand, whereas the sum total of demand for a product by all individuals in a market is known as market/collective demand.* The distinction between individual and market demand is very useful for personalized service/target group planning as a part of sales strategy formulation.

ix. Total Market and Market Segment Demand: A market for a product may have different segments based on location, age, sex, income, nationality etc. The demand for a product in a particular market segment is called as market segment demand. Total market demand is a sum total of demand in all segments of a market of that particular product.

x. Company and Industry Demand: A company is a single firm engaged in the production of a particular product, while an industry is the aggregate / group of firms engaged in the production of the same product. Thus, the company's demand is similar to an individual demand, whereas the industry's demand is similar to the total demand. For instance, the demand for iron and steel produced by Bokaro plant is an example of company's demand, but the demand for iron and steel produced by all iron and steel companies including the Bokaro plant is the example of industry demand.

8.3 Determinants of Demand

The demand of a product depends upon many factors. Some of them are listed below:

i. Price of the Commodity: Demand for a product depends upon its price. If price is less demand will be more and if price is high demand will be low.

ii. Price Expectations: Demand for a product is also influenced by consumer's expectation about price. If consumer expects price to rise he will demand more in present. But if he expects price to fall in future he will stop his present consumption and delay it till price fall.

iii. Price of Related Goods: There are two types of related goods, substitutes and complimentary goods. Demand is also influenced by these two related goods. If the price of substitute product is less than demand for product will fall. But if the price of substitute product is high than demand will increase for product. Tea and coffee are substitute products. If price of coffee rises then demand for tea increases and vice a versa. But, in case of complimentary goods, its reverse. Car and petrol are complimentary goods. If price of petrol rises, the demand for car falls and vice a versa.

iv. Income of the Consumers: Demand for product also depends upon income of consumer. More the income more will be the demand, less income less demand. This is true in case of normal goods. But in case of inferior goods, the demand falls with rise in income.

v. Population: Increase in population will increase demand; decrease in population will lead to fall in demand. Composition of population also affects demand. For example if the population is mainly of youngsters than goods for youngster will be in more demand as compared to any other age group in population.

vi. Taste and Preferences: Taste and preference means fashion, habit, custom etc. If somebody is in habit of consuming liquor, its price won't affect its buying habit. He will buy liquor whether it is expensive or cheap. Price won't affect demand of good.

vii. Distribution Of Income: If the income is equally distributed in society then there will be more demand as compared to when there is less income in hands of majority population. And if major income is in hands of few then there will be less demand.

viii. Discoveries: If new substitutes are discovered, this may reduce the demand for original product. For example demand for glass bottles for milk is reduced due to polythene milk bags.

ix. Climate and Weather: Demand for goods also depends upon the climate and weather of the region. For example woolen clothes are demanded in hilly areas and cotton clothes in summer season.

x. Trade Activity: The economic conditions of the country also decide the demand pattern of the economy. If the country is passing through boom period, the demand will be high. But if country is passing through depression, the demand will be less.

xi. Money Supply: If money supply is more in economy, demand will be more. If money supply is less, the demand will fall.

xii. Savings: If consumer saves his income, it means he has less to spend, then demand will decrease. If consumer saves less, demand will increase.

xiii. Taxes: If government levies less tax, consumer will have more income to spend which will increase demand. But if taxes are more, demand will be less.

8.4 Demand Function

The demand for a particular commodity is influenced by so many factors and they together are known as determinants of demand. It is also stated as demand function. A demand function in mathematical terms expresses the **functional relationship between the demand for a product and its various determining factors**. For instance,

$$D_x = f(P_x, P_R, Y, T, \dots \text{etc.})$$

Here:

D_x = Demand for x commodity (say, tea)

P_x = Price of x commodity (of tea)

P_R = Price of Related goods

Y = Disposable income of the consumer

- T = Taste and Preference of the consumer
- A = Advertisement of X commodity
- C = Climate
- E = Price expectation of the consumer
- P = Population
- G = Govt. policies pertaining to taxes and subsidies
- U = Other factors (unspecified/unidentified)

Here D_x , which means the demand for commodity x is the functional relationship 'f' between the demands of commodity x and the other variables like P_R which refers to price of related goods; Y represents the income of the consumer while T is taste and preference of consumer. It is clear that demand for a good depends upon its price and other factors like price of related goods, income of consumer, climate, population, taxes, taste and preference of consumer etc.

i. Income: The relationship between income and the demand is a direct one. It means the demand changes in the same direction as the income. An increase in income leads to rise in demand and vice versa.

ii. Population: The size of population also affects the demand. The relationship is a direct one. The larger the size of population, the higher is the demand and vice versa.

iii. Tastes and Habits: The tastes, habits, likes, dislikes, prejudices and preference etc. of the consumer have a profound effect on the demand for a commodity. If consumer dislike a commodity, he will not buy it despite a fall in price. On the other hand a very high price also may not stop him from buying a good if he likes it very much.

iv. Other Prices: This is another important determinant of demand for a commodity. The effect depends upon the relationship between the commodities in question. If the price of a complimentary commodity rises, the

demand for the commodity in reference falls. Opposite effect will be experienced in case of substitutes.

v. Advertisement: This factor has gained tremendous importance in the modern days. When a product is aggressively advertised through all the possible media, the consumers buy the advertised commodity even at a high price and many times even if they don't need it.

vi. Fashion: Hardly anyone has the courage and the desire to go against the prevailing fashions as well as social customs and the traditions. This factor has a great impact on the demand.

vii. Imitation: This tendency is commonly experienced everywhere. This is known as the demonstration effects, due to which the low income groups imitate the consumption patterns of the rich ones. This operates even at international levels when the poor countries try to copy the consumption patterns of rich countries.

8.5 Demand Schedule

A demand schedule expresses the response of amount demanded to changes in price of a commodity. A demand schedule is the tabular statement of quantity demanded of a commodity at different hypothetical prices. It depicts the information on prices and quantity demanded. The demand schedule is a schedule or a table which contains various possible prices of a commodity and different quantities demanded at them. It explains functional relationship between prices and quantity demanded of a commodity. It is of T shape. In one column, various prices and in other column various quantities demanded are shown. The demand schedule reveals the inverse price-demand relationship is when price is high, quantity demanded is low and at low prices quantity demanded is high.

*“Demand schedule is a table that shows different prices of a good and the quantity of that good demanded at each of these prices.” **Mc. Connell***

Demand Schedule is of two types:

i. Individual Demand Schedule: An individual demand schedule reveals the reaction of an individual consumer towards different amounts of a commodity at their corresponding prices. The individual demand schedule expresses the indirect relation that exists between price and quantity demanded. An individual demand schedule represents the demand of an individual consumer.

Price of Wheat (in Rs. Per kg)	Quantity Demanded (in kg.) by 'A'
50	10
40	20
30	30
20	40
10	50

Table 8.1 Individual Demand Schedule

ii. Market Demand Schedule: A market demand schedule is the combination of different individual demand schedules in the market at a given price in a given period of time. The market demand schedule shows the total demand of all the consumers taken together. In every market, there are many buyers of a commodity. The market demand schedule is total of all the individual demand schedules. It is sum total of all individual demand schedule of commodity at different prices.

Price of Wheat (in Rs. Per kg)	Demand by 'A' (Kg.)	Demand by 'B' (Kg.)	Demand by 'C' (Kg.)	Market Demand (Kg.)
50	10	20	30	$10+20+30=60$
40	20	30	40	$20+30+40=90$
30	30	40	50	$30+40+50=120$
20	40	50	60	$40+50+60=150$
10	50	60	70	$50+60+70=180$

Table 8.2 Market Demand Schedule

8.6 Demand Curve

A demand curve can be obtained by plotting a demand schedule on a graph and joining the points so obtained. It is a geometrical presentation to present the demand schedule. Graphical representation of demand schedule is demand curve. It is a geometrical device to express the relation between quantity demanded and price.

“The demand curve represents the maximum quantities per unit of time that consumers will take at various prices.” **Leftwich**

“The curve, which shows the relation between the price of a commodity and the amount of the commodity that the consumer wishes to purchase, is called demand curve.” **Lipsey**

Like the demand schedule, demand curve is of two types; an individual demand curve as well as a market demand curve.

i. Individual Demand Curve: *The demand curve of an individual buyer is called as individual demand curve.* It is a curve which represents the different quantities demanded by an individual consumer at different prices. Figure 8.1 represents individual demand curve. On OY axis is price, and on OX axis is Demand. DD is demand curve. Demand curve represents the relation of price and quantity demanded. The demand curve slopes downward from left to right. When price is high, low quantity is demanded but when price falls more quantity is demanded. Therefore this slope is negative slope of demand curve. This demand curve is based on Table 8.1

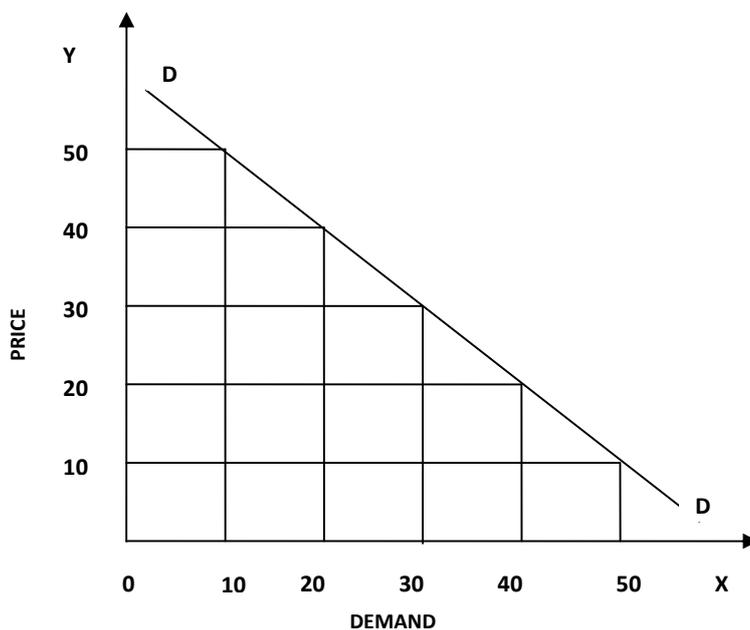


Fig 8.1 Individual Demand Curve

ii. **Market Demand Curve:** The sum total of the entire individual curves is a market or a total demand curve. Market demand curve represents the aggregate demand of all the consumers in the market at different prices. It is summation of individual consumers in the market, or individual demand curves of homogeneous commodity. For example there are three consumers in the market, named A, B and C. Individual demand curves of each are represented in Fig. 8.2, 8.3 and 8.4 respectively. In fig. 8.5 the market demand curve. D_M is the market demand curve. These demand curves are based on **Table 8.2.**

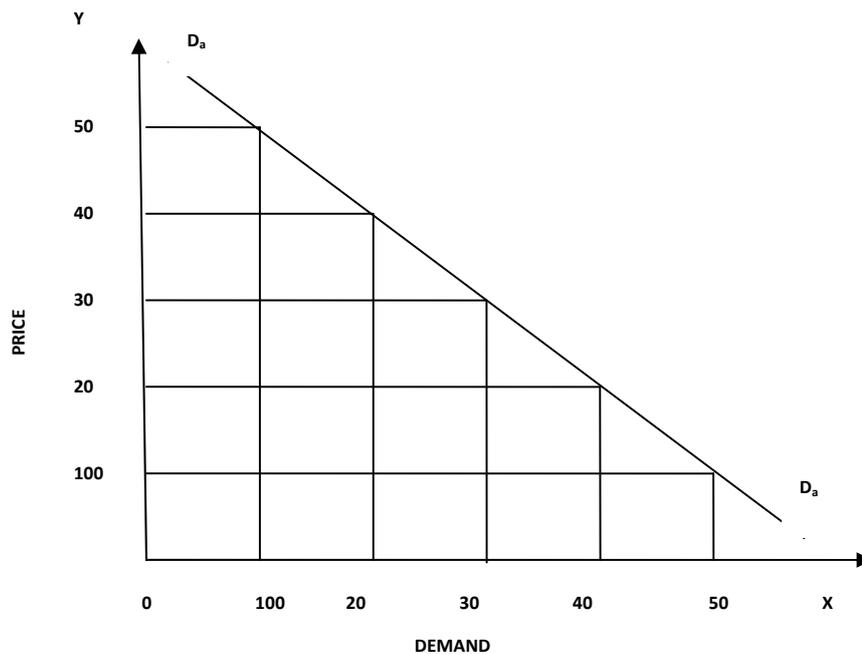


Fig 8. 2 Demand Curve of Consumer A

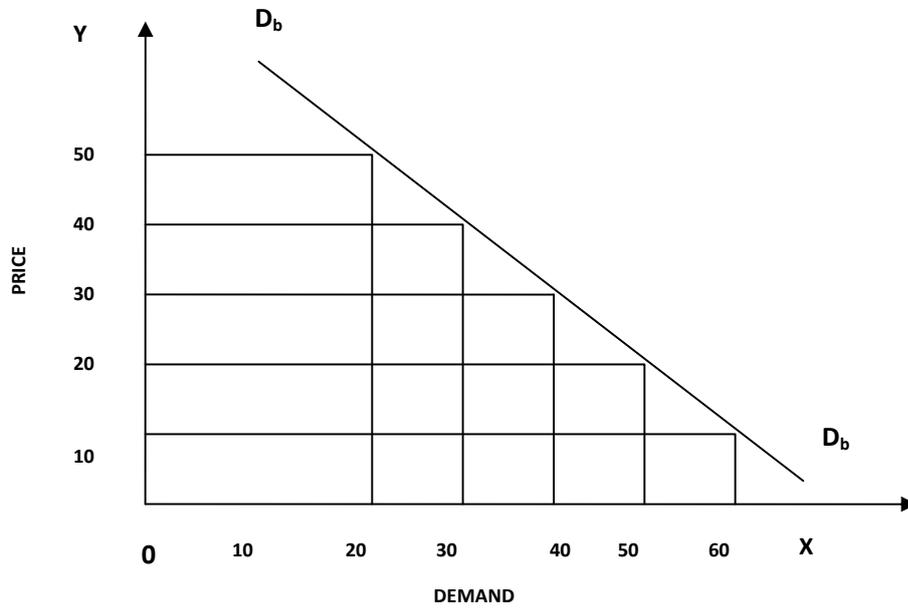


Fig 8.3 Demand Curve of Consumer B

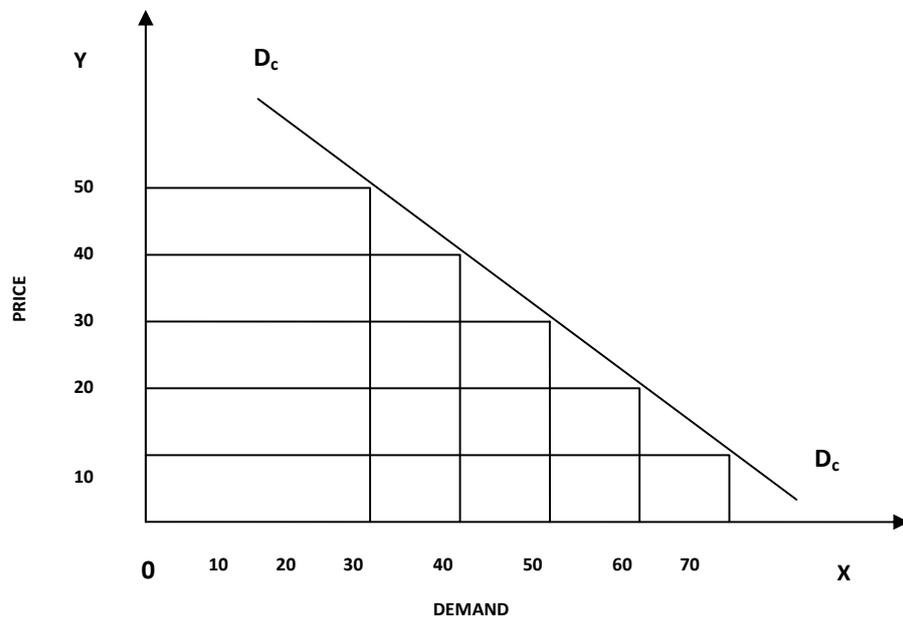


Fig 8.4 Demand Curve of Consumer C

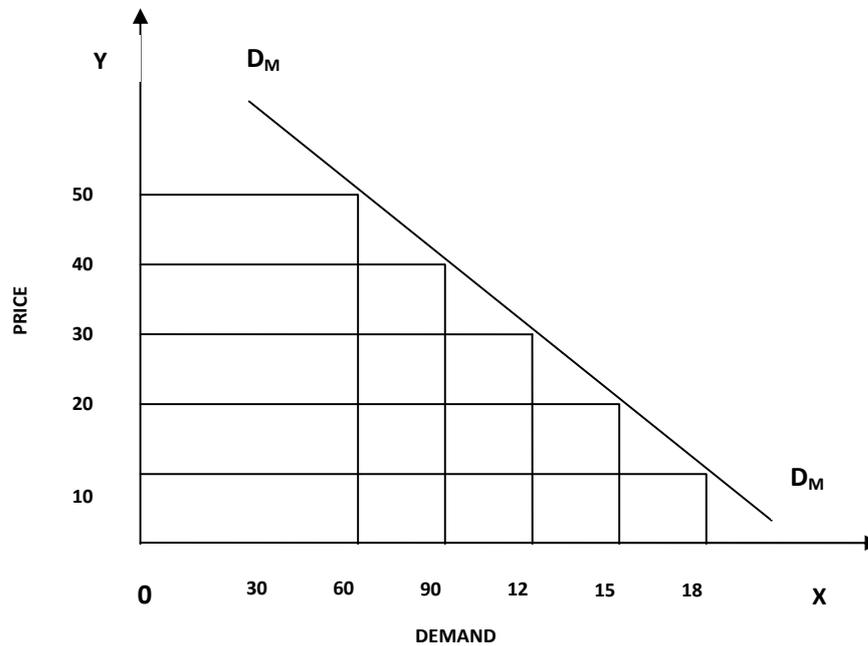


Fig 8.5 Market Demand Curve

8.7 Law of Demand

Law of demand is also called as first law of purchase. Law of demand depicts the functional relationship between the price of a commodity and quantity demanded. *The law of demand states that other things remaining constant, a fall in price causes quantity demanded to rise and a rise in price causes quantity demanded to fall.* The other things which are held constant are the taste and preferences of the consumer, the income of the consumer, the prices of related goods etc. Law of demand explains the inverse relationship between price and quantity demanded of a commodity.

Definitions

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

"Law of demand states that the quantity demanded varies inversely with price." **Ferguson**

"The law of demand states that amount demanded increases with a fall in price and diminishes with a rise in price." **Dr. Marshall**

"The Law of demand states that, other things being equal, the quantity demanded per unit of time will be greater the lower the price and smaller the higher the price." **Bilas**

"Usually a larger quantity of a commodity will be demanded at a lower price than at a higher price." **Benham**

8.7.1 Features of Law of Demand

- i.** There is **inverse relationship** between price and quantity demanded. When price increases demand falls, and when price falls demand increases.
- ii.** **Price is an independent** variable and **demand is a dependent** variable. Law of demand studies how with change in price the quantity demanded changes. It does not study how price changes with change in quantity demanded.
- iii.** The law of demand study relationship between price and quantity when other factors affecting demand are held constant or unchanged. The law of demand assumes **other things remaining same**.
- iv.** Law of demand only tells the **direction** in which quantity demanded will change but not how much demand will change. So it only shows direction of change.

- v. Law of demand is also related with a particular time which may be a day, week, month or a year. But it is for a particular time period.

4.7.2 Assumptions of Law of Demand

Law of demand holds well when all other factors affecting demand are held constant or unchanged. Other factors which affect demand are price of related goods, taste and preference of customers, income of the consumer, price expectation etc. The main assumptions of law of demand are as under:

- i. There is no change in price of related goods.
- ii. There is no change in price expectation of good.
- iii. There is no change in income of consumer.
- iv. There is no change in taste and preference of consumer.
- v. There is no change in government policies.
- vi. There is no change in weather conditions.
- vii. There is no change in demographic factors.

8.7.3 Explanation of Law of Demand

Law of demand states that there is inverse relation between price and quantity demanded of a commodity. It only shows the direction of change. It does not tell how much would be the change in quantity demanded due to change in price. It simply tells the direction of change in demand due to change in price. The law can be explained with the help of demand schedule and demand curve.

Price of Milk (in Rs. Per Litre)	Quantity Demanded (in litre .) by 'A'
50	10
40	20
30	30
20	40
10	50

Table 8.3 Demand Schedule

The schedule indicates the quantity demanded by all the consumers of a commodity collectively at its different prices. Table 8.3 represents market demand schedule. It shows when the price is Rs. 50 per litre only 10 litres of milk is demanded but as price falls to Rs. 40 per litre the demand goes up to 20 litres and so on. Figure 8.6 shows the same. On OX axis quantity demanded and on OY axis Price is shown. When price is less, demand is more, and when price is high, demand is less. When price is 10 rupees than quantity demanded of milk is 50 litres. But when price rises to 20 rupees per litre than quantity demanded falls to 40 litres.

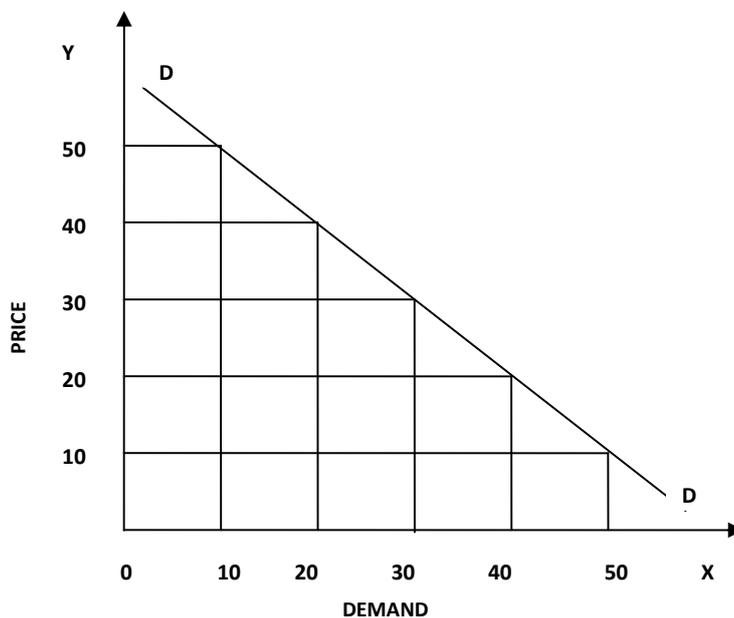


Fig 8. 6 Demand Curve

8.7.4 Causes of Demand Curve Sloping Downward

Figure 8.6 shows that demand curve slopes downward from left to right. Figure 8.6 shows, when price rise, demand falls and when price falls, demand increases. Demand curve slopes downward due to following reasons.

i. Law of Diminishing Marginal Utility: A consumer demands a commodity because it has utility. Utility means want satisfying capacity of a commodity. When consumer consumes more and more units of same commodity the

marginal utility of commodity goes on decreasing with each successive unit. Law of marginal utility applies on consumption.

ii. Substitution Effect: Substitute goods are those goods which can be used in replacement of some good. For example, tea can be used in replacement of coffee, ball point pen is used in substitution of ink pen. So if the price of ink pen rises consumer will demand more ball point pen.

iii. Income Effect: Income effect means that with change in person's real income, there is a change in consumption pattern of consumer. When price of commodity falls the person's real income increases. He could buy more commodities. And when price increases the real income decreases, so consumer can buy fewer products.

iv. New Buyers: When the price of product falls the number of users increases in two ways. One the consumer who already consume the product, increase their consumption, second new users are added with fall in price, who initially could not afford the product.

v. Different Uses: There are some products which can be put to different uses. For example, electricity, water, milk etc. When the price of such product rises; they are put to important uses only. But when there prices fall they could be put to many uses. Thus the demand for such goods with alternative uses tends to rise when price is low and tends to fall when prices are high.

8.7.5 Exceptions to Law of Demand

i. Articles of Distinction: Articles of distinction are those goods which have high demand when their price is high. For example jewellery, diamonds, gems and costly carpets, art by great artists etc. These articles of distinction are also called Veblen goods.

ii. Ignorance: Sometimes, consumer out of ignorance thinks costly things to be better than cheaper goods. If price is high, it means good is of better quality and if the price is less it means product is of low quality.

iii. Giffen Goods: Giffen goods are those inferior goods whose demand falls when price falls. For example, dalda ghee. When price of dalda ghee falls, consumer real income increases so consumer may shift its demand to refined or desi ghee. Fall in the price of inferior goods is followed by fall in their demand and vice versa. It is not necessary that in case of all inferior goods law of demand fails. But those inferior goods in which law of demand fails is called Giffen goods.

iv. Speculative Effect: When the price of a commodity goes up, and people fear more rise in prices then people may buy larger quantity than before. This is called speculative effect. When people buy larger quantity than before in anticipation of further rise in price, then law of demand doesn't hold good. For example when there was rise in price of onions and people anticipated further rise in its prices and so they started stocking up onions to save themselves from further price rise.

v. Future Expectation: When consumer hopes fall in prices in near future then he postpones his demand till prices fall. And when he hopes rise in prices in near future then he demand more in present. So when demand increases in present even the prices are higher.

vi. Illusion: Sometimes consumer thinks that fall in price of commodity means reduction in the quality of the product. For example when shopkeeper put clearance sale consumer thinks goods may be of bad or poor quality, or may have some defects and so they don't buy from sale. At this point, law of demand fails.

vii. Necessities of Life: Some goods are necessity of life, for example, food grains, petrol, and diesel; cooking gas etc. These goods are bought even when their prices rise. Whatever the price may be, consumers have no option but to buy it.

viii. Branded And Trademark: Consumer may have the habit of particular brand or trade mark. The consumer will buy the same commodity even if its price is increased. For example, consumer may be using Taj Mahal Tea or Parker Pen, he will consume same product even at higher prices. Rise in price won't affect their demand for these commodities.

ix. War or Emergency: When consumer is having fear of war or emergency then he will buy the products even at higher prices due to shortage of the availability of goods. The law of demand fails at this situation. Consumer pile up the stock for future at higher prices.

x. Total Expenditure: Those goods on which very little part of total expenditure is done, do not hold law of demand. For example newspaper, match box, post card, broom etc. change in the price of these products would not change its demand.

8.8 Movement along Demand Curve and Shifts in Demand Curve

The law of demand explains the effect of only-one factor viz., price, on the demand for a commodity, under the assumption of constancy of other determinants. In practice, other factors such as, income, population, price of related goods, taxation policy of government, weather etc. cause the rise or fall in demand without any change in the price. These effects are different from the law of demand. They are termed as changes in demand in contrast to variations in demand which occur due to changes in the price of a commodity. In economic theory a distinction is made between (i) Variations i.e. extension and contraction in demand due to price and (ii) Changes i.e. increase and decrease in demand due to other factors.

a. Movement along the Demand Curve or variations is Extension and Contraction in demand:

Variations in demand refer to those changes which occur due to changes in the price of a commodity only. These changes are shown by different points along the same demand curve. When due to price change demand changes it is termed as movement along the demand curve. Here change in demand is due to one factor only and that is price. Variations are of two types.

a. Extension of Demand: It refers to rise in quantity demanded due to a fall in price of the commodity other things being constant. It is shown by a downwards movement on a given demand curve. Table 8.4 shows, that when price is Rs.50, demand is 10 units, but when price falls to Rs. 10, quantity demanded rises to 50 units. Same is shown with the help of figure 8.7. AB is demand curve. When the price is Rs. 50 per unit, the demand is 10 units: but when the price falls to Rs.10, quantity demanded falls to 50 units. The consumer is at point A of demand curve, but due to fall in price it moves to point B on demand curve. This movement of consumer from point A to B is called Extension of demand or movement along the demand curve from higher point to lower point.

Price	Quantity Demanded	Details
50	10	Fall in Price leads to extension of demand
10	50	

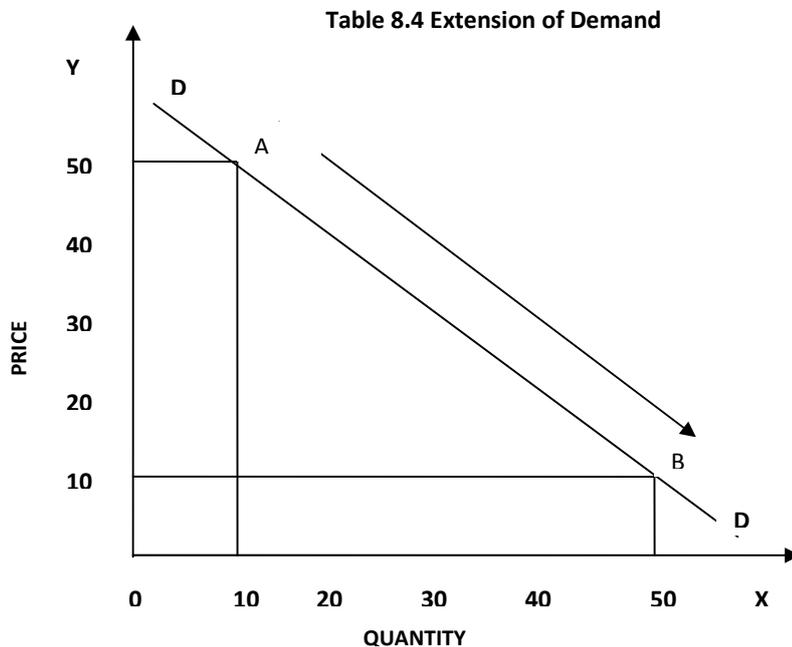


Fig 8.7 Extension of Demand

b. Contraction of Demand: This means fall in demand due to increase in price and can be shown by an upwards movement on a given demand curve. Table 8.5 shows, when price is Rs.10, demand is 50 units, but when price rises to Rs. 50, quantity demanded falls to 10 units. Same is shown with the help of figure 8.8. AB is demand curve. When the price is Rs. 10 per unit the demand is 50 units but when the price rises to Rs.50 quantity demanded falls to 10 units. The consumer is at point B of demand curve but due to rise in price it moves to point A on demand curve. This movement of consumer from point B to A is called contraction of demand or movement along the demand curve from lower point to higher point.

Price	Quantity Demanded	Details
10	50	Rise in Price leads to contraction of demand
50	10	

Table 8.5 Contraction of Demand

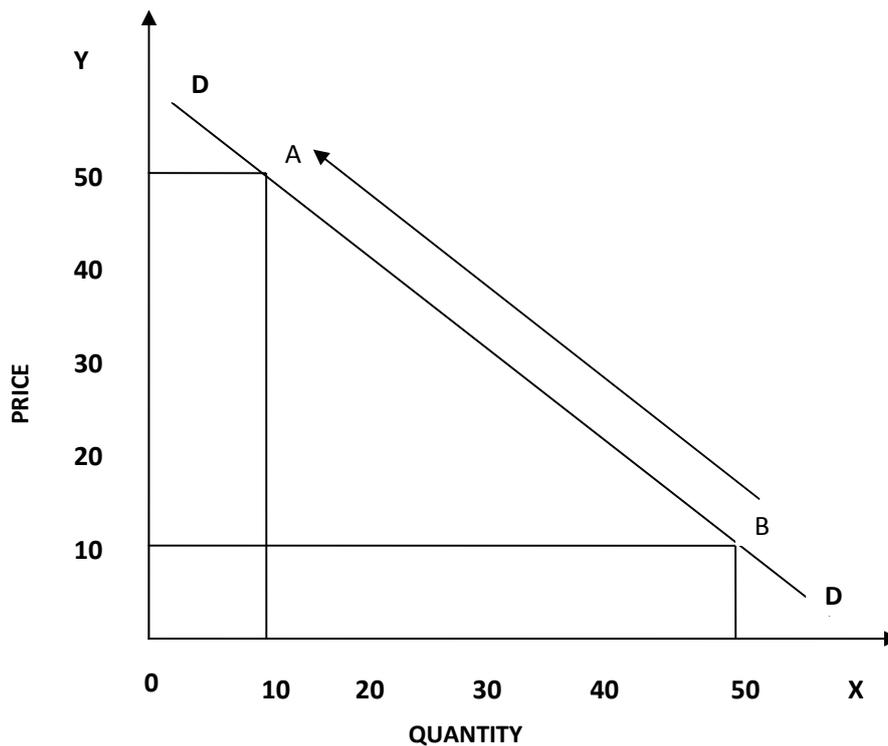


Fig 8.8 Contraction of Demand

- b. **Change in Demand or Shift of Demand Curve:** Changes in demand imply the rise and fall in demand due to factors other than price. It means changes in demand which occur without any change in price. It leads to shift of demand curve upward or downward. An increase in demand is shown by rightward shift while decrease in demand is shown by leftward shift of entire demand curve. Change in demand is of two types.
- a. **Increase in Demand:** This refers to higher demand at the same price and results from rise in income, population etc. This is shown on a new demand curve lying above the original one. An increase in demand is shown by rightward shift. Increase in demand can be in two ways, one same price more demand and the other is more price same demand.
- i. **Same Price More Demand:** When the price of a commodity remains same but more commodity is demanded then it is called as increase in demand. As shown in table 8.6 and Figure 8.9.
 - ii. **More Price Same Demand:** When the price of a commodity increases but the quantity demanded remains same than it is called as increase in demand. As shown in table 8.6 and Figure 8.9.

Same Price, More Demand		More Price, Same Demand	
Price in Rs.	Demand	Price in Rs.	Demand
30	30	30	30
30	40	40	30

Table 8.6 Increase in demand

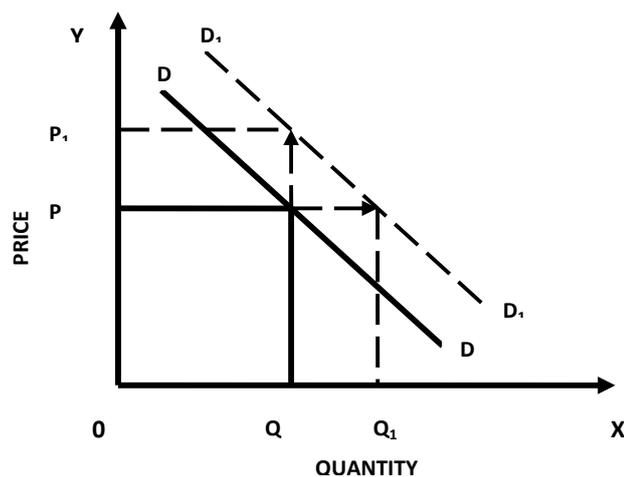


Fig 8.9 Increase in Demand

- b. **Decrease in demand:** It means less quantity demanded at the same price. This is the result of factors like fall in income, population etc. This is shown on a new demand curve lying below the original one. Decrease in demand is shown by leftward shift of entire demand curve. Decrease in demand can be shown in two ways, one same price less demand and other is less price same demand.

Same Price, Less Demand		Less Price, Same Demand	
Price in Rs.	Demand	Price in Rs.	Demand
30	30	30	30
30	20	20	30

Table 8.7 Decrease in demand

Same Price Less Demand: When at same price less quantity of commodity is demanded then it is called as decrease in demand. As shown in Table 8.7 and Figure 8.10.

Less Price Same Demand: When the price of commodity is lower but still the demand remains same then its called decrease in demand. As shown in Table 7 and Figure 10.

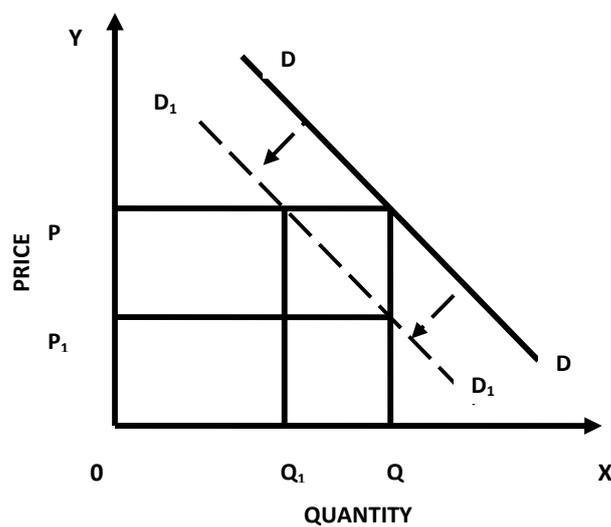


Fig 8.10 Decrease in Demand

Chapter at a Glance:

- **Introduction to Demand:** Demand is one of the most important economic decision variables. The analysis of demand for a firm's product plays a crucial role in business decision-making. Demand determines the size and pattern of market. All business activities are mostly demand driven.
- **Meaning of Demand:** Demand is a technical economic concept. It is a different and broader concept than the 'desire' and "want". The following **five elements are inclusive** in it: 1. Desire to have a product 2. Purchasing power to buy product, 3. Willingness to spend on product, 4. Given/particular price, and 5. Given/particular time period.
- **Types of Demand:** 1. Direct and Derived demand 2. Domestic and Industrial Demand 3. Perishable and Durable Goods Demand 4. New and Replacement Demand 5. Final and Intermediate Demand 6. Short run and Long Run Demand: 7. Autonomous and Induced Demand 8. Individual and Market Demand 9. Total Market and Market Segment Demand 10. Company and Industry Demand
- **Determinants of Demand:** The main determinants of demand are Price of the Commodity, Price Expectations, Price of Related Goods, Income of the Consumers, Population, Taste and Preferences, Distribution of Income, Discoveries, Climate and Weather, Trade Activity, Money Supply, Savings, and Taxes.
- **Demand Function:** A demand function in mathematical terms expresses the functional relationship between the demand for a product and its various determining factors.
- **Demand Schedule:** "Demand schedule is a table that shows different prices of a good and the quantity of that good demanded at each of these prices."
Mc. Connell
- **Demand Curve:** "The demand curve represents the maximum quantities per unit of time that consumers will take at various prices." **Leftwich**
- **Law of Demand:** "The Law of demand states that, other things being equal, the quantity demanded per unit of time will be greater the lower the price and smaller the higher the price." **Bilas**
- **Movement along Demand Curve:** Variations in demand refer to those changes which occur due to changes in the price of a commodity only. These changes are shown by different points along the same demand curve. When

due to price change demand changes is termed as movement along the demand curve, here changes in demand are due to one factor only that is price.

- **Shifts in Demand Curve:** Changes in demand imply the rise and fall in demand due to factors other than price. It means changes in demand which occur without any change in price. It leads to shift of demand curve upward or downward. An increase in demand is shown by rightward shift while decrease in demand is shown by leftward shift of entire demand curve.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. Demand is the function of _____.
2. _____ causes the demand curve slope downward to the right.
3. Determinant of demand is _____.
4. The demand for anything, at a given _____, is the amount of it which will be bought per unit of time at that price.
5. A demand function in _____ terms expresses the functional relationship between the demand for a product and its various determining factors.
6. The Law of demand states that, other things being equal, the quantity demanded per unit of time will be _____ the lower the price and smaller the higher the price.
7. Demand schedule is a _____ that shows different prices of a good and the quantity of that good demanded at each of these prices.
8. The demand _____ represents the maximum quantities per unit of time that consumers will take at various prices.
9. The individual demand schedule expresses the _____ relation that exists between price and quantity demanded.
10. Substitute goods are those goods which can be use in _____ of some good.
11. _____ demand refers to the demand for goods meant for final consumption.

12. An industry is the _____ of firms engaged in the production of the same product.
13. There is _____ relationship between price and quantity demanded.
14. Law of demand only tells the _____ in which quantity demanded will change but not how much demand will change.
15. Price is an _____ variable and demand is a dependent variable.

Answer key

- | | | |
|-----------------|--|-----------------------|
| 1. Price | 2. Law of diminishing Marginal utility | 3. price |
| 4. Price | 5. Mathematical | 6. Greater |
| 7. Table | 8. Curve | 9. Indirect |
| 10. Replacement | 11. Direct | 12. Aggregate / group |
| 13. Inverse | 14. Direction | 15. Independent |

(B) State whether the following statements are True or False.

1. Demand means a desire.
2. Demand is a different and broader concept than the 'desire' and "want".
3. Demand is defined as the amount of commodity or service bought per unit of time at a given price.
4. Direct demand refers to the demand for goods meant for intermediate consumption.
5. Perishable goods are also known as durable goods.
6. Replacement demand is meant for maintaining the old stock of capital/asset intact.
7. A company is a single firm engaged in the production of a particular product.
8. When the price of a commodity remains same but more commodities is demanded than it is called as Extension in demand.
9. When the price of a commodity increases but the quantity demanded remains same than it is called as increase in demand.
10. When at same price less quantity of commodity is demanded than it is called as contraction in demand.

Answer key:

- | | | | | |
|----------|---------|----------|----------|-----------|
| 1. False | 2. True | 3. True | 4. False | 5. False |
| 6. True | 7. True | 8. False | 9. True | 10. False |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. Demand analysis includes:

(A) Demand determinants	(B) demand forecasting
(C) Demand differentials	(D) All of these

2. Demand is the function of:

(A) Price	(B) Product
(C) Firm	(D) cost

3. Which of the following is the cause of demand curve sloping downward?

(A) Income effect	(B) substitution effect
(C) Law of diminishing utility	(D) All of these

4. Which is the exception of law of demand?

(A) Speculation	(B) Giffen paradox
(C) Ignorance	(D) All of these

5. Which of the following is not a determinant of demand?

(A) Advertising	(B) Climate and season
(C) Government policy	(D) None of these

6. Type of demand is/are:

(A) Producer Demand	(B) consumer demand
(C) Perishable good Demand	(D) All of these

7. Which of the following would not, of itself cause a shift of the demand curve for a product.

(A) A change in consumer's preference	(B) A change in consumer's income
(C) A change in the price of product	(D) A change in the price of related products

8. Demand can be defined as:

(A) Desire to buy	(B) willingness to buy
(C) Ability to buy	(D) desire and willingness to buy backed by adequate purchasing power

9. The law of demand is:

(A) An indicative statement	(B) A cost
(C) A Qualitative statement	(D) A selective statement

10. The demand curve is a monotonic _____ function of price.

(A) Decreasing	(B) increasing
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(C) Decreasing and increasing

(D) increasing and decreasing

11. The slope of the normal demand curve is:

(A) Negative

(B) positive, zero and negative

(C) Zero

(D) Infinity

12. Demand curve is a group of the relationship between the price of a goods and the

(A) Quantity supplied

(B) supply

(C) Quantity demanded

(D) demand

13. Two goods for which an increase in the price of one leads to an increase in the demand for the other called

(A) Complimentary goods

(B) Substituted goods

(C) Sub goods

(D) All of these

14. Inferior goods are goods for which other things equal in increase in _____ leads to a decrease in demand.

(A) Income

(B) profit

(C) Revenue

(D) price

15. _____ two goods for which an increase in the price of one leads to decrease in demand for the other:

(A) Complimentary goods

(B) demand curve

(C) Market force

(D) price constant

Answer key:

1. D

2. A

3. D

4. D

5. D

6. D

7. C

8. D

9. C

10. A

11. A

12. C

13. B

14. A

15. A

(D) Very Short Answer Type Questions

1. What do you mean by demand?
2. What do you mean by demand schedule?
3. What do you mean by demand curve?
4. What do you mean by individual demand curve?
5. What do you mean by market demand curve?
6. What do you mean by individual demand schedule?
7. What do you mean by market demand schedule?
8. What do you mean by autonomous demand?

9. What do you mean by derived demand?
10. What do you mean by market segment demand?
11. What do you mean by complimentary goods?
12. What do you mean by supplementary goods?
13. What do you mean by Giffen goods?
14. What do you mean by Veblen goods?
15. What do you mean by inferior goods?

2. Short Answer Type Questions

1. What is demand function?
2. What are assumptions of law of demand?
3. What does law of demand states?
4. What are exceptions of law of demand?
5. What do you mean by price of related goods?
6. Differentiate between increase in demand and extension of demand.
7. Differentiate between decrease in demand and contraction of demand.
8. What do you understand by movement along the demand curve?
9. Differentiate between company and industry demand?
10. Differentiate between demand schedule and demand curve.
11. What does shift of demand curve mean?
12. Why does demand curve slope downwards?

3. Long Answer Type Questions.

1. "The amount demanded increases with a fall in price and diminishes with a rise in the price." Discuss the statement.
2. What do you mean by demand? What are various types of demand?
3. Differentiate between extension and contraction of demand with increase and decrease in demand.
4. What do you mean by movement along the demand curve and shift of demand curve?
5. What do you mean by demand? What are its determinants?
6. What do you mean by demand schedule and demand curve?
7. State and explain the law of demand. What are its exceptions?

Chapter 9

Demand of Elasticity

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Meaning of Elasticity of Demand*
- *Price Elasticity Of Demand*
- *Measurement Of Price Elasticity Of Demand*
- *Income Elasticity Of Demand*
- *Cross Elasticity Of Demand*
- *Advertising Elasticity Of Demand*
- *Importance Of Elasticity Of Demand*

9.0 Introduction

The law of demand explains the functional relationship between price and demand. In fact, the demand for a commodity depends not only on the price of a commodity but also on other factors such as income, population, tastes and preferences of the consumer. The law of demand assumes these factors to be constant and states the inverse price-demand relationship. Barring certain exceptions, the inverse price- demand relationship holds well in case of the goods that are bought and sold in the market. The law of demand explains the direction of a change as it states that with a rise in price the demand contracts and with a fall in price it expands. However, it fails to explain the extent or magnitude of a change in demand with a given change in price. In other words, the law of demand merely shows the direction in which the demand changes as a result of a change in price, but does not throw any light on the amount by which the demand will change in response to a given change in price. Thus, the law of demand explains the qualitative but not the quantitative aspect of price- demand relationship. Although it is true that

demand responds to change in price of a commodity, such response varies from commodity to commodity. Some commodities are more responsive or sensitive to change in price while some others are less. The concept of the elasticity of demand has great significance as it explains the degree of responsiveness of demand to a change in price. It thus elaborates the price-demand relationship. The elasticity of demand thus means the sensitiveness or responsiveness of demand to a change in price.

9.1 Meaning of Elasticity of Demand

Different commodities react to a change in price in different extent and magnitude though the degree of their response differs. Demand for some commodities is more sensitive or responsive to a change in price, while it is less responsive for some others. *Elasticity of demand is a measure of relative changes in the amount demanded in response to a small change in price.* Certain goods are said to have an elastic demand while others have an inelastic demand. The demand is said to be elastic when a small change in price brings about considerable change in demand. On the other hand, the demand for a good is said to be inelastic when a change in price fails to bring about significant change in demand. The concept of price elasticity reveals that the degree of responsiveness of demand to the change in price differs from commodity to commodity. Demand for some commodities is more elastic while that for certain others are less elastic.

Some Definitions

“The elasticity (or responsiveness) of demand in a market is great or small accordingly as the demand changes (rises or falls) much or little for a given change (rise or fall) in price.” **Marshall**

“The elasticity of demand measures the responsiveness of the quantity demanded of good, to change in its price, price of other goods and changes in consumer’s income.” **Dooley**

The elasticity of demand may be defined as the percentage change in quantity demanded which would result from one percent change in price.” **Boulding**

Elasticity of demand means degree of variation in quantity demanded due to change in price, income or price of other related goods. *If the change in price leads to change in quantity demanded it is called price elasticity but if change*

in income of consumer leads to change in quantity demanded it is called income elasticity while change in price of one commodity leads to change in quantity demanded of other good it is called cross elasticity. Generally if term elasticity of demand is used it means price elasticity. Price elasticity means percentage change in quantity demanded due to percentage change in price of commodity. It means elasticity of demand tells us how much change would be there in quantity demanded due to percentage change in price of commodity.

9.2 Price Elasticity

Demand for some commodities is more sensitive or responsive to a change in price, while it is less responsive for some others. Elasticity of demand is a measure of relative changes in the amount demanded in response to a small change in price. Certain goods are said to have an elastic demand while others have an inelastic demand. The demand is said to be elastic when a small change in price brings about considerable change in demand. On the other hand, the demand for a good is said to be inelastic when a change in price fails to bring about significant change in demand.

Definitions

“Elasticity of demand may be defined as the percentage change in quantity demanded divided by the percentage change in price.” **Dr. Marshall**

“Price elasticity of demand measures the responsiveness of the quantity demanded to change in price.” **Boulding**

“The price elasticity of demand measures the responsiveness of the quantity demanded to a change in its price.” **Dooley**

“Elasticity of demand is the ratio of relative change in quantity to relative change in price.” **Antol Murad**

“Price elasticity of demand may be defined as the ratio of the percentage change in demand to the percentage change in price.” **Prof Lipsey**

The concept of elasticity can be expressed in the form of an equation as:

$$E_p = \frac{\text{Change in Quantity Demanded} / \text{Quantity Demanded}}{\text{Change in Price} / \text{Price}}$$

9.2.1 Degrees of Price Elasticity of Demand

The concept of price elasticity reveals that the degree of responsiveness of demand to the change in price differs from commodity to commodity. Change in demand may not be equivalent to change in price. Change in demand can be more than change in price or less than change in price. Demand for some commodities is more elastic while that for certain others are less elastic. Using the formula of elasticity, it is possible to mention the following different degrees of price elasticity:

i. Perfectly Inelastic Demand ($e_p = 0$)

This describes a situation in which demand shows no response to a change in price. In other words, whatever be the price, the quantity demanded remains the same. The vertical straight line demand curve as shown in figure 9.1 reveals that with a change in price (from OP to OP₁) the demand remains same at OQ. Thus, demand does not respond to a change in price. Thus $e_p = 0$, Hence, perfectly inelastic demand.

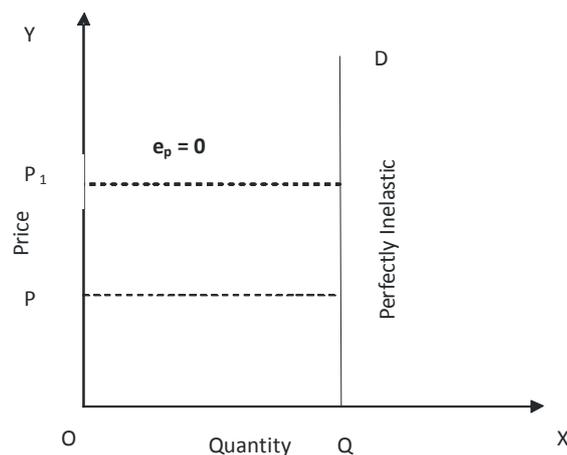


Figure 9.1 Perfectly Inelastic Demand

ii. **Perfectly Elastic Demand ($e_p = \infty$)**

This is experienced when the demand is extremely sensitive to the changes in price. In this case an insignificant change in price produces tremendous change in demand. The demand curve showing perfectly elastic demand is a horizontal straight line as shown in Figure 9.2. It can be noticed that at a given price an infinite quantity is demanded. A small change in price produces infinite change in demand. A perfectly competitive firm faces this type of demand.

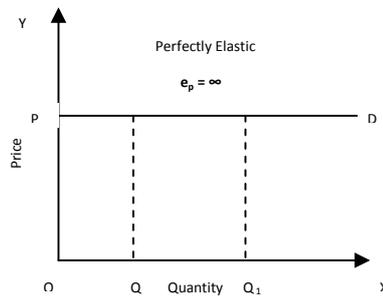


Figure 9.2 Perfectly Elastic Demand

iii. **Inelastic Demand (Less Elastic) ($e_p < 1$)**

In the case of inelastic demand the proportionate change in demand is smaller than in price. The figure 9.3 shows the inelastic demand curve. Percentage change in demand is smaller than percentage change in price. It means the demand is relatively less responsive to the change in price. This is referred to as an inelastic demand. This type of demand is seen in articles of necessity like electricity, water; LPG etc. consumer has to consume goods of necessity whatever the change in price is. Consumer cannot control the consumption pattern much.

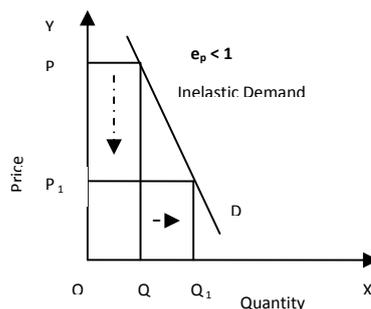


Figure 9.3 Inelastic Demand

iv. Unitary Elasticity Demand ($e_p = 1$)

When the percentage change in price produces equivalent percentage change in demand, it's a case of unitary elasticity. The rectangular hyperbola as shown in the figure 9.4 demonstrates this type of elasticity. In this case percentage change in demand is equal to percentage change in price, hence $e = 1$.

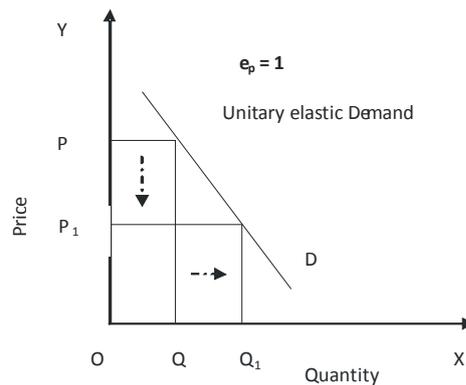


Figure 9.4 Unitary Elastic Demand

v. Elastic Demand (More Elastic) ($e_p > 1$)

In case of certain commodities the demand is relatively more responsive to the change in price. It means a small change in price induces a significant change in demand. This can be understood by means of the figure 9.5. It can be noticed that in the figure the percentage change in demand is greater than that in price. Hence, the elastic demand ($e > 1$). This kind of elasticity is experienced in luxury items. The demand curve is flatter and more horizontal.

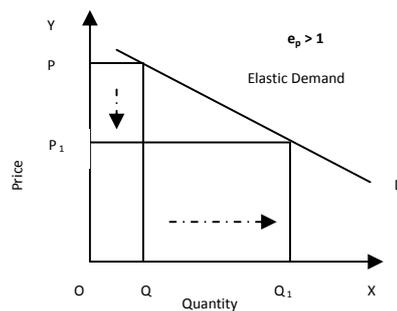


Figure 9.5 Elastic Demand

From the above analysis it can be concluded that theoretically five different types of price elasticity can be mentioned. In practice, however two extreme cases i.e. perfectly elastic and perfectly inelastic demand, are rarely experienced. What in practically is more elastic ($e > 1$) or less elastic ($e < 1$) demand. The unitary elasticity is a dividing line between these two cases.

9.2.2 Factors Affecting Price Elasticity of Demand

- i. **Nature of the Commodity:** Human wants, i.e. the commodities satisfying them can be classified broadly into necessities on the one hand and comforts and luxuries on the other hand. The nature of demand for a commodity depends upon this classification. The demand for necessities is inelastic and for comforts and luxuries it is elastic. The demand for luxury goods in general is more elastic than the demand for necessary goods. For example, consider a car in the first category and sugar in the second category.
- ii. **Number of Substitutes Available:** The availability of substitutes is a major determinant of the elasticity of demand. Larger the number of substitutes, the higher is the elastic. It means if a commodity has many substitutes, the demand will be elastic. As against this in the absence of substitutes, the demand becomes relatively inelastic because the consumers have no other alternative but to buy the same product irrespective of whether the price rises or falls. Larger the number of substitutes available to a product, the more will be the elasticity of demand; the smaller the number, the less elastic the demand. For example, consider T.V. set for the first type and salt for the second type.
- iii. **Number of Uses:** If a commodity can be put to a variety of uses, the demand will be more elastic. When the price of such commodity rises, its consumption will be restricted only to more important uses and when the price falls the consumption may be extended to less urgent uses, e.g. coal electricity, water etc.
- iv. **Possibility of Postponement of Consumption:** This factor also greatly influences the nature of demand for a commodity. If the consumption of a commodity can be postponed, the demand will be elastic.

- v. **Range of prices:** The demand for very low-priced as well as very high-price commodity is generally inelastic. When the price is very high, the commodity is consumed only by the rich people. A rise or fall in the price will not have significant effect in the demand. Similarly, when the price is so low that the commodity can be bought by all those who wish to buy, a change, i.e., a rise or fall in the price, will hardly have any effect on the demand. Highly priced goods tend to have elastic demand, while lower-priced goods have less elastic demand. The expression 'highly priced' is normally taken to mean a price at which the quantity that the consumer plans to buy is close to zero. For example, consider a product like refrigerator.
- vi. **Proportion of Income Spent:** Income of the consumer significantly influences the nature of demand. If only a small fraction of income is being spent on a particular commodity, say newspaper, the demand will tend to be inelastic.
- vii. **The Importance of the Goods:** A product which accounts for a high percentage of consumer's total expenditure is characterized by high elasticity. You may now examine why salt is inelastic.
- viii. **Price Expectation of Buyers:** When the price of the goods has fallen and the buyers expect it to fall further, then they will postpone buying the goods and this will make demand less responsive. On the other hand, if they expect price to go up then they will speed up purchase, which will increase elasticity.

9.2.3 Measurement of Price Elasticity of Demand

For practical purposes, it is essential to measure the exact elasticity of demand. By measuring the elasticity we can know the extent to which the demand is elastic or inelastic. Different methods are used for measuring the elasticity of demand.

- i. **Percentage-Change Method:** In this method, the percentage change in demand and percentage change in price are compared. As per this method proportionate change in demand is divided by proportionate change in price. it is expressed as under:

$$E_d = \frac{\text{Proportionate Change in Quantity Demanded}}{\text{Proportionate Change in Price}}$$

$$E_d = \frac{\text{Change in Quantity Demanded} / \text{Quantity Demand}}{\text{Change in Price} / \text{Price}}$$

$$= \frac{(Q_1 - Q) / Q}{(P_1 - P) / P} = \frac{\Delta Q / Q}{\Delta P / P}$$

$$= \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where,

Q = Initial Quantity

P = Initial Price

Q₁ = Changed Quantity

P₁ = Changed Price

Let's consider an example, suppose price of pen is Rs. 5 and quantity demanded is 1. When the price of pen falls to Rs. 2 demand extends to 4 pens.

Here,

$$Q = 1$$

$$P = 5$$

$$Q_1 = 4 - 1 = 3$$

$$P_1 = 5 - 2 = 3$$

$$E_d = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

$$= \frac{3 \times 5}{3 \times 1} = 5$$

Hence it implies 1 percent change in price leads to 5 percent change in quantity demanded.

ii. Total Outlay Method: Another method which can be used to measure the price elasticity of demand is the **Outlay method** or the total expenditure method or the total revenue method. The elasticity of demand can be

measured by considering the changes in price and the consequent changes in demand causing changes in the total amount spent on the goods. The change in price changes the demand for a commodity which in turn changes the total expenditure of the consumer or total revenue of the seller.

- ❖ **Unitary Elasticity of Demand:** If a given change in price fails to bring about any change in the total outlay, it is the case of unit elasticity. It means if the total revenue (Price x Quantity bought) remains the same inspite of a change in price, 'Ep' is said to be equal to 1
- ❖ **Greater Than Unitary:** If price and total revenue are inversely related, i.e., if total revenue falls with rise in price or rises with fall in price, demand is said to be elastic or $e > 1$.
- ❖ **Less Than Unitary:** When price and total revenue are directly related, i.e. if total revenue rises with a rise in price and falls with a fall in price, the demand is said to be inelastic or $e < 1$.

Elasticity Of Demand	Price	Total Expenditure
Greater Than Unitary	Rise	Down
	Fall	Up
Unitary	Rise	Unchanged
	Fall	Unchanged
Less Than Unitary	Rise	Up
	Fall	Down

Table 9.1 Total Outlay Method

Total outlay method can be explained with the help of an example, as shown in table 9.2. Suppose a consumer demands 4 units of X commodity when price is Rs.2. If the price rises to Rs.4 he demands 2 units of X commodity, and if price falls to Rs.1 than he demands 8 units. In all the three cases total expenditure remains the same i.e. Rs.8. so the price change has no effect on total expenditure. This is unitary elastic demand. Similarly if the rise in price leads to fall in total expenditure or fall in price leads to rise in total expenditure it is termed as greater than unitary elastic demand. And if with rise in price total expenditure also increases or decrease with fall in price it is termed as less than unitary elastic demand as shown in table 9.2.

Price of commodity	Quantity	Total expenditure	Effect on Total expenditure	Elasticity of demand
2	4	8	Same to Total expenditure	Unitary Elastic
4	2	8		
1	8	8		
2	4	8	Less Total expenditure More Total expenditure	Greater Than Unitary
4	1	4		
1	10	10		
2	3	6	More Total expenditure Less Total expenditure	Less Than Unitary
4	2	8		
1	4	4		

Table 9.2 Total Outlay Method

iii. Point Method: Another method suggested by Marshall is to measure elasticity at a point on a straight line is called Point Method. It refers to price elasticity of demand at any point on the demand curve. Point elasticity method shows different points on demand curve measuring different elasticity. Therefore, price elasticity can be measured at every point on given demand curve separately.

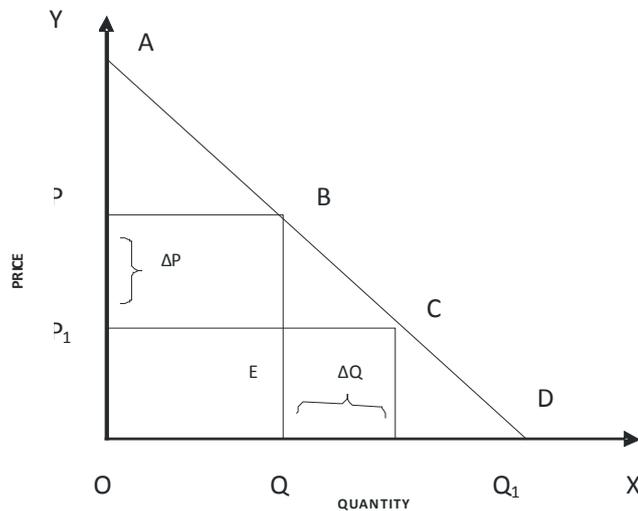


Figure 9.6 Point elasticity of demand

Figure 9.6, above shows demand curve AD as a straight line. At point B elasticity of demand would be BD/BA. It can also be measured with the help of following formula:

$$E_d = \frac{\text{Lower Portion of Demand Curve}}{\text{Upper Portion of Demand Curve}}$$

Price elasticity at different points of straight line can also be known with the help of point method. If the point is located at the middle of the straight line than the elasticity of demand is unitary. Point located above the middle point is more than elastic. But if the point lies on y axis then the elasticity of demand is perfectly elastic or infinite. Point below the middle point shows less than unitary elasticity of demand, As the point moves closer to X-axis then elasticity is zero or perfectly inelastic. Elasticity of demand at middle point on the demand curve is unity, at point above the mid-point it is greater than unity and point below the middle point is less than unity.

9.3 Income Elasticity

The price elasticity of demand reveals the extent of change in demand as a result of change in price. However, price is not the only determinant of demand. Demand for a commodity changes in response to a change in income of the consumer. In fact, income effect is a constituent of the price effect. The income effect suggests the effect of change in income on demand. The income elasticity of demand explains the extent of change in demand as a result of change in income. In other words, income elasticity of demand means the responsiveness of demand to changes in income.

Definitions

“Income elasticity of demand means the ratio of the percentage change in the quantity demanded to the percentage change in income.”

Watson

“The responsiveness of demand to changes in income is termed as income elasticity of demand.” **Richard G. Lipsey**

9.3.1 Measurement of Income Elasticity

Income elasticity of demand can be expressed as:

$$E_y = \frac{\text{Change in Quantity Demanded} / \text{Quantity Demand}}{\text{Change in Income} / \text{Income}}$$

9.3.2 Types of Income Elasticity

The following three types of income elasticity can be observed:

Positive Income Elasticity ($E_y > 0$): When the quantity demanded of a commodity changes in same direction as income of consumer it is called positive income elasticity. If income of consumer increases its commodity demanded also increases and vice versa, it is termed as positive income elasticity. Income elasticity is positive in case of normal goods.

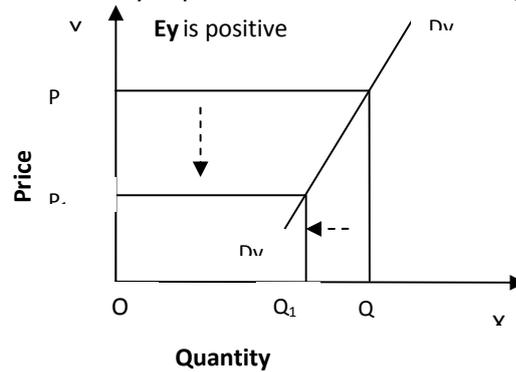


Figure 9.7 Positive Income Elasticity

Zero Income Elasticity of Demand ($E_y = 0$): This is the case when change in income of the consumer does not bring about any change in the demand for a commodity.

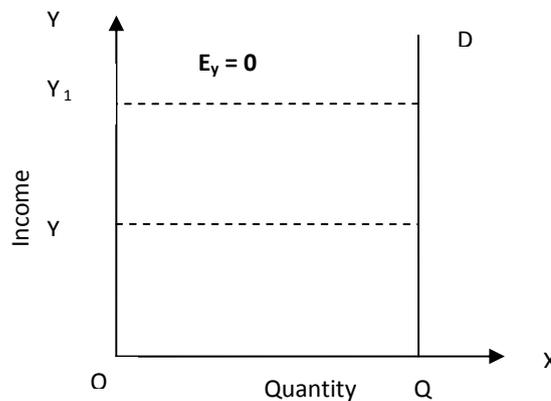


Figure 9.8 Zero Income Elasticity of Demand

Negative Income Elasticity of Demand ($E_y < 0$): It is well known that income effect for most of the commodities is positive. But in case of inferior goods, the income effect beyond a certain level of income becomes negative. This

implies that as the income increases the consumer, instead of buying more of a commodity, buys less and switches on to a superior commodity. The income elasticity of demand in such cases will be negative.

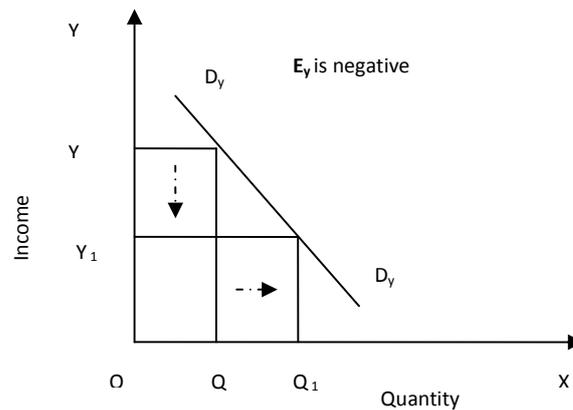


Figure 9.9 Negative Income Elasticity of Demand

9.3.3. Degrees of Positive Income Elasticity of Demand

There are three degrees of income elasticity of demand

- i. **Income Elasticity of Demand Greater than One:** When the percentage change in demand is greater than the percentage change in income, a greater portion of income is being spent on a commodity with an increase in income- income elasticity is said to be greater than one.

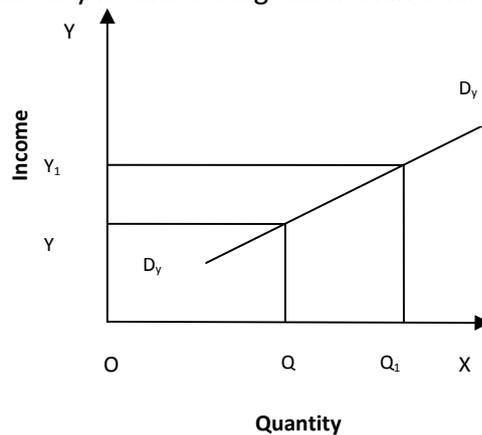


Figure 9.10 Income Elasticity of Demand Greater than One

- ii. **Income Elasticity is Unitary:** When the proportion of income spent on a commodity remains the same or when the percentage change in income is equal to the percentage change in demand, $E_Y = 1$ or the income elasticity is unitary.

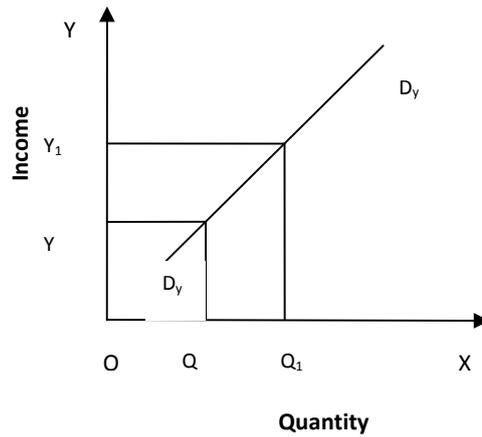


Figure 9.11 Income Elasticity of Demand Equal to One

- iii. **Income Elasticity Less Than One ($E_Y < 1$):** This occurs when the percentage change in demand is less than the percentage change in income. Income elasticity of demand is less than unity when percentage change in demand is less than percentage change in income.

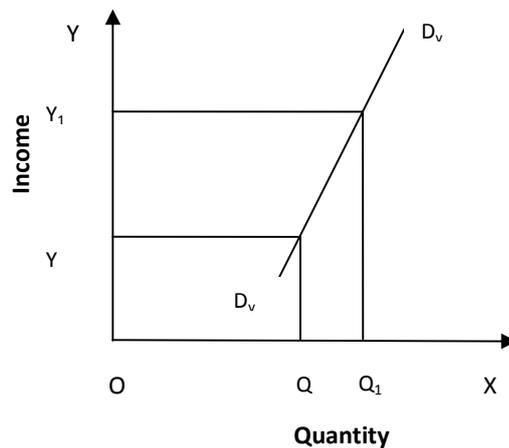


Figure 9.12 Income Elasticity of Demand Less than One

9.4 Cross Elasticity

Demand for a commodity depends not only on the price of that commodity but also on the prices of other related goods. Thus, the demand for a commodity X depends not only on the price of X but also on the prices of other commodities Y, Z....N etc. The concept of cross elasticity explains the degree of change in demand for X as, a result of change in price of Y. Cross elasticity of demand is the rate at which quantity demanded of commodity X changes, as a result of change in price of Y commodity, other things being constant.

Definitions

“Cross elasticity of demand is the responsiveness of demand for good ‘A’ to changes in the prices of good ‘B’.” **Lipsey**

“Cross elasticity of demand is the proportional change in the quantity of X good demanded resulting from a given relative change in the price of the related good.” **Ferguson**

“The cross elasticity of demand is measure of the responsiveness of purchases of y to change in the price of x.” **Leibhafsky**

9.4.1 Measurement Of Cross Elasticity of Demand

Cross elasticity of demand can be expressed as:

$$E_c = \frac{\text{Change in Quantity Demanded} / \text{Quantity Demand X}}{\text{Change in Price of Y} / \text{Price of Y}}$$

The relationship between any two goods is of three types. The goods X and Y can be complementary goods (such as pen and ink) or substitutes (such as ink pen and ball pen) or can have no relation (such as shoe and wheat grain). In case of complementary commodities, the cross elasticity will be negative. This means that fall in price of X (pen) leads to rise in demand for Y (ink) On the other hand, the cross elasticity for substitutes is positive which means a fall in price of X (ink pen) results in fall in demand Y (ball pen). If two commodities, say X and Y, are unrelated there will be no change i.e. Demand for X as a result of change in price of Y. Cross elasticity in case of such unrelated goods will be then zero.

In short, cross elasticity will be of three types:

i. Negative Cross Elasticity – Complementary commodities.

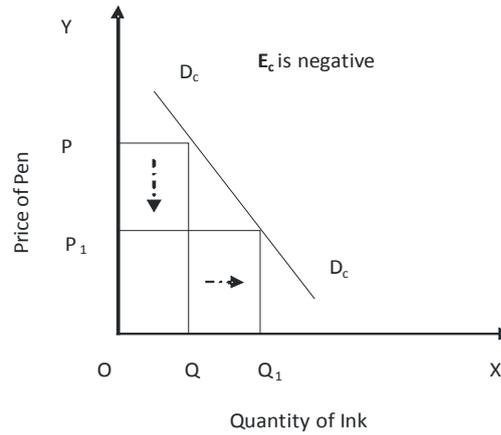


Figure 9.13 Negative Cross Elasticity

ii. Positive Cross Elasticity – Substitutes.

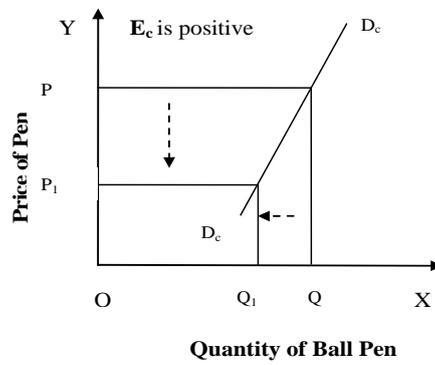


Figure 9.14 Positive Cross Elasticity

iii. **Zero Cross Elasticity – Unrelated goods.**

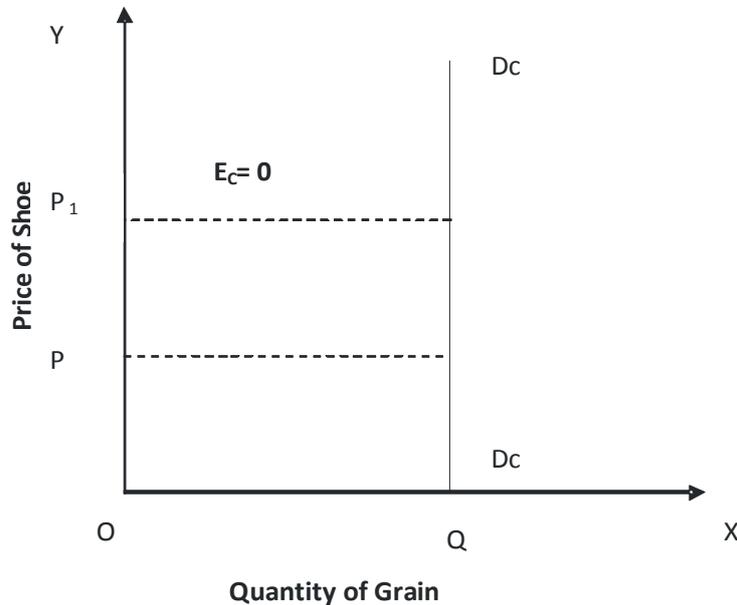


Figure 9.15 Zero Cross Elasticity

9.5 Advertising Elasticity

Advertising elasticity means when a company spends on advertisement and how much its sales increase due to this expense. Advertisement elasticity tells how much proportionate change is in sales as compared to proportionate change in advertising expenditure. If the sales increase more than the expenditure done by the company it is called as elastic advertising elasticity but if the sales do not increase as compared to expenditure done it is called inelastic advertisement elasticity. The increase in sales by means of advertisement and other promotional efforts may be measured by the advertising elasticity of demand. Other name of advertising elasticity is promotional elasticity. It measures the responsiveness of demand to change in advertising expenditure. It is measured as given below:

$$E_a = \frac{\text{Change In Sales / Sales}}{\text{Change in advertising expenditure / advertisement expenses}}$$

9.6.1 Importance of Elasticity

The concept of elasticity is of great importance both in economic theory and in practice.

1. Theoretically, its importance lies in the fact that it deeply analyse the price-demand relationship. The law of demand merely explains the qualitative relationship while the concept of elasticity of demand analysis the quantitative price-demand relationship.
2. The Pricing policy of the producer is greatly influenced by the nature of demand for his product. If the demand is inelastic, he will be benefited by charging a high price. If on the other hand, the demand is elastic, low price will be advantageous to the producer. The concept of elasticity helps the monopolist while practicing the price discrimination.
3. The price of joint products can be fixed on the basis of elasticity of demand. In case of such joint products, such as wool and mutton, cotton and cotton seeds, separate costs of production are not known. High price is charged for a product having inelastic demand (say cotton) and low price for its joint product having elastic demand (say cotton seeds).
4. The concept of elasticity of demand is helpful to the government in fixing the prices of public utilities.
5. The Elasticity of demand is important not only in pricing the commodities but also in fixing the price of labour viz., wages.
6. The concept of elasticity of demand is useful to government in formulation of economic policy in various fields such as taxation, international trade etc. (a) the concept of elasticity of demand guides the finance minister in imposing the commodity taxes. He should tax such commodities which have inelastic demand so that the government can raise handsome revenue. (b) The concept of elasticity of demand helps the government in formulating commercial policy. Protection and subsidy is granted to the industries which face an elastic demand.
7. The concept of elasticity of demand is very important in the field international trade. It helps in solving some of the problems of international trade such as gains from trade; balance of payments etc. policy of tariff also depends upon the nature of demand for a commodity.

In nutshell, it can be concluded that the concept of elasticity of demand has great significance in economic analysis. Its usefulness in branches of economic such as production, distribution, public finance, international trade etc., has been widely accepted.

Chapter at a Glance:

- **Introduction to Elasticity:** Some commodities are more responsive or sensitive to change in price while some others are less. The concept of the elasticity of demand has great significance as it explains the degree of responsiveness of demand to a change in price. It thus elaborates the price-demand relationship. The elasticity of demand thus means the sensitiveness or responsiveness of demand to a change in price.
- **Meaning of Elasticity of Demand:** Elasticity of demand means degree of variation in quantity demanded due to change in price, income or price of other related goods. If the change in price leads to change in quantity demanded it is called price elasticity but if change in income of consumer leads to change in quantity demanded it is called income elasticity while change in price of one commodity leads to change in quantity demanded of other good it is called cross elasticity. Generally if term elasticity of demand is used it means price elasticity.
- **Some Definitions:** "The elasticity of demand measures the responsiveness of the quantity demanded of good, to change in its price, price of other goods and changes in consumer's income." **Dooley**
- **Price Elasticity of Demand:** Elasticity of demand is a measure of relative changes in the amount demanded in response to a small change in price.
- **Degrees of Price Elasticity of Demand:** There are five degrees of price elasticity of demand; perfectly elastic; perfectly inelastic. Unitary elastic. Inelastic and elastic.
- **Factors Affecting Price Elasticity Of Demand:** various factors affect elasticity of demand. Some of them are: Nature of the Commodity; Number of Substitutes Available; Number of Uses; Possibility of Postponement of Consumption; Range of prices; Proportion of Income Spent; The Importance of the Goods; Price Expectation of Buyers.
- **Measurement Of Price Elasticity Of Demand:**

$$E_d = \frac{\text{Proportionate Change in Quantity Demanded}}{\text{Proportionate Change in Price}}$$

- **Income Elasticity of Demand:** “Income elasticity of demand means the ratio of the percentage change in the quantity demanded to the percentage change in income.” **Watson**
- **Cross Elasticity of Demand:** “The cross elasticity of demand is measure of the responsiveness of purchases of y to change in the price of x.” **Leibhafsky**
- **Advertising Elasticity of Demand:** It measures the responsiveness of demand to change in advertising expenditure. Advertising elasticity means when a company spends on advertisement how much its sales increase. Advertisement elasticity tells how much proportionate change in sales as compared to proportionate change in advertising expenditure.
- **Importance of Elasticity of Demand:** law of demand merely tells about the direction of change but elasticity of demand tells how much change in price will lead to how much change in demand. It is very important for producer while deciding price of a product. The concept of elasticity of demand is useful to Government in formulation of economic policy in various fields such as taxation, international trade etc. Elasticity of demand is very important in the field international trade.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. Elasticity of Demand measures the _____ of sales to changes in a particular casual factor.
2. The elasticity of demand measures the responsiveness of the _____ demanded of good, to change in its price, price of other goods and changes in consumer’s income.
3. Perfectly _____ demand describes a situation in which demand shows no response to a change in price.
4. In perfectly _____ demand an insignificant change in price produces tremendous change in demand.
5. The percentage change in demand is greater than that in price is termed as _____ demand.

6. When the percentage change in price produces equivalent percentage change in demand, it's a case of _____ elasticity.
7. In the case of _____ demand the proportionate change in demand is smaller than in price.
8. The demand curve showing perfectly elastic demand is a _____ straight line
9. In the case of _____ demand insignificant change in price produces tremendous change in demand.
10. The demand for _____ goods in general is more elastic than the demand for necessary goods.
11. Proportionate change in demand is _____ by proportionate change in price to measure price elasticity of demand.
12. If a given change in price fails to bring about any change in the total outlay, it is the case of _____ elasticity.
13. If price and total revenue are _____ related demand is said to be elastic or $e > 1$.
14. _____ elasticity of demand means the ratio of the percentage change in the quantity demanded to the percentage change in income.
15. Other name of advertising elasticity is _____ elasticity.

Answer key

- | | | |
|----------------|---------------|----------------------|
| 1. Sensitivity | 2. Quantity | 3. Inelastic |
| 4. Elastic | 5. Elastic | 6. Unitary |
| 7. Inelastic | 8. Horizontal | 9. Perfectly elastic |
| 10. Luxury | 11. Divided | 12. Unitary |
| 13. Inversely | 14. Income | 15. Promotional |

(B) State whether the following statements are True or False.

- 1 Other name of advertising elasticity is promotional elasticity.
- 2 The cross elasticity of demand is measure of the responsiveness of purchases of y to change in the price of y.
- 3 Unrelated goods have zero cross elasticity.
- 4 Substitutes have positive cross elasticity.
- 5 Complimentary goods have negative cross elasticity.
- 6 Income elasticity of demand is less than unity when percentage change in demand is more than percentage change in income.

- 7 A greater portion of income is being spent on a commodity with an increase in income- income elasticity is said to be greater than one.
- 8 If a commodity can be put to a variety of uses, the demand will be more inelastic.
- 9 The demand for very low-priced as well as very high-price commodity is generally inelastic.
- 10 If only a small fraction of income is being spent on a particular commodity, say newspaper, the demand will tend to be elastic.

Answer key:

- | | | | | |
|----------|----------|----------|---------|-----------|
| 1. True | 2. False | 3. True | 4. True | 5. True |
| 6. False | 7. True | 8. False | 9. True | 10. False |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. Elasticity of demand may be defined as the percentage change in quantity demanded divided by the percentage change in price.
 (A) Robinson (B) Boulding
 (C) A.Cairncross (D) Marshall
2. Which of the following is not a type of elasticity of demand?
 (A) Price Elasticity (B) Cost Elasticity
 (C) Cross Elasticity (D) Income Elasticity
3. Types of price elasticity includes:
 (A) Perfectly Elastic (B) Unitary Elastic
 (C) Perfectly Inelastic (D) All of Them
4. Calculate the price elasticity of demand if : $Q_1 = 4000$, $P_1 = \text{Rs. } 20$, $Q_2 = 5000$, $P_2 = \text{Rs. } 19$.
 (A) Rs. 5 (B) Rs.6
 (C) Rs. 9 (D) Rs.3
5. The price of commodity is Rs. 20 and the quantity demanded at this price is 200 units. If the price falls to Rs. 16 and the quantity demanded increases to 280 units. Calculate the elasticity of demand.
 (A) Rs. 5 (B) Rs.6
 (C) Rs. 2 (D) Rs.3
6. Demand analysis includes:
 (A) Point Elasticity (B) Price Elasticity
 (C) Income Elasticity (D) All of These

7. Which is the method of measuring elasticity of demand?
 (A) Total Outlay Method (B) Point Method
 (C) Percentage Method (D) All of These
8. Calculate the price elasticity of demand if 20% increase in milk price causes the amount of milk sales to fall by 40%.
 (A) 2 (B) 4
 (C) 0.5 (D) 6
9. The ratio of the percentage change in the quantity demanded to the percentage change in income.
 (A) Price elasticity (B) Income Elasticity
 (C) Cross Elasticity (D) Advertising Elasticity
10. Measure of the responsiveness of purchases of y to change in the price of x.
 (A) Price elasticity (B) Income Elasticity
 (C) Cross Elasticity (D) Advertising Elasticity
11. The responsiveness of demand to change in advertising expenditure.
 (A) Price elasticity (B) Income Elasticity
 (C) Cross Elasticity (D) Advertising Elasticity
12. The vertical straight line demand curve shows
 (A) Perfectly Elastic (B) Perfectly Inelastic
 (C) Unitary Elastic (D) Inelastic
13. The horizontal straight line demand curve shows
 (A) Perfectly Elastic (B) Perfectly Inelastic
 (C) Unitary Elastic (D) Inelastic
14. If price and total revenue are inversely related, i.e., if total revenue falls with rise in price or rises with fall in price, demand is said to be:
 (A) Perfectly Elastic (B) Perfectly Inelastic
 (C) Greater than Unitary Elastic (D) less than unitary Inelastic
15. When price and total revenue are directly related, i.e. if total revenue rises with a rise in price and falls with a fall in price, the demand is said to be:
 (A) Perfectly Elastic (B) Perfectly Inelastic
 (C) Greater than Unitary Elastic (D) less than unitary Inelastic

Answer key:

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. D | 2. B | 3. D | 4. A | 5. C |
| 6. D | 7. D | 8. A | 9. B | 10. C |
| 11. D | 12. B | 13. A | 14. C | 15. D |

(D) Very Short Answer Type Questions

1. What do you mean by elasticity?
2. What do you mean by price elasticity of demand?
3. What do you mean by income elasticity of demand?
4. What do you mean by cross elasticity of demand?
5. What do you mean by advertising elasticity of demand?
6. What do you mean by perfectly inelastic demand?
7. What do you mean by perfectly elastic demand?
8. What do you mean by inelastic demand?
9. What do you mean by elastic demand?
10. What do you mean by total outlay method?
11. What do you mean by point method?
12. What do you mean by proportionate method?
13. What do you mean by zero cross elasticity?
14. What do you mean by positive cross elasticity?
15. What do you mean by negative cross elasticity?

2. Short Answer Type Questions

1. What are the various types of elasticity of demand?
2. What are the various degrees of price elasticity?
3. What are the factors which affect price elasticity of demand?
4. Explain the importance of elasticity of demand?
5. What do you mean income elasticity of demand?
6. How cross elasticity of demand is measured?
7. How income elasticity of demand is measured?
8. How price elasticity of demand is measured?
9. How advertising elasticity of demand is measured?
10. Explain the various types of income elasticity of demand.
11. Explain the various degrees of income elasticity of demand.
12. What do you mean by proportionate or percentage method of price elasticity of demand?
13. What do you mean by total outlay or total expenditure method of price elasticity of demand?
14. What do you mean by point method of price elasticity of demand?

3. Long Answer Type Questions.

1. Explain in detail how the demand for a commodity is affected by changes in price. In come, price of related goods and advertisement.
2. Define price elasticity of demand and distinguish between its various types. Discuss the role of price elasticity of demand in business decision
3. Define elasticity of demand. Explain with diagrams the cases where the absolutely value of elasticity is (i) zero (ii) infinity (iii) one (iv) less than one (v) more than one.
4. Define elasticity of demand. Explain various factors affecting the elasticity of demand.
5. What are the various methods to measure price elasticity of demand?
6. Explain with the help of diagrams price, income and cross elasticity of demand.
7. Explain how to measure various elasticity of demand.
8. What do you mean by elasticity of demand and what is its managerial significance?

Chapter 10

Production Function

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Meaning of Production Function*
- *Concepts of Production*
- *Nature of Production*
- *Attributes of Production*
- *Law of Variable Proportion*

10.0 Introduction

The term Production Function refers to the relationship between the inputs and the outputs produced. The terms, “factors of production” and “resources” are used interchangeably with the term “inputs”. The inputs are what the firm buys, namely productive resources, and outputs are what it sells. Production is not the creation of matter but it is the creation of value. Production is also defined as producing goods which satisfy some human want. Production is a sequence of technical processes requiring either directly or indirectly the mental and physical skill of craftsmen and consists of changing the shape, size and properties of materials and ultimately converting them into more useful articles. Means of production refers to the concept which combines the means of labour and the subject of labour. Means of labour simply means all the things which require labour to transform it. Subject of labour means the material to work on. Production, therefore, is the combined resources and equipment needed to come up with goods or services. The relationship is

purely physical or technological in nature, that is, it ignores the prices of inputs & outputs. The study of production function is directed towards establishing the maximum output which can be achieved with a given set of resources or inputs and with a given set of technology.

10.1 Meaning of Production Function

Production is the transformation of inputs (land, labour, capital, raw materials, etc) into output. The production function expresses a functional relationship between quantities of inputs and outputs. It shows how and to what extent output changes with variations in inputs during a specified period of time. Basically, the production function is a technological or engineering concept which can be expressed in the form of a table, graph and equation showing the amount of output obtained from various combinations of inputs used in production, given the state of technology. Algebraically, it may be expressed in the form of an equation as

$$Q = f(L, M, N, K, T).$$

Where Q = the output of a good per unit of time, L = labour,

M = Management (Or Organization), N = Land (Or Natural Resources),
 K = Capital T = Given Technology, And f = Functional Relationship.

Some Definitions

- "The production function is the name given to the relationship between rates of input of productive services and the rate of output of product. It is the economist's summary of technical knowledge." **Stigler**
- "The production is purely a technical relation which connects factor inputs and outputs." **Koutsoyianis**
- "A production function is a description of the quantitative relationship between the inputs absorbed and the outputs emerging from a particular production process." **Prof. Leontief**

10.2 Concepts of Production

- i. Fixed and Variable Inputs:** In economic sense, a fixed input is one whose supply is inelastic in the short run, e.g., plant, machinery, building, etc. In technical sense, a fixed factor is one that remains fixed for a certain level of output.
A variable input is one whose supply is elastic in the short run, e.g., labour, raw material, etc. Technically, a variable input is one that changes with the change in output. In the long run, all inputs are variable.
- ii. Short-Run and Long-Run:** The short run refers to a period of time in which the supply of certain inputs e.g., plant, building, machinery, etc. is fixed or inelastic. In the short run therefore, production of a commodity can be increased by increasing the use of only variable inputs like labour and raw materials. The long run refers to a period of time in which the supply of all the inputs is elastic, but not enough to permit a change in technology. That is, in the long run, all the inputs are variable. Therefore, in the long run, output can be increased by employing more of both variable and fixed inputs.
- iii. Total product** (also known as total physical product) is defined as the total quantity of output produced by a firm for a given quantity of input necessities. Total product identifies the specific outputs which are possible using variable levels of counts. An understanding of total product is essential to the short-run analysis of a firm's production. Changes in total product are taken into account closely when there are changes in variable costs (labour) of production. *Total product of a factor is the amount of total output produced by a given amount of the factor, other factors held constant.* As the amount of a factor increases, the total output increases.
- iv. Marginal Product** is similar to average product, but is looked at from another perspective. Discrete marginal product is defined as the change in total product that comes as a result of a one unit increase in the variable input/capital level of a firm. Continuous marginal product is calculated as the derivative of total product with respect to the variable input employed. *Marginal product of a factor is the addition to the total production by the employment of an extra unit of a factor.* Suppose when two workers are employed to produce wheat in an agricultural farm and they produce 170 quintals of wheat per year. Now, if instead of two workers, three workers are employed and as a result total product increases to 270 quintals, then the third worker has added 100 quintals of

wheat to the total production. Thus 100 quintals is the marginal product of the third worker. Mathematically, if employment of labour increases by ΔL units which yield an increase in total output by ΔQ units, the marginal physical product of labour is given by $\Delta Q/\Delta L$. That is, $MP_L = \Delta Q/\Delta L$

- v. **Average Product** is defined as the product produced per unit of variable input employed when fixed inputs are held constant. It is commonly thought of as the amount of product produced by every worker. *Average product of a factor is the total output produced per unit of the factor employed.* Thus,

Average Product = Total Product/Number of units of a factor employed

If Q stands for total product, L for the number of a variable factor employed, and then average product (AP) is given by:

$$AP = Q/L$$

10.3 The Nature of Production Function

The production function depends upon the following factors:

- i) The quantities of inputs to be used.
- ii) The state of technical knowledge.
- iii) The possible processes of production.
- iv) The size of the firm.
- v) The prices of inputs.

10.4 Attributes of Production Function

The following are the important attributes of production function:

- i. The production function is a flow concept.
- ii. A production function is a technical relationship between inputs and outputs expressed in physical terms.
- iii. The production function of a firm depends on the state of technology and inputs.

- iv. From the economic point of view, a rational firm is interested not in all the numerous possible levels of output but only in that combination which yields maximum outputs.
- v. The short run production function pertains to the given scale of production. The long run production function pertains to the changing scale of production

10.5 Production Function with One Variable Input

The Law of Variable Proportions or Return to a Factor

If one input is variable and all other inputs are fixed the firm's production function exhibits the law of variable proportions. *The law of variable proportions states that as the quantity of one factor is increased, keeping the other factors fixed, the marginal product of that factor will eventually decline.* This means that upto the use of a certain amount of variable factor, marginal product of the factor may increase and after a certain stage it starts diminishing. When the variable factor becomes relatively abundant, the marginal product may become negative. If the number of units of a variable factor is increased, keeping other factors constant, how output changes is the concern of this law. Suppose land, plant and equipment are the fixed factors, and labour the variable factor. When the number of labour increase successively to have larger output, the proportion between fixed and variable factors is altered and the law of variable proportions sets in. *The law states that as the quantity of a variable input is increased by equal doses keeping the quantities of other inputs constant, total product will increase, but after a point at a diminishing rate.* When more and more units of the variable factor are used, holding the quantities of fixed factors constant, a point is reached beyond which the marginal product, then the average and finally the total product will diminish. *The law of variable proportions is also known as the law of diminishing returns.*

10.5.1 Assumptions

The law of return to a factor is based on the following assumptions:

- i) Only one factor is variable while others are held constant.
- ii) All units of the variable factor are homogeneous.
- iii) There is no change in technology.
- iv) It is possible to vary the proportions in which different inputs are combined.
- v) It assumes a short run situation; in the long run all factors are variable.

The product is measured in physical units, i.e. in quintals, tones etc. The use of money in measuring the product may show increasing rather than decreasing returns if the prices of the product rise, even though the output might have declined.

10.5.2 Explanation

The law of variable proportions states that as the quantity of one factor is increased, keeping the other factors fixed, the marginal product of that factor will eventually decline. This means that upto the use of a certain amount of variable factor, marginal product of the factor may increase and after a certain stage it starts diminishing. When the variable factor becomes relatively abundant, the marginal product may become negative.

The law of variable proportion is illustrated in the following table and figure. Suppose there is a given amount of land in which more and more labour (variable factor) is used to produce wheat.

Units of Labour	Total Product	Marginal Product	Average Product
1	2	2	2
2	6	4	3
3	12	6	4
4	16	4	4
5	18	2	3.6
6	18	0	3
7	14	-4	2
8	8	-6	1

Table 10.1 Returns to a Factor

It can be seen from the table that upto the use of 3 units of labour, total product increases at an increasing rate and beyond the third unit, total product increases at a diminishing rate. This fact is shown by the marginal product which is the addition made to Total Product as a result of increasing the variable factor i.e. labour. It can be seen from the table that the marginal product of labour initially rises and beyond the use of three units of labour, it

starts diminishing. The use of six units of labour does not add anything to the total production of wheat. Hence, the marginal product of labour has fallen to zero. Beyond the use of six units of labour, total product diminishes and therefore marginal product of labour becomes negative. Regarding the average product of labour, it rises up to the use of third unit of labour and beyond that it is falling throughout.

Three Stages of the Law of Variable Proportions: These stages are illustrated in the following figure where labour is measured on the X-axis and output on the Y-axis.

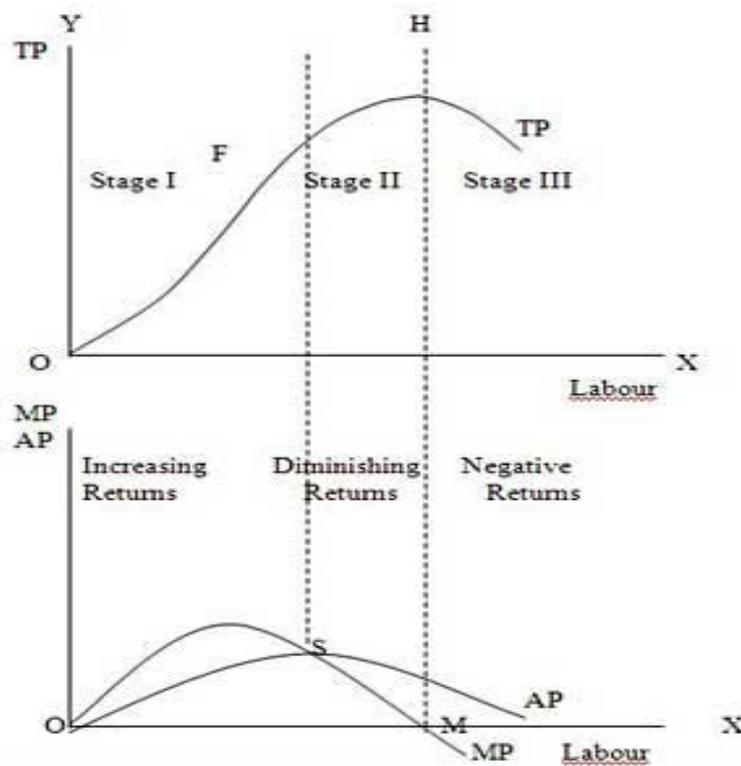


Figure 10.1 Return to a Factor

Stage 1. Stage of Increasing Returns: In this stage, total product increases at an increasing rate up to a point. This is because the efficiency of the fixed factors increases as additional units of the variable factors are added to it. In the figure, from the origin to the point F, slope of the total product curve TP is increasing i.e. the curve TP is concave upwards upto the point F, which means that the marginal product MP of labour rises. The point F where the total

product stops increasing at an increasing rate and starts increasing at a diminishing rate is called the point of inflection. Corresponding vertically to this point of inflection marginal product of labour is maximum, after which it diminishes. This stage is called the stage of increasing returns because the average product of the variable factor increases throughout this stage. This stage ends at the point where the average product curve reaches its highest point.

Stage 2. Stage of Diminishing Returns: In this stage, total product continues to increase but at a diminishing rate until it reaches its maximum point H where the second stage ends. In this stage both the marginal product and average product of labour are diminishing but are positive. This is because the fixed factor becomes inadequate relative to the quantity of the variable factor. At the end of the second stage, i.e., at point M marginal product of labour is zero which corresponds to the maximum point H of the total product curve TP. This stage is important because the firm will seek to produce in this range.

Stage 3. Stage of Negative Returns: In stage 3, total product declines and therefore the TP curve slopes downward. As a result, marginal product of labour is negative and the MP curve falls below the X-axis. In this stage the variable factor (labour) is too much relative to the fixed factor.

Total Physical Product	Marginal Physical Product	Average Physical Product
<u>Stage 1</u> Increases at an increasing rate	Increases, Reaches its maximum & then declines till MR=AP	Increases & reaches its Maximum
<u>Stage 2</u> Increases at a diminishing rate till it reaches its maximum	Is diminishing & becomes equal to zero	Starts Diminishing
<u>Stage 3</u> Starts Declining	Becomes Negative	Continues to decline

Table 10.2 Relationship between Total Product, Marginal Product and Average Product

10.5.3 Importance of Law

- i. Production of food grains lags behind with increase in population. Agriculture obeys the law of diminishing returns.
- ii. Theory of rent is based on the law of variable return. The labour yields less returns with every increment on land.
- iii. Theory of distribution is also based on this very law.
- iv. This laws help producer to decide for optimum production level.
- v. This law gives stress on the significance of industries in the field of production.
- vi. Due to operation of this law people migrate from one place to another. When land labour ratio is unfavourable people move to a place where this ratio is favourable.

Chapter at a Glance:

- **Introduction to Production Function:** Production, therefore, is the combined resources and equipment needed to come up with goods or services. The relationship is purely physical or technological in nature, that is, it ignores the prices of inputs & outputs. The study of production function is directed towards establishing the maximum output which can be achieved with a given set of resources or inputs and with a given set of technology.
- **Meaning of Production Function:** Production is the transformation of inputs (land, labour, capital, raw materials, etc) into output. The production function expresses a functional relationship between quantities

of inputs and outputs. It shows how and to what extent output changes with variations in inputs during a specified period of time.

- **Some Definitions:** "The production function is the name given to the relationship between rates of input of productive services and the rate of output of product. It is the economist's summary of technical knowledge."

Stigler

- **Concepts of Production: Fixed and Variable Inputs:** a fixed input is one whose supply is inelastic in the short run, e.g., plant, machinery, building, etc. a variable input is one that changes with the change in output. In the long run, all inputs are variable. **Short-Run and Long-Run:** The short run refers to a period of time in which the supply of certain inputs The long run refers to a period of time in which the supply of all the inputs is elastic, but not enough to permit a change in technology. **Total product: Total product** (also known as total physical product) is defined as the total quantity of output produced by a firm for a given quantity of input necessities. **Marginal Product:** Marginal product of a factor is the addition to the total production by the employment of an extra unit of a factor. **Average Product:** Average Product is defined as the product produced per unit of variable input employed when fixed inputs are held constant.
- **Law of Variable Proportion:** The law of variable proportions states that as the quantity of one factor is increased, keeping the other factors fixed, the marginal product of that factor will eventually decline.
- **Importance of Law:** Production of food grains lags behind with increase in population. Agriculture obeys the law of diminishing returns. Theory of rent is based on the law of variable return. The labour yields less returns

with every increment on land. Theory of distribution is also based on this very law. This laws help producer to decide for optimum production level. This law gives stress on the significance of industries in the field of production. Due to operation of this law people migrate from one place to another. When land labour ratio is unfavourable people move to a place where this ratio is favourable.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. In the stage 1, total production _____ at increasing rate.
2. In the stage 1 marginal production, Increases and Reaches its maximum & then declines till $MR = \underline{\hspace{2cm}}$.
3. In the stage 1 average production, Increases & reaches its _____
4. The law of variable proportions states that as the quantity of one factor is increased, keeping the other factors fixed, the _____ of that factor will eventually decline
5. _____ is defined as the product produced per unit of variable input employed when fixed inputs are held constant.
6. _____ of a factor is the addition to the total production by the employment of an extra unit of a factor.
7. _____ is defined as the total quantity of output produced by a firm for a given quantity of input necessities.
8. A variable input is one whose supply is _____ in the short run
9. A fixed input is one whose supply is _____ in the short run
10. _____ = Q/L
11. _____ = $\Delta Q/\Delta L$
12. A production function is a technical relationship between inputs and outputs expressed in _____ terms.

13. The _____run production function pertains to the changing scale of production
14. The _____run production function pertains to the given scale of production.
15. The production function is a _____concept.

Answer key

- | | | |
|---------------------|--------------------|---------------------|
| 1. Increases | 2. AP | 3. Maximum |
| 4. Marginal Product | 5. Average Product | 6. Marginal Product |
| 7. Total Product | 8. Elastic | 9. Inelastic |
| 10. AP | 11. MP_L | 12. Physical |
| 13. Long | 14. Short | 15. Flow |

(B) State whether the following statements are True or false.

1. The term Production Function refers to the relationship between the inputs and the outputs produced.
2. Production is the transformation of outputs into input.
3. A fixed input is one whose supply is elastic in the short run.
4. A variable input is one whose supply is elastic in the short run.
5. The short run refers to a period of time in which the supply of certain inputs is elastic.
6. The long run refers to a period of time in which the supply of all the inputs is elastic, but not enough to permit a change in technology.
7. As the amount of a factor increases, the total output decreases.
8. Average product of a factor is the total output produced per unit of the factor employed
9. If all inputs are variable the firm's production function exhibits the law of variable proportions.
10. Theory of rent is not based on the law of variable return.

Answer key:

- | | | | | |
|---------|----------|----------|----------|------------|
| 1. True | 2. False | 3. False | 4. True | 5. False |
| 6. True | 7. False | 8. True | 9. False | 10. False. |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. A production function is a description of the quantitative relationship between the inputs absorbed and the outputs emerging from a particular production process.
(A) Prof. Leontief (B) Koutsoyianis
(C) Stigler (D) Marshall
2. Fixed factor is one that remains fixed for a certain level of _____.
(A) Inputs (B) Output
(C) Goods (D) Services
3. A variable input is one that changes with the change in output. In the long run, all inputs are.
(A) Fixed (B) Semi Variable
(C) Variable (D) None Of Above
4. In the long run, output can be _____ by employing more of both variable and fixed inputs.
(A) Decreased (B) Constant
(C) Variable (D) Increased
5. _____ of a factor is the amount of total output produced by a given amount of the factor, other factors held constant.
(A) Total product (B) Average product
(C) Marginal product (D) none of these
6. _____ of a factor is the addition to the total production by the employment of an extra unit of a factor.
(A) Total product (B) Average product
(C) Marginal product (D) none of these
7. _____ of a factor is the total output produced per unit of the factor employed.
(A) Total product (B) Average product
(C) Marginal product (D) None of these

8. If total product is 280 units and labour employed is 10 then average production is _____.
- (A) 2.8 (B) 180
(C) 140 (D) 28
9. Production is the function of
- (A) Land (B) Labour
(C) Capital (D) All of these
10. Land is _____ input.
- (A) Variable (B) Fixed
(C) Constant (D) None of these

Answer Key:

- | | | | | |
|------|------|------|------|-------|
| 1. A | 2. B | 3. C | 4. D | 5. C |
| 6. C | 7. B | 8. D | 9. D | 10. B |

(D) Very Short Answer Type Questions

1. What do you mean by production?
2. What do you mean by total product?
3. What do you mean by average product?
4. What do you mean by marginal product?
5. What do you mean by fixed factor?
6. What do you mean by variable factor?
7. What do you mean by short run?
8. What do you mean by long run?
9. Write two attributes of production function.
10. Write any one difference between short run and long run.

2. Short Answer Type Questions

1. What do you mean by production? Write any two features of production function.
2. Explain the attributes of production function.
3. What do you mean by total production? Write the formula to calculate total production.

4. What do you mean by return to a factor? Write any two features.
5. What do you mean by short run? Write any two features.
6. What do you mean by long run? Write any two examples.
7. What do you mean by return to a factor? Explain with example.
8. What do you mean by average product? Explain with example.
9. Write features of production function.
10. Write differences between total product and marginal product.

3. Long Answer Type Questions.

1. Explain the law of variable proportions. Explain the various stages of this law with the help of a table and diagram.
2. What do you mean by production function? What are its various attributes?
3. Discuss the various concepts of production.
4. Discuss the various stages of return to factor with table and figure.
5. Discuss the importance of law of return to a variable factor.
6. What is the relationship between the concept of total product, average product and marginal product?

Chapter 11

Supply and Producer's Equilibrium

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Meaning of Supply*
- *Determinants of Supply*
- *Supply Schedule and Supply Curve*
- *Law of Supply*
- *Movement along and Shift of Supply Curve*
- *Price Elasticity of Supply*
- *Producer's Equilibrium*

11.0 Introduction

Supply means the quantity offered for sale by producers at a particular price. Supply during a given period of time means the quantities of goods which are offered for sale at particular prices. Supply is the amount of that commodity which a seller is able and willing to offer for sale at a particular price during a certain period of time. It is a relative term. The term supply is always used in context of particular price and time.

Definition

“Supply may be defined as a schedule of the amount of a product that would be offered for sale at all possible prices at any one instant of time, or during

any one period of time, for example, a day, a week and so on, in which the conditions of supply remain the same.” **Meyers**

11.1 Determinants of Supply

There are various determinants of supply. Price is not the only factor on which the supply of a commodity depends. The determinants of supply are as follows:

- i) Price of Commodity:** Supply for a product depends upon its price. If price is less supply will be less, and if price is high, supply will be high.
- ii) Cost of Factor of Production:** If the cost of factor of production is less, products would be supplied at cheaper prices. But if cost of factor of production rises, then the cost of production would increase and the producer will supply costly products.
- iii) Production Technology:** Production technology means state of technology. If technology is modern and latest, the supply would be more as compared to if technology is old and outdated supply would be less.
- iv) Price of Other Commodities:** If the price of substitute commodity is higher then the supply of commodity will decrease but if it is lesser the supply would increase. But if the price of complimentary commodity is higher the supply of commodity will go higher, and vice a versa.
- v) Number of Producers:** If there are large numbers of suppliers, then the market supply will increase. But if the number of suppliers is less then the market supply will be less.
- vi) Government Policy:** If the government increases the taxes, this will lead to higher cost of production and in return the supply would decrease and vice a versa. If government provides subsidies to producers and sellers, then the supply would increase in supply.
- vii) Future Price Expectation:** Future expectation of prices also affects the supply. If the producer expects hike in prices then supply would

decrease. But if in case he expects prices to be down then the supply would increase.

11.2 Supply Function

The supply function is the mathematical expression of the relationship between supply and those factors that affect the willingness and ability of a supplier to offer goods for sale. It is also known as the determinants of supply. The important determinants of supply can be grouped together in a supply function as follows:

$$S_n = f(P_n, P_r, F, T, G)$$

Supply function describes the functional relationship between supply of a commodity (say n) and other determinants of supply, i.e., price of the commodity (P_n), price of a related commodity (P_r), prices of the factors of production (F), technical know-how (T) and goals or general objectives of the producer (G). Each of the factors influences supply in a different way. To isolate the effect of other factors, other factors are held constant while considering the relationship between supply and one of the above variables. For example, if to study the relationship between price and supply of commodity n , assume other factors P_r , F , T and G to remain constant or unchanged.

11.3 Supply Schedule

Supply schedule represents the variations between prices and the quantities that seller is willing to produce and sell. A detail account of the supply of any commodity at a given time and at different prices is known as the supply schedule.

Supply schedule is of two types:

(i) Individual Supply Schedule: *An Individual Supply Schedule reveals the reaction of an individual producer towards different amounts of a commodity at their corresponding prices.* The Individual Supply Schedule expresses the direct relation that exists between price and quantity supplied. An Individual Supply Schedule represents the supply of an individual producer. Individual

supply schedule states the quantities of a commodity a producer would offer for sale at various prices.

Price of Wheat (in Rs. Per kg)	Quantity Supplied (in kg.) by 'A'
50	50
40	40
30	30
20	20
10	10

Table 11.1 Individual Supply Schedule

(ii) Market Supply Schedule: A Market Supply Schedule for a given commodity is the sum of individual supply for all those firms which are engaged in the production of a given commodity during a given period. It is the combination of different Individual Supply Schedules in the market at a given price in a given period of time. The Market Supply Schedule shows the total Supply of all the producers taken together. In every market, there are many sellers of a commodity. The concept is made clear by the Table 11.2:-

Price of Wheat (in Rs. Per kg)	Supply by 'A' (Kg.)	Supply by 'B' (Kg.)	Supply by 'C' (Kg.)	Market Supply (Kg.)
50	50	40	30	$50+40+30=120$
40	40	30	20	$40+30+20=90$
30	30	20	10	$30+20+10=60$
20	20	10	5	$20+10+5=35$
10	10	0	0	$10+0+0=10$

Table 11.2 Market Supply Schedule

11.4 Supply Curve

A supply curve is a graphical depiction of a supply schedule. It is derived by plotting price on the vertical axis and quantity supplied on the horizontal axis. The supply curve is upward-sloping, reflecting the law of supply. A graphic representation of relationship between price and the quantity supplied other things being equal is termed as Supply Curve. A Supply Curve can be obtained by plotting a Supply Schedule on a graph and joining the points so obtained. It is a geometrical device to express the relation between quantity supplied and price.

Supply Curve is of two types:

- i) **Individual Supply Curve:** The Supply Curve of an individual seller is called as Individual Supply Curve. It is a curve which represents the different quantities supplied by an individual seller at different prices.
- ii) **Market Supply Curve:** The sum total of the entire individual curves is a Market or a Total Supply Curve. Market Supply curve represents the aggregate Supply of all the sellers in the market at different prices. It is summation of individual sellers in the market, or individual supply curves of homogeneous commodity. The market supply curve can be obtained by aggregating the individual supply curves of the commodity. The market supply curve also shows the same relationship between the price and the quantity supplied. The quantity supplied increases proportionately with the increase in price.

The two supply curves are shown in figure 11.1 and 11.2:-

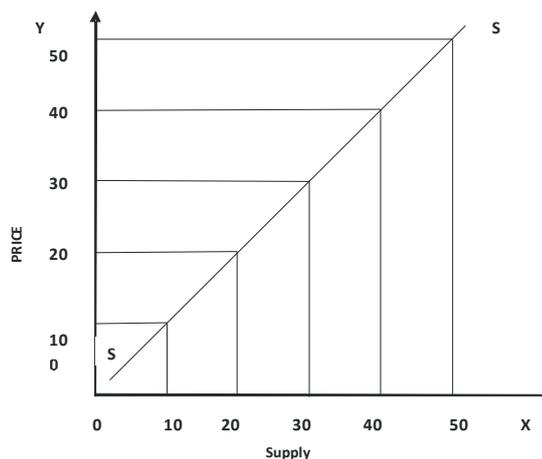


Figure 11.1 Individual Supply Curve

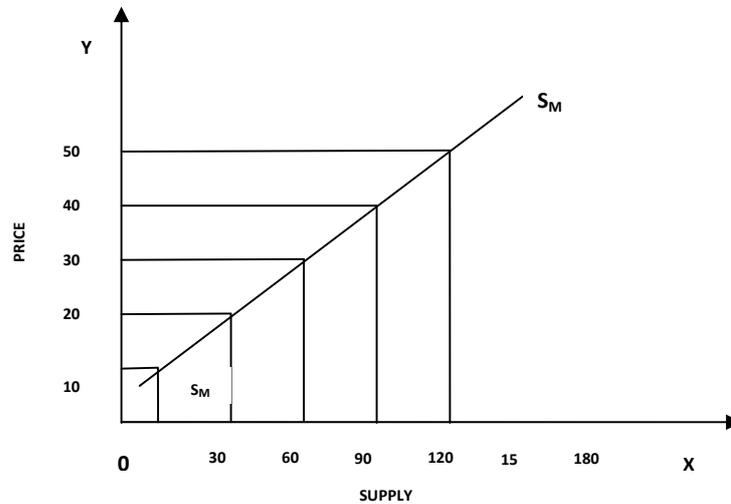


Figure 11. 2 Market Supply Curve

11.5 Law of Supply

Law of Supply explains the relationship between price of a commodity and its quantity supplied. Price and supply are directly related. A rise in price induces producers to supply more quantity of the commodity and a fall in prices, force them to reduce the supply. The higher is the price of the commodity the larger is the profit that can be earned, and, thus the greater is the incentive to the producer to produce more of the commodity and offer it in the market. Likewise at lower prices, profit margin shrinks and hence producers reduce the sale. The *law of supply* holds that other things being equal, as the price of a good rises, its quantity supplied will rise, and vice versa. *The basic law of supply is that as the price of a commodity rises, so producers expand their supply onto the market.* A supply curve shows a relationship between price and quantity a firm is willing and able to sell. The quantity supplied varies directly with price. When price rise supply will extend and when price falls supply will contract.

Definition

“A rise in price tends to increase supply and a fall in price tends to reduce it. For instance, if the price of rice increases, sellers will supply more rice, on a

contrary, if the price of rice falls, sellers will offer lower quantity of rice for sale.” **S.E.Thomas**

11.5.1 Assumptions

The law of supply is based on the following assumptions:

- (a) It is assumed that the cost of production remains constant.
- (b) There is no change in technique of production.
- (c) It is assumed that the scale of production is constant.
- (d) There is no change in government policy.
- (e) There is no change in transport cost.
- (f) Sellers do not speculate about future changes in price of product.
- (g) The prices of related goods are held constant.

11.5.2 Explanation

The law can be explained and illustrated with the help of a Supply Schedule and Supply Curve, as shown in Table 11.3 and Figure 11.3. When the data of Supply Schedule is plotted on a graph, a Supply Curve can be drawn as in figure 11.3. Supply schedule and supply curves shows that with rise in price, supply expands and with fall in price, supply contracts. Upward sloping curve shows the direct relationship between price and quantity supplied.

Price of Wheat (in Rs. Per kg)	Market Supply (Kg.)
50	120
40	90
30	60
20	35
10	10

Table 11.3 Market Supply Schedule

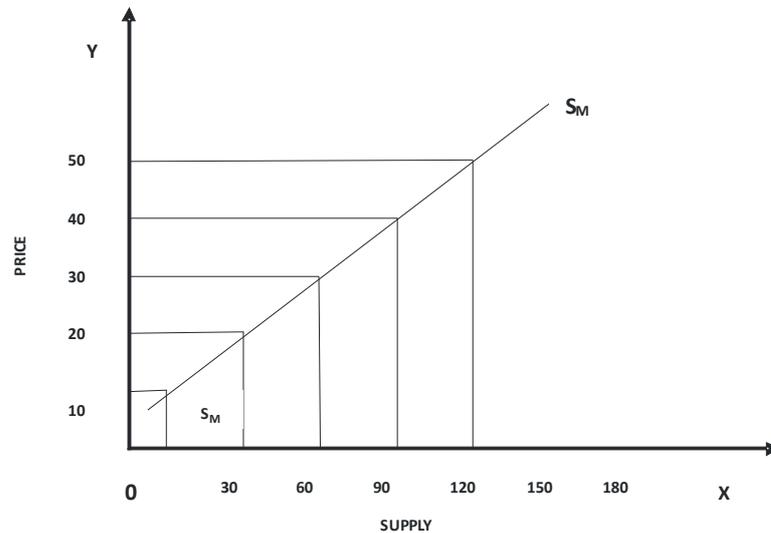


Figure 11.3 Market Supply Curve

Along the OX axis the quantity of product and on OY axis the price of the product are being represented. S_M is the supply curve which indicates that a fall in price leads to a contraction in the quantity supplied and vice versa.

11.5.3 Exceptions to the Law of Supply

The law of supply does not apply under the following conditions:

- i. **Fear of further fall in Price:** When the seller is afraid of a further fall in the price of the commodity, they may sell more units even at lower price and get rid of the supply of it.
- ii. **Auction sale:** In the case of an auction, the law of supply does not apply. While selling the commodity in an auction, auctioneer may have other motives to sell the commodity other than maximizing profits.

11.5.4 Movement along and Shift of Supply Curve

The supply of a commodity depends on its own price and other factors like input prices, technique of production, prices of other goods, goals of the firm, taxes on the commodity etc. A change in price results in a movement along a fixed supply curve. This is also referred to as a *change in quantity supplied*. Movement along the same supply curve represents contraction or expansion in

supply as a result of a change in the price of a commodity. A shift in supply curve occurs when the producer is willing to offer more or less of a commodity because of reasons other than the price of the commodity.

i. Movement along a Supply Curve

The law of supply states the effect of a change in the price of a commodity on its own supply, other things remaining constant. The supply curve also carries the same assumption. Thus when other factors influencing supply do not change, and only the own price of the commodity changes, the change in supply takes place along the curve only. This is what movement along a supply curve means. A movement from one point to another on the same supply curve is also referred to as a change in quantity supplied.

In figure 11.4, OQ is the quantity supplied at price OP. When the price rises to OP_1 the quantity supplied increases to OQ_1 . Thus there is an upward movement along the supply curve from point A to B. **It is extension of supply.** Similarly, when the price of a commodity falls from OP to OP_2 , there is a decrease in quantity supplied from OQ to OQ_2 and thus a downward movement along the supply curve from A to C. **It is contraction of supply.** Movements along the supply curve are caused by a change in the own price of the good only, other things remaining the same.

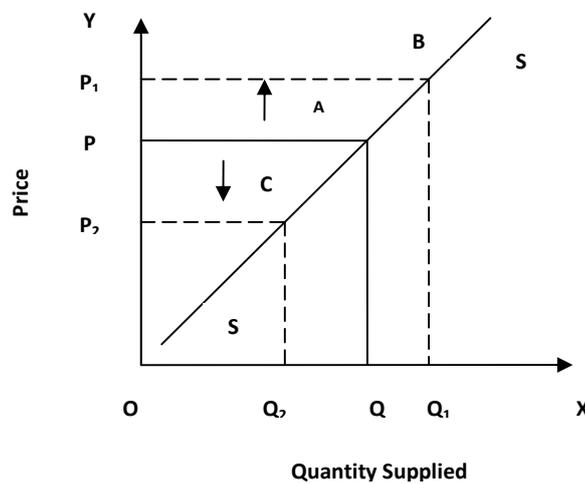


Figure 11.4 Movement Along Supply Curve

ii. Shifts of the Supply Curve

When supply changes due to changes in factors other than the own price of the commodity, it results in a shift of the supply curve. This is also referred to as a “**change in supply**.”

- An ‘**increase**’ in supply means more of the commodity is supplied at the same price. As a result, the supply curve shifts to the right. In figure 11.5, at price OP , the previous supply was OQ which increased to OQ_1 . This also means that OQ units can now be supplied at a lower price OP with the new supply curve S_1S_1 . This change in supply which occurs because of a change in any of the determinants of supply, other than the price, is known as increase or decrease in supply. An ‘**increase**’ in supply can take place due to many reasons, for example, if the input prices fall or there is an improvement in technology, it will enable producers to produce and sell more at the same price resulting in a rightward shift of the supply curve.
- A ‘**decrease**’ in supply means less of the commodity is supplied at the same price, than previously. As a result, the supply curve shifts inwards to the left. In figure 11.6, at price OP , previously OQ units were supplied which decreased to OQ_1 . This also means that OQ units can now be supplied at a higher price OP with the new supply curve S_1S_1 .

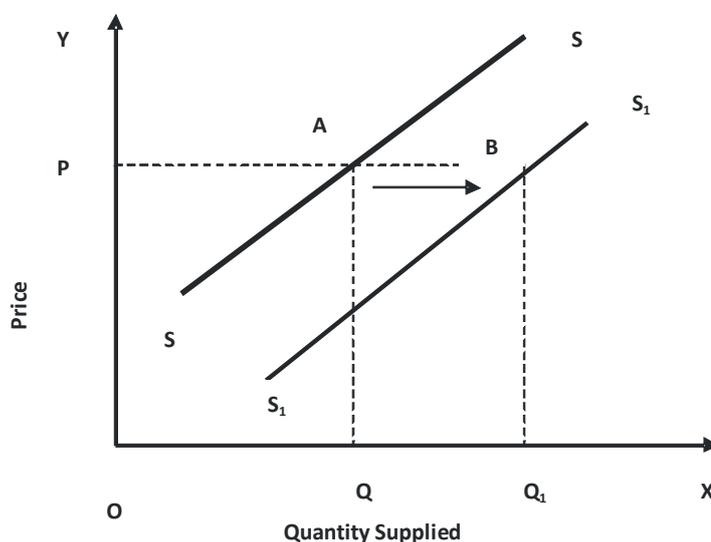


Figure 11.5 Shift in Supply Curve (increase)

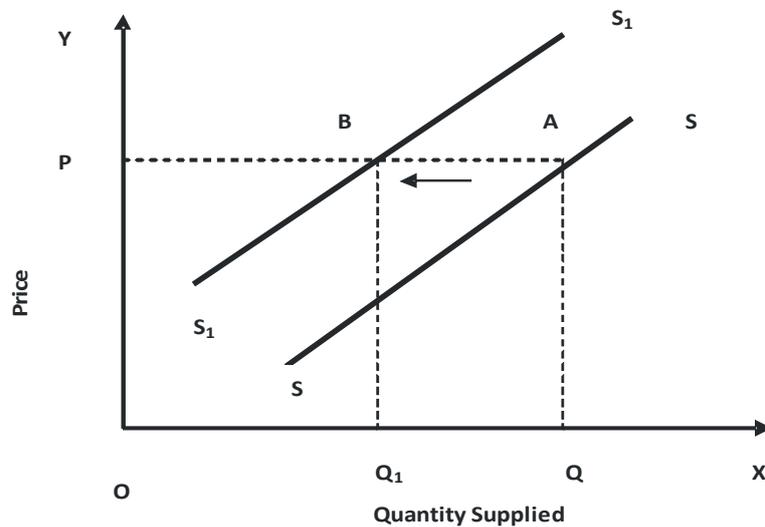


Figure 11.6 Shift in Supply Curve (decrease)

11.6 Price Elasticity of Supply

Quantity supplied of different commodities responds in different proportions to the price changes. The extent of change in supply in accordance with the change in price is called elasticity of supply. It is defined as the degree of responsiveness of supply of a product in the market to change in its price.

Elasticity of supply of a commodity measures changes in the quantity supplied as a result of a change in the price of commodity. It is measured as a percentage change in amount supplied divided by the percentage change in price of the commodity. In short,

$E_s = \text{Percentage change in quantity supplied} / \text{Percentage change in Price}$

11.6.1 Degrees of Elasticity of Supply

i. Perfectly Inelastic Supply ($e_s = 0$)

This describes a situation in which supply shows no response to a change in price. In other words, whatever be the price the quantity supplied remains the same. The vertical straight line supply curve as shown in figure 11.7 reveals that with a change in price (from OP to Op_1) the supply remains same at OQ .

Thus, supply does not respond to a change in price. Thus $E_s = 0$, Hence, perfectly inelastic supply.

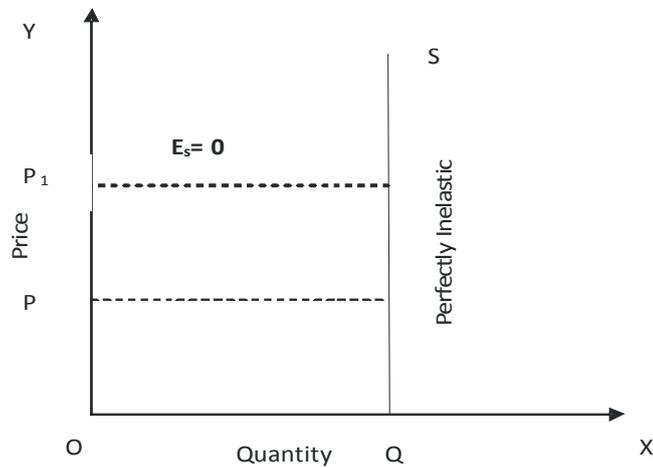


Figure 11.7 Perfectly Inelastic Supply

ii. Perfectly Elastic Supply ($E_s = \infty$)

This is experienced when the supply is extremely sensitive to the changes in price. In this case an insignificant change in price produces tremendous change in supply. The supply curve showing perfectly elastic supply is a horizontal straight line as shown in Figure 8. It can be noticed that at a given price an infinite quantity is supplied. A small change in price produces infinite change in supply. A perfectly competitive firm faces this type of supply.

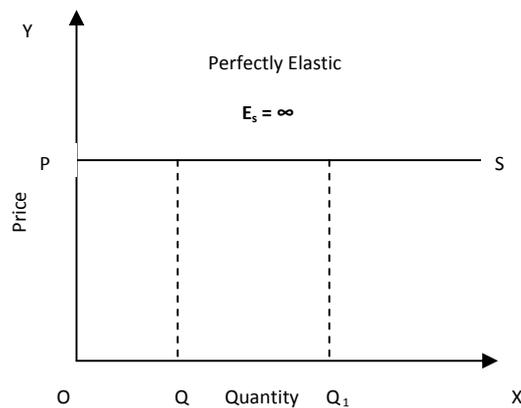


Figure 11.8 Perfectly Elastic Supply

iii. Unitary Elasticity Supply ($E_s = 1$)

When the percentage change in price produces equivalent percentage change in supply, it is a case of unitary elasticity. The rectangular hyperbola as shown in the figure 11.9 demonstrates this type of elasticity. In this case percentage change in demand is equal to percentage change in price, hence $e = 1$.

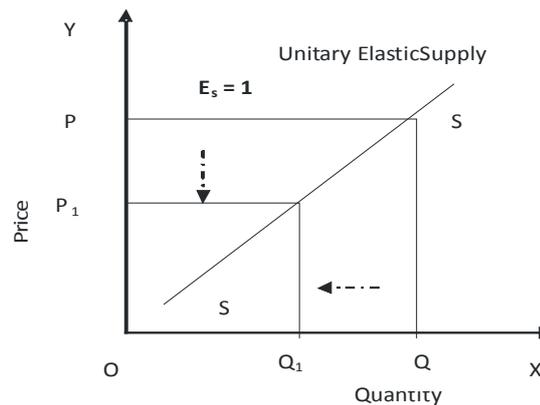


Figure 11.9 Unitary Elastic Supply

iv. Inelastic Supply (Less Elastic) ($E_s < 1$)

In the case of inelastic supply the proportionate change in supply is smaller than in price. The figure 11.10 shows the inelastic supply curve. Percentage change in supply is smaller than percentage change in price. It means the supply is relatively less responsive to the change in price. This is referred to as an inelastic supply.

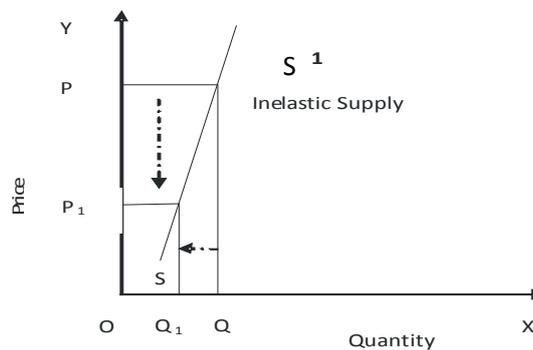


Figure 11.10 Inelastic Supply

v. Elastic Supply (More Elastic) ($E_s > 1$)

In case of certain commodities the supply is relatively more responsive to the change in price. It means a small change in price induces a significant change in supply. This can be understood by means of the figure 11.11. It can be noticed that in the figure, the percentage change in supply is greater than that in price. Hence, the elastic supply ($e > 1$). The demand curve is flatter and more horizontal.

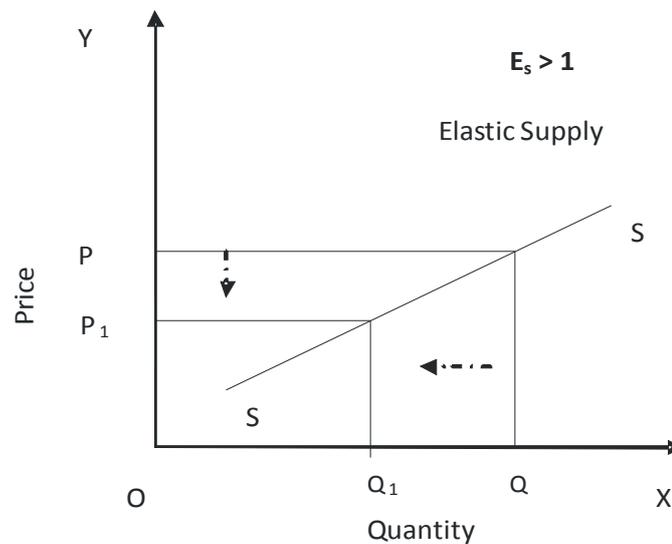


Figure 11.11 Elastic Supply

11.6.2. Measurement of Price Elasticity of Supply

For practical purposes, it is essential to measure the exact elasticity of supply. By measuring the elasticity we can know the extent to which the supply is elastic or inelastic. Different methods are used for measuring the elasticity of supply.

- i. Percentage-Change Method:** In this method, the percentage change in supply and percentage change in price are compared. As per this method proportionate change in supply is divided by proportionate change in price. it is expressed as under:

$$E_d = \frac{\text{Proportionate Change in Quantity Supplied}}{\text{Proportionate Change in Price}}$$

$$E_d = \frac{\text{Change in Quantity Supplied} / \text{Quantity supply}}{\text{Change in Price} / \text{Price}}$$

$$= \frac{Q_1 - Q}{Q} / \frac{P_1 - P}{P} = \frac{\Delta Q / Q}{\Delta P / P}$$

$$= \frac{\Delta Q}{\Delta P} = \frac{P}{Q}$$

Where,

Q = Initial Quantity P = Initial Price

Q₁ = Changed Quantity P₁ = Changed Price

- ii. **Point Method:** Another method to measure elasticity at a point on a straight line is called Point Method. On a given supply curve, the elasticity of supply at a point P is measured by the ratio of the distance along the tangent, from the point P on the supply curve to the point where it intersects the horizontal axis and the distance along the tangent from the point P on the supply curve to the point where it intersects the vertical axis. The elasticity of supply at point P is measured as:

$$E_s = AB/OB$$

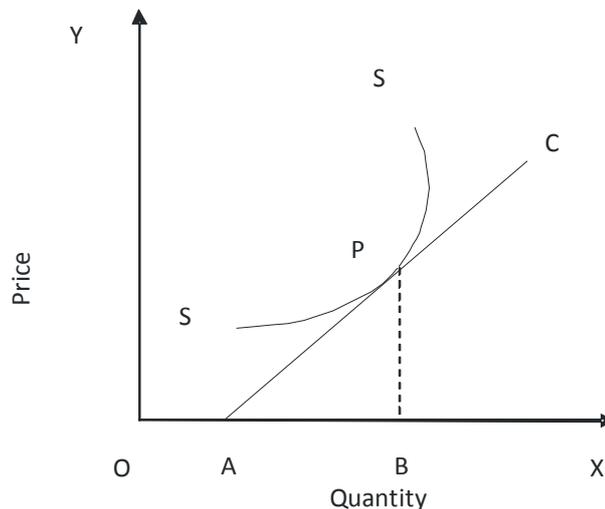


Figure 11.12 Point Elasticity of Supply

11.6.3 Factors Influencing Elasticity of Supply

Elasticity of supply depends upon a number of factors, some of which are as follows:

i. Nature of the Commodity: The first and foremost determinant of the elasticity of supply is the nature of the commodity. Commodities on the basis of their nature can be classified as (i) perishable, and (ii) durable. Perishable products cannot be stored, and hence their supply does not respond in an effective manner to the change in their price, hence, their supply is inelastic in nature. Durable products, on the other hand, can be stored; hence, their supply is generally elastic, *i.e.*, supply responds to the change in prices.

ii. Time: Supply of a commodity, in the ultimate analysis, depends upon its production. Production always involves a time-lag which may vary from a few days to few years, Moreover; increased production of a commodity may contemplate a change in the very size, if the plant, which in turn may be a long, time-consuming process. Hence, supply of a commodity may be less elastic in the short run, as time progresses supply may become more elastic.

iii. Techniques of Production: Simple techniques of production are, by and large, less expensive in nature. If demand conditions so require, the production and the supply of such commodities as involve simple techniques of production could be easily increased. In other words, supply of such commodities is generally elastic in nature, On the other hand, if the technique of production of a commodity is cumbersome, complex and time-consuming in nature it may not be possible to change the supply in response to varying price-demand conditions. Supply of such commodities would generally be less elastic.

iv. Estimates of Future Prices: Future expectations of price changes may also influence supply of a commodity. If the producers expect the prices to rise in future they may hold on to the stocks or the commodities.

v. Scale of Production: Goods produced on small scale have inelastic supply, whereas goods produced on large scale have elastic supply.

vi. Natural Factors: There are certain natural factors which are beyond the control of man like climate, rainfall, fertility of soil etc. these factors affect elasticity of supply of agricultural products. Due to natural factors agricultural goods are inelastic.

11.7 Producer's Equilibrium

The primary objective of a producer is to earn maximum profits. Profit is the difference between total revenue and total cost. At that level of output, he is in equilibrium at which he is earning maximum profit, and he has no incentive to increase or decrease his output. If he produces less than this he does not maximize total profits, if he produces beyond this, total profits decline. Thus the producer is in a 'state of rest' only at the level of output at which the difference between the total revenue and total cost of production is maximum i.e. total profits are maximum. A firm is said to be in equilibrium when it has no inclination to expand or to contract its output. The firm will reach such a state when it maximizes its residual profits. Residual profits are the difference between the total revenue and total cost. The firm will, therefore, reach equilibrium when it maximizes the difference between its total revenue and total cost.

Conditions of Equilibrium

According to marginal revenue and marginal cost approach, the equality between the marginal revenue and marginal cost of the firm is the condition of profit maximizing output as well as the equilibrium of the firm. This suggests that a firm will go on expanding its output as long as every additional unit produced, adds more to its total revenue than what it adds to its total cost. The firm will not produce a unit which adds more to its total costs than what it adds to its total revenue, as this would put the firm to a loss. The firm will be increasing its profits by expanding its output to the level at which the marginal revenue equals to marginal cost. It will not be suitable for the firm to produce an output of less than this level or more than this level, because then its total residual profits will be less than maximum.

Market Price	Output	Total Revenue	Total Cost	Profit or Loss	Marginal Revenue	Marginal Cost
10	0	0	10	-10	0	0
10	1	10	16	-6	10	6
10	2	20	20	0	10	4
10	3	30	21	9	10	1
10	4	40	22	18	10	1
10	5	50	25	25	10	3
10	6	60	30	30	10	5
10	7	70	37	33	10	7
10	8	80	47	33	10	10
10	9	90	61	29	10	14
10	10	100	81	19	10	20

Table 11.4 Producer's Equilibrium

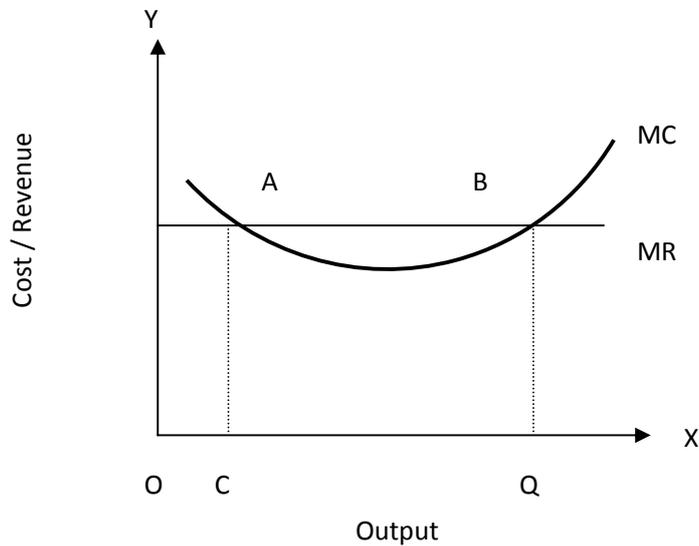


Figure 11.13 Equilibrium

A firm will be in equilibrium when it produces a level of output at which the marginal cost is equal to marginal revenue. This is clear in table 11.4. When the MR is greater than MC, it is profitable for the firm to produce more, as each additional output sold adds to total profit. The firm gets maximum total profit of Rs. 33 when 8 units are sold. At this stage $MR = MC$. After this more additional units leads to loss.

Essential Conditions for Equilibrium

1. $MR = MC$
2. MC curve must intersect the MR curve from below.

Chapter at a Glance:

- **Meaning of Supply:** Supply during a given period of time means the quantities of goods which are offered for sale at particular prices.
- **Determinants of Supply:** There are various determinants of supply price is not the only factor on which the supply of a commodity depends. The determinants of supply are as follows :

- Cost of Factor of Production, Production Technology, Price of Other Commodities, Number of Producers, Government Policy, and Future Price Expectation.
- **Supply Schedule:** Supply schedule represents the variations between prices and the quantities that seller is willing to produce and sell. A detail account of the supply of any commodity at a given time and at different prices is known as the supply schedule.
- **Supply Curve:** A graphic representation of relationship between price and the quantity supplied other things being equal is termed as supply curve.
- **Law of Supply:** “A rise in price tends to increase supply and a fall in price tends to reduce it. For instance, if the price of rice increases, sellers will supply more rice, on a contrary, if the price of rice falls, sellers will offer lower quantity of rice for sale.” **S.E.Thomas**
- **Movement along and Shift of Supply Curve:** The supply of a commodity depends on its own price and 'other factors' like input prices, technique of production, prices of other goods, goals of the firm, taxes on the commodity etc. A change in price results in a movement along a fixed supply curve. This is also referred to as a *change in quantity supplied*. Movement along the same supply curve represents contraction or expansion in supply as a result of a change in the price of a commodity. A shift in supply curve occurs when the producer is willing to offer more or less of a commodity because of reasons other than the price of the commodity
- **Price Elasticity of Supply:** Elasticity of supply of a commodity measures changes in the quantity supplied as a result of a change in the price of commodity
- **Measurement of Price Elasticity: Percentage Method:** In this method, the percentage change in supply and percentage change in price are compared. As per this method proportionate change in supply is divided by proportionate change in price. **Point Method:** On a given supply curve, the elasticity of supply at a point P is measured by the ratio of the distance along the tangent from the point P on the supply

curve to the point where it intersects the horizontal axis and the distance along the tangent from the point P on the supply curve to the point where it intersects the vertical axis.

- **Producer's Equilibrium:** A firm is said to be in equilibrium when it has no inclination to expand or to contract its output. The firm will reach such a state when it maximizes its residual profits. Residual profits are the difference between the total revenue and total cost. The firm will, therefore, reach equilibrium when it maximizes the difference between its total revenue and total cost.
- **Conditions of Producer's Equilibrium:**
 1. $MR = MC$
 2. MC curve must intersect the MR curve from below.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. Elasticity of supply measures the _____ of sales to changes in a particular casual factor.
2. The elasticity of supply measures the responsiveness of the _____ supplied of good, to change in its price, price of other goods and changes in consumer's income.
3. Perfectly _____ demand describes a situation in which demand shows no response to a change in price.
4. In perfectly _____ supply an insignificant change in price produces tremendous change in supply.
5. The percentage change in supply is greater than that in price is termed as _____ supply.
6. When the percentage change in price produces equivalent percentage change in supply, it's a case of _____ elasticity.

7. In the case of _____ supply the proportionate change in supply is smaller than in price.
8. The supply curve showing perfectly elastic supply is a _____ straight line
9. In the case of _____ supply insignificant change in price produces tremendous change in supply.
10. The supply for _____ goods in general is more elastic than the supply for necessary goods.
11. Proportionate change in supply is _____ by proportionate change in price to measure price elasticity of supply.
12. If a given change in price fails to bring about any change in the quantity, it is the case of _____ elasticity.
13. If the price of substitute commodity is higher then the supply of commodity will _____.
14. If there are _____ numbers of suppliers then the market supply will increase.
15. When the MR is greater than _____, it is profitable for the firm to produce more.

Answer key

- | | | |
|----------------|---------------|----------------------|
| 1. Sensitivity | 2. Quantity | 3. Inelastic |
| 4. Elastic | 5. Elastic | 6. Unitary |
| 7. Inelastic | 8. Horizontal | 9. Perfectly elastic |
| 10. Luxury | 11. Divided | 12. Zero |
| 13. Decrease | 14. Large | 15. MC |

(B) State whether the following statements are True or False.

- 1 In the case of an auction, the law of supply does not apply.
- 2 When the seller is afraid of a further fall in the price of the commodity, they may sell less units even at lower price and get rid of the supply of it.
- 3 The sum total of the entire individual curves i.e. a market or a total Supply curve.
- 4 The Supply curve of an individual seller is called as individual Supply curve.
- 5 A *supply curve* is a graphical depiction of a supply schedule plotting price on the vertical axis and quantity supplied on the horizontal axis.

- 6 A market supply schedule for a given commodity is the average of individual supply for all those firms which are engaged in the production of a given commodity during a given period.
- 7 The individual Supply schedule expresses the direct relation that exists between price and quantity supplied.
- 8 Supply schedule represents the variations between prices of related goods and the quantities that seller is willing to produce and sell.
- 9 The demand for very low-priced as well as very high-price commodity is generally inelastic.
- 10 When the percentage change in price produces more percentage change in supply, it's a case of less than unitary elasticity.

Answer key:

- | | | | | |
|----------|----------|----------|---------|-----------|
| 1. True | 2. False | 3. True | 4. True | 5. True |
| 6. False | 7. True | 8. False | 9. True | 10. False |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. When the price of a commodity falls, there is a decrease in quantity supplied and thus a downward movement along the supply curve. It is _____ of supply.

(A) Extension	(B) Contraction
(C) Increase	(D) Decrease
2. Which of the following is a type of elasticity of supply?

(A) Price Elasticity	(B) Cost Elasticity
(C) Cross Elasticity	(D) Income Elasticity
3. Types of price elasticity includes:

(A) Perfectly Elastic	(B) Unitary Elastic
(C) Perfectly Inelastic	(D) All of Them
4. Calculate the price elasticity of supply if : $Q_1 = 4000$, $P_1 = \text{Rs. } 20$, $Q_2 = 5000$, $P_2 = \text{Rs. } 19$.

(A) Rs. 5	(B) Rs.6
(C) Rs. 9	(D) Rs.3

5. The price of commodity is Rs. 20 and the quantity demanded at this price is 200 units. If the price falls to Rs. 16 and the quantity demanded increases to 280 units. Calculate the elasticity of demand.
- (A) Rs. 5 (B) Rs.6
(C) Rs. 2 (D) Rs.3
6. Supply analysis includes:
- (A) Point Elasticity (B) Price Elasticity
(C) Income Elasticity (D) All of These
7. Which is the method of measuring elasticity of supply?
- (A) Total Outlay Method (B) Point Method
(C) Percentage Method (D) B and C
8. Calculate the price elasticity of supply if 20% increase in milk price causes the amount of milk sales to rise by 40%.
- (A) 2 (B) 4
(C) 0.5 (D) 6
9. The ratio of the percentage change in the quantity supply to the percentage change in price.
- (A) Price elasticity (B) Income Elasticity
(C) Cross Elasticity (D) Advertising Elasticity
10. When the price rises the quantity supplied increases. Thus there is an upward movement along the supply curve. *It is _____ of supply.*
- (A) Extension (B) Contraction
(C) Increase (D) Decrease
11. A movement from one point to another on the same supply curve is also referred to as a _____ in quantity supplied.
- (A) Extension (B) Contraction
(C) Change (D) Movement
12. The law of supply is not based on the following assumption
- (A) Price of related goods unchanged (B) Price unchanged
(C) Cost of production unchanged (D) technology unchanged
13. The horizontal straight line supply curve shows
- (A) Perfectly Elastic (B) Perfectly Inelastic
(C) Unitary Elastic (D) Inelastic
14. A rise in price tends to increase supply and a fall in price tends to reduce it
- (A) Law of demand (B) Law of supply
(C) Law of sale (D) Law of producer

15. The horizontal straight line supply curve shows
(A) Perfectly Elastic (B) Perfectly Inelastic
(C) Unitary Elastic (D) Inelastic

Answer key:

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. B | 2. A | 3. D | 4. A | 5. C |
| 6. B | 7. D | 8. A | 9. A | 10. A |
| 11. C | 12. B | 13. A | 14. B | 15. B |

(D) Very Short Answer Type Questions

1. What do you mean by elasticity of supply?
2. What do you mean by price elasticity of supply?
3. What do you mean by supply function?
4. What do you mean by supply curve?
5. What do you mean by supply schedule?
6. What do you mean by perfectly inelastic supply?
7. What do you mean by perfectly elastic supply?
8. What do you mean by inelastic supply?
9. What do you mean by elastic supply?
10. What do you mean by individual supply schedule?
11. What do you mean by point method?
12. What do you mean by percentage method?
13. What do you mean by market supply schedule?
14. What do you mean by producer's equilibrium?
15. What do you mean by market supply schedule?

2. Short Answer Type Questions

1. What are the various types of elasticity of supply?
2. What are the various degrees of price elasticity of supply?
3. What are the factors which affect price elasticity of supply?
4. Explain the importance of elasticity of supply?
5. What do you mean unitary elasticity of supply?

6. How price elasticity of supply is measured?
7. How elasticity of supply is measured with point method?
8. How price elasticity of supply is measured with the help of percentage method?
9. Explain the various types of elasticity of supply.
10. Explain the various degrees of elasticity of supply.
11. What do you mean by proportionate or percentage method of price elasticity of supply?
12. What do you mean by point method of price elasticity of supply?
13. What do you mean by producer's equilibrium?
14. What are the various conditions of producer's equilibrium?

3. Long Answer Type Questions.

1. Explain in detail how the supply for a commodity is affected by changes in price.
2. Define price elasticity of supply and distinguish between its various types. Discuss the role of price elasticity of supply in business decision
3. Define elasticity of supply. Explain with diagrams the cases where the absolutely value of elasticity is (i) zero (ii) infinity (iii) one (iv) less than one (v) more than one.
4. Define elasticity of supply. Explain various factors affecting the elasticity of supply.
5. What are the various methods to measure price elasticity of supply?
6. Explain with the help of diagrams various degrees of elasticity of supply.
7. Explain how to measure various elasticity of supply.
8. What do you mean by elasticity of supply and what is its managerial significance?
9. What do you mean by producer's equilibrium? What are its conditions? Explain with the help of table and diagram.

Chapter 12

Cost and Revenue Concept

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Introduction to Cost*
- *Cost function*
- *Determinants of Cost*
- *Cost Concepts*
- *Relationship between Total Cost, Average Cost and Marginal cost*
- *Introduction to Revenue*
- *Concepts of Revenue*
- *Relationship between Total Revenue, Average Revenue and Marginal*

12.0 Introduction

When an entrepreneur decides to produce a commodity, he has to pay the price for inputs which he uses in production. When entrepreneur employs labour, he pays wages to them and pays money when he buys raw material, fuel and power, rent for the factory building and so on, all of these are included in cost of production. The kind of cost concept used in a particular situation depends on cost of production and upon the business decision that the management makes. An accountant will take into account only the payments and charges made by the manager to the suppliers of various

productive inputs, but the managerial economist views the cost in some what different form. The cost estimates made by conventional, financial accounting are not appropriate for all managerial uses, further different problems call for different kinds of costs, and therefore it is necessary to have a complete understanding of different cost concepts for clear business thinking.

12.1 Cost Function

Cost function is derived from the production function. Time factor is very important in cost theory. The short-run costs are the costs over a period during which some factors of production are fixed. The long-run costs are the costs over a period long enough to permit changes in all factors of production. Both in the short-run and in the long-run, cost is a multivariate function, i.e., it is determined by many factors simultaneously. Symbolically, the long run cost function is given as:

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

And the shot-run-run cost function is:

$$C = f(X, T, Pf, K)$$

Where C = Total Cost

X = Output

T = Technology

Pf = prices of factors

K = Fixed factor (s)

12.1.1 Determinants of Costs

Factors determining the cost are

i. Size of Plant: There is an inverse relationship between size of plant and cost. As size of plant increases, cost falls and vice versa.

ii. Level of Output: There is a direct relationship between output level and cost. More the level of output, more is the cost (i.e. total cost) and vice Versa.

iii. Price of Inputs: There is a direct relationship between price of inputs and cost. As the price of inputs rises, cost increases and vice versa.

iv. State of Technology: More modern and upgraded the technology implies lesser cost and vice versa.

v. Management and Administrative Efficiency: Efficiency and cost are inversely related. More the efficiency in management and administration better will be the product and less will be the cost. Cost will rise in case of inefficiencies in management and administration.

12.1.2 Cost Concepts

Cost concepts differ because of differences in view point. Different combinations of cost ingredients are important for various kinds of management problems. Disparities occur from deletions, from additions and from recombination which do not appear anywhere in the accounting records. Different cost concepts are:

i. Actual Cost and Opportunity Cost

Actual costs are those that involve financial expenditure incurred for acquiring inputs for producing a commodity. These expenditures are recorded in the books of accounts of the firm. The expenditures are wages, payment made for the purchase of raw materials, machinery etc. These costs are called actual costs or outlay costs or real costs.

“Pains and sacrifices of labour are real cost of production” Adam Smith

Opportunity Cost is the cost of producing any commodity in the next best alternative cost. For example, the inputs which are used to manufacture a car may also be used in the productions of military equipment. A farmer who is producing paddy can also produce sugar cane with the same factors. Therefore, the opportunity cost of one quintal of paddy is the amount of sugarcane given up.

“Opportunity cost of a particular product is the value of the foregone alternative product that resources used in its production, could have produced.” Leftwitch

Main points of opportunity cost are:

1. The opportunity cost of any commodity is only the next best alternative forgone.
2. The next best alternative commodity that could be produced with the same value of the factors which are more or less the same.
3. It helps in determining relative prices of factor inputs at different places.
4. It helps in determining the remuneration to factors
5. It helps the manager to decide what he should produce in the factory.

ii. Past and Future Costs

Past costs are actual costs incurred in the past. These costs are mentioned in the financial accounts. **Future costs** are those costs which are to be incurred in the near future. This is only a forecast. Future costs matter for managerial decisions because, the management can evaluate the desirability of that expenditure, since the past costs are costs that have already been incurred, and there is no scope for managerial decision. If the management finds out that the past costs are excessive, it cannot do anything to rectify it now. In the case of future costs, if the management considers them very high, it can either reduce them or postpone the use of them.

iii. Short Run and Long Run Costs

Shorts run costs are those which are associated with variations in the utilization of fixed plant or other facilities, whereas **long run costs** encompass changes in the size and kind of plant. Short run cost is relevant when a firm has to decide whether or not to produce more or less with the given plant and equipments. If the firm decides to expand the capacity of the plant, it must examine the long run cost. Long run cost is useful in making investment decisions.

iv. Prime or Variable Costs and Supplementary or Fixed Costs

Prime costs are variable or direct costs. Normally, they include the money cost of the raw material used in making a commodity, the wages of the labour

directly spent on it and the extra wear and tear of the machine that makes it. Suppose a carpenter has been asked to charge for a chair, he would first think of the wood and cane that he used and the number of days he spent in making it. This is the prime cost. It is clear that prime cost of a commodity differs with the quantity produced. When more chairs are made, more money will have to be spent on carpenter's wages as well as on wood. When production is stopped, the prime costs disappear. Prime costs therefore are also called the Variable Costs.

Supplementary or Fixed Costs

The carpenter will not only charge for the chair but also for the wood and his wage. In addition to the above he will think of including a portion of rent in the cost that he is paying and also interest on the capital invested and the municipal taxes, etc. A big company will further have to include a portion of the salaries of the manager, the peons, the cost of advertisement and salesmanship, etc. These costs must also be covered. They are called supplementary costs or overhead charges or fixed costs. The fixed costs do not change with the volume of production. Irrespective of quantity of goods produced, big or small, the charges on account of rent, taxes, interest salaries, etc will be included. Even if the orders cease to flow in and the factory is closed, these costs will continue. They are fixed costs.

Generally, the distinction between the variable and fixed costs applies only for a short period, because nothing can really remain fixed in the long run. In the long run the salary bill of the staff may change, the amount of capital invested may be different, and hence the amount of interest would vary. Thus, all costs, which are regarded as fixed in the short run, may vary in the long run. Thus in the long run, all costs are variable.

v. Incremental Costs and Sunk Costs

Incremental costs are the added costs of a change in the level of production or the nature of activity. It may be adding a new product or changing distribution channel, or adding new machinery, etc. It appears to be similar to marginal cost, but it is not managerial cost. Marginal cost refers to the cost on added unit of output.

Sunk costs are costs which cannot be altered in any way. Sunk costs are costs which have already been incurred, for example, cost incurred in constructing a factory. When the factory building is constructed costs have already been incurred. The building has to be used for which originally envisaged. It cannot be altered when operations are increased or decreased. Investment on machinery is an example of sunk cost.

The distinction between the sunk cost and the incremental cost is important in evaluating the alternative. Incremental cost will be different in the case of different alternative. Hence incremental cost is relevant for the management in decision making. Sunk cost will remain the same irrespective of the alternative in decision making. Sunk cost will remain the same irrespective of the alternative selected. Marketing programme has its own set of incremental costs for equipment, delivery men and executive time and so on.

vi. Traceable Costs and Non-traceable Costs

Traceable costs are those which can easily be identified by a producing unit. These are directly related to a unit of operation like a product, a process or department of firm. These are also known as direct costs or assignable costs.

Non-traceable costs or indirect costs are not traceable to plant, department or unit or operation or individual final product. For example, for operating air-services, the cost of runway, airport equipment, staff, etc. cannot be assigned to one passenger. These are common costs to distinguish between traceable and non-traceable costs. Change in the total output and product-mix affect the total costs in complex ways. Even a traceable cost gets lost in the process and has to be identified as overhead cost only.

vii. Explicit Cost and Implicit Costs

The total cost of production of a particular commodity can be said to include 'expenditure' or 'explicit' cost, 'non-expenditure' or 'implicit' cost. **Explicit costs** are paid by the employer to owners of the factor units, which do not belong to the employer himself. These costs include payments for raw

material, interest on borrowed funds, rent on hired land and taxes paid to the government.

Non-expenditure or implicit costs arise when factor units are owned by the employer himself, the two non expenditure costs are money supplied by the shareholders. In case of small business units the depreciation and an average or normal return on the money capital wages of the entrepreneur or organizer himself will have to be included in this category. Expenditure costs are explicit since they are paid to factors outside the firm while non-expenditure costs are implicit and hence they are imputed costs.

viii. Controllable Costs and Non-Controllable Costs

Controllable costs are those that can be controlled by some executive action on the part of the management. These can improve the efficiency of the factor inputs. **Non-controllable** costs are those that cannot be controlled through any administrative or supervisory action. These tend to wastage of resources and encourage inefficiency.

ix. Private, External and Social Costs

Sometimes, there is a discrepancy between the cost incurred by a firm and the cost that must be incurred by the society as a whole. For example, a factory may dispose of its untreated waste into a river or a lake. Such a method of waste disposal may minimize the private cost but it does impose a cost to the society in the form of polluted waterways. A cost that is not borne by the firm, but is incurred by others in society is called an external cost. The true cost to the society must include all costs regardless of who bears them. Thus, the social cost is the sum of private and external cost.

$$\text{Social cost} = \text{Private Cost} + \text{External Cost}$$

Or

$$\text{External Cost} = \text{Social Cost} - \text{Private Cost}$$

12.1.3 Total Cost

Total cost is the total actual cost incurred on the production of goods and services. It refers to the total outlays of money expenditure, both explicit and implicit, on the factors used to produce a given level of output. It includes both fixed and variable costs. Total cost (TC) in the simplest terms is all the costs incurred in producing something or engaging in an activity. In economics, total cost is made up of variable costs + fixed costs. It is the cost of all necessary resources to produce to a particular product. In short run factors are classified as fixed factors and variable factors and in similar way costs are classified as fixed costs and variable costs. Total cost covers the cost of all inputs whether fixed or variable used to produce a certain output. Total cost always rises with rise in production.

“Total cost is the sum of total fixed cost and total variable cost for each output level.” **Browning**

Total cost of a firm at a certain level of output is the sum of total fixed cost and total variable cost

$$\text{TC} = \text{TFC} + \text{TVC}$$

i. **Total Fixed Costs:** The cost of fixed inputs is called total fixed costs. It can be obtained by multiplying fixed factor by its price.

“Total fixed cost is the sum of the short run explicit fixed costs and the implicit costs incurred by an entrepreneur.” **Ferguson**

$$\text{TFC} = \text{Units of Fixed Factor} * \text{Price of the Factor}$$

ii. **Total Variable Costs:** Costs incurred on variable factors of production is called total variable cost. “**Total variable cost is the sum of amounts spent for each of variable input used.**” **Ferguson**

It can be explained with the help of a table and diagram.

Output	Fixed cost	Variable cost	Total cost
0	20	0	20
1	20	20	40
2	20	28	48
3	20	34	54
4	20	38	58
5	20	42	62
6	20	48	68
7	20	56	76
8	20	72	92

Table 12.1 Total Costs

In Table 12.1, the sum of fixed cost and variable cost constitute total cost. By aggregating fixed costs and variable costs total cost is calculated. It is also evident from table that with increase in level of output total cost also increases.

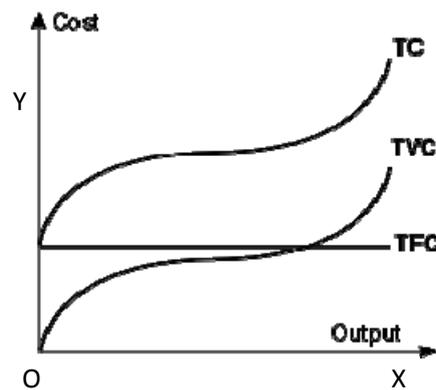


Figure 12.1 Total Cost

Total cost can be shown with the help of figure 12.1. On OX axis quantity is shown while on OY axis the Cost is shown. TFC represents total fixed cost while TVC represents total variable cost and TC shows total cost curve. Total cost curve is the aggregate of Total Fixed cost and Total Variable Cost. At zero level of production variable cost is zero while fixed cost is Rs. 20. This shows that there is Rs. 20 between total and variable cost. This remains uniform throughout therefore TC and TVC are always parallel to each other.

Difference between Fixed Costs and Variable Costs

- a) Fixed costs have nothing to do with output, whether the output is zero or maximum, fixed cost remains same. Whereas the variable cost vary with level of output.
- b) Fixed costs are same at zero level of production as at maximum level. Whereas variable cost becomes zero with zero level of production.
- c) As the level of output increases the average fixed costs start decreasing but average variable cost decrease at lesser rates than average fixed costs.
- d) Fixed cost include rent of land and building, interest on capital, salaries to permanent employees etc. whereas variable cost covers cost of raw material, wages, coal, power etc.

12.1.4 Average Cost

Average cost is not actual cost; it is of statistical nature. It is obtained by dividing total cost by total output. Average cost is per unit cost of output.

- “The average cost of production is the total cost per unit of output.”

Dooley

- “Average cost is total cost divided by output.” **Ferguson**

$$AC = TC/Q$$

Or

$$AC = AFC + AVC$$

Here, AC = Average Cost, TC = Total Cost, AFC = Average Fixed cost and AVC = Average Variable Cost.

- i. **Average Fixed Cost:** It is the per unit fixed cost. It can be calculated by dividing total fixed cost by output. Fixed cost is constant, as the output increase the fixed cost per unit decrease. This can be explained with the help of Table 12.2 and Figure 12.2

$$AFC = FC/Q$$

Output	Fixed cost	Average Fixed cost
1	20	20
2	20	10
3	20	6.67
4	20	5
5	20	4
6	20	3.33
7	20	2.86
8	20	2.50

Table 12.2 Average Fixed Cost

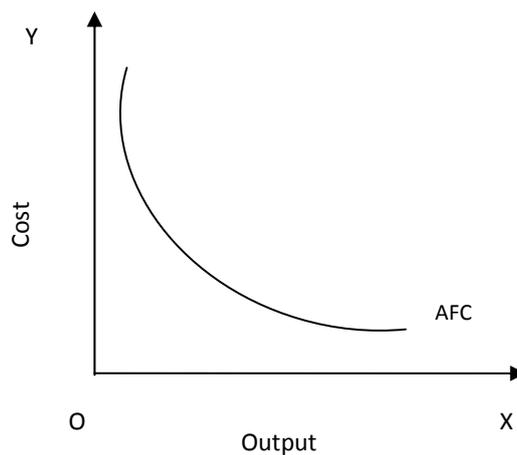


Figure 12.3 Average Fixed Cost

ii. **Average Variable Cost:** Average Variable Cost is per unit variable cost.

Total variable cost divided by output comes to average variable cost.

$$AVC = TVC/Q$$

Here AVC = Average Variable Cost, TVC = Total Variable Cost, Q = Quantity

This can be explained with the help of Table 3 and Figure 3.

Output	Variable Cost	Average Variable Cost
1	20	20
2	28	12
3	34	11
4	38	19
5	42	21
6	48	24
7	56	28
8	72	36

Table 12.3 Average Variable Cost

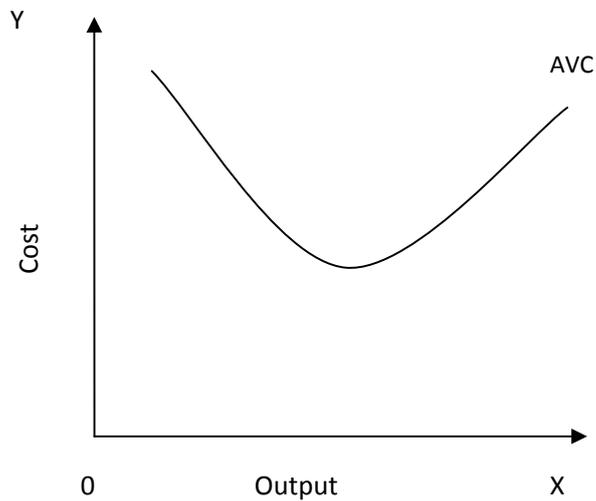


Figure 12.3 Average Variable Cost

12.1.5 Marginal Cost

It is the addition to total cost on account of producing one additional unit of product. It is the cost of marginal unit produced. It is calculated by following formula

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

Or

$$MC = \Delta TC / \Delta Q$$

Here MC = Marginal Cost, ΔTC = Change in Total Cost, ΔQ = Change in Quantity

“Marginal cost may be defined as the additional cost of producing one more unit of output.” **Mc Conell**

“Marginal cost is the addition to total cost due to the addition of one unit of output.” **Ferguson**

Output	Total Cost	Marginal Cost
1	40	$40 - 20 = 20$
2	48	$48 - 40 = 8$
3	54	$54 - 48 = 6$
4	58	$58 - 54 = 4$
5	62	$62 - 58 = 4$
6	68	$68 - 62 = 6$
7	76	$76 - 68 = 8$
8	92	$92 - 76 = 16$

Table 12.4 Marginal Cost

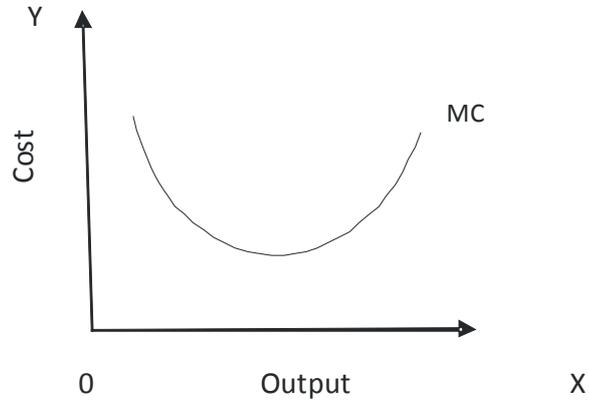


Fig. 12.4 Marginal Cost

1.8 Relationship between Total Cost, Average Cost & Marginal Cost:

Output	TC	FC	VC	AFC	AVC	AC	MC
0	20	20	0	-	0	-	-
1	40	20	20	20	20	40	20
2	48	20	28	10	12	22	8
3	54	20	34	6.67	11	17.67	6
4	58	20	38	5	19	24	4
5	62	20	42	4	21	25	4
6	68	20	48	3.33	24	27.33	6
7	76	20	56	2.86	28	30.86	8
8	92	20	72	2.50	36	38.50	16

Table 12.5 Relationship between Total Cost, Average Cost & Marginal Cost

It is evident from the above table that marginal cost of the second unit has been derived from subtracting Rs20 from Rs40 ($40-20 = 20$). Marginal costs of subsequent units are obtained in the same manner. Hence Marginal cost is the addition made to the total cost at each step. In order to understand the cost relationships, it would be necessary to refer to the laws of increasing diminishing returns. Empirical evidence has shown that at first there may be great economies in using some or all of the productive factors on a large scale. This phenomenon is said to be expressed by the law of increasing returns. But beyond this initial phase, due to the operation of the law of diminishing results, the cost of producing each additional unit tends to increase. Thus marginal cost tends to increase ultimately even though there may be an initial phase in which marginal cost is falling.

12.2 Introduction to Revenue

Money received by a firm by selling its commodities is termed as revenue. In simple terms sale proceeds of a firm are termed as revenue.

“The revenue of a firm is its sales receipts or income.” **Prof. Dooley**

12.2.1 Concepts of Revenue

There are three concepts of revenue

- i. Total Revenue
- ii. Marginal Revenue
- iii. Average Revenue

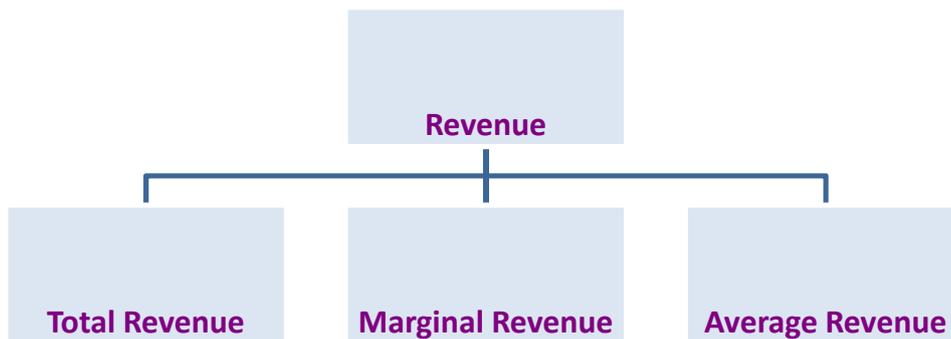


Figure 12.5 Concepts of Revenue

i. Total Revenue

Total sale proceeds of a firm are termed as total revenue or the revenue that a firm obtains by selling a given quantity of commodity is called total revenue.

“Total revenue is the sum of all sales receipts or income of a firm.” **Dooley**

Measurement of Total Revenue

$$TR = f(Q)$$

$$TR = AR * Q \quad \text{or} \quad TR = P * Q$$

$$TR = \Sigma MR$$

Here TR = Total Revenue; F = function of; Q = quantity; P = price;

AR= Average Revenue; Σ = summation of; MR = Marginal Revenue

ii. Marginal Revenue

Marginal revenue is the revenue earned by selling one additional unit of a commodity. Or in simple terms it is called the revenue added in total revenue by selling one additional unit of given commodity. It is the change in total revenue by selling one more unit of a commodity.

“Marginal revenue is the change in total revenue which results from the sale of one more or one less unit of output.” **Ferguson**

Measurement of Marginal Revenue

$$MR = \Delta TR / \Delta Q \quad \text{or} \quad MR = TR_n - TR_{n-1}$$

Here, MR = Marginal Revenue; Δ = Change In; TR = Total Revenue

Q = Quantity; TR_n = Total Revenue of n Units; TR_{n-1} = Total Revenue of n-1 Units

iii. Average Revenue

Average revenue is the revenue earned per unit of commodity sold. It is the rate at which output is sold. Average revenue is calculated by dividing the total revenue by the number of units sold.

“Average revenue is the per unit revenue received from the sale of a commodity.”
Mc Connell

Measurement of Average Revenue

$$AR = TR / Q$$

$$AR = (P * Q) / Q = P$$

Here AR = Average revenue; TR = Total Revenue; Q = Quantity; P = Price;

Quantity	Price	Total Revenue	Marginal Revenue	Average Revenue
1	10	10	10	10
2	10	20	10	10
3	10	30	10	10
4	10	40	10	10
5	10	50	10	10
6	10	60	10	10

Table 12.6 Total Revenue, Marginal Revenue and Average Revenue

12.2.2 Relationship between Total Revenue, Average Revenue and Marginal Revenue

- a) When TR is increasing at increasing rate, MR is increasing.
- b) When TR is increasing at constant rate, MR is constant.
- c) When TR is increasing at diminishing rate, MR is decreasing.
- d) When TR is maximum, MR is zero.
- e) When TR is decreasing, MR is negative.
- f) If AR is constant than $MR = AR$.
- g) If AR is Zero, $TR = 0$
- h) MR can be negative but AR and TR can't be.

Chapter at a Glance:

- **Introduction to Cost:** When an entrepreneur decides to produce a commodity, he has to pay the price for inputs which he uses in production. When entrepreneur employs, labour, he pays wages to them and pays money when buys raw material, fuel and power, rent for the factory building and so on. All these are included in cost of production.
- **Cost function :** $C = f(X, T, Pf)$
- **Determinants of Cost:** Size of Plant, Level of Output, Price of Inputs, State of Technology and Management and Administrative Efficiency are the various determinants of cost.
- **Cost Concepts:** There are various cost concepts like: Actual Cost and Opportunity Costs, Past and Future Costs, Short Run and Long Run Costs, Variable or Prime Cost and Fixed Costs or Supplementary Costs, Incremental Costs and Sunk Costs, Traceable and Non-Traceable Costs, Explicit and Implicit Costs, Controllable and Non-Controllable Costs, Private, External and Social Costs, Total, Average and Marginal Costs
- **Total Cost:** Total cost is the total actual cost incurred on the production of goods and services. It refers to the total outlays of money expenditure, both explicit and implicit, on the factors used to produce a given level of output. It includes both fixed and variable costs.
- **Average Cost:** Average cost is not actual cost; it is of statistical in nature. It is obtained by dividing total cost by total output. Average cost is the per unit cost of output.
- **Marginal Cost:** It is the addition to total cost on account of producing one additional unit of product. It is the cost of marginal unit produced.
- **Introduction to Revenue:** "The revenue of a firm is its sales receipts or income." Prof. Dooley
- **Concepts of Revenue:** There are three concepts of revenue A) Total Revenue B) Marginal Revenue C) Average Revenue
- **Relationship between Total Revenue, Average Revenue and Marginal Revenue:** Total sale proceeds of a firm are termed as total revenue or the revenue that a firm obtains by selling a given quantity of commodity is called total revenue. Marginal revenue is the revenue earned by selling one

additional unit of a commodity. Or in simple terms it is called the revenue added in total revenue by selling one additional unit of given commodity. Marginal revenue is the revenue earned by selling one additional unit of a commodity. Or in simple terms it is called the revenue added in total revenue by selling one additional unit of given commodity. Average revenue is the revenue earned per unit of commodity sold. It is the rate at which output is sold. Average revenue is calculated by dividing the total revenue by the number of units sold.

Exercise for Practice

1. Objective Type Questions:

(C) Fill in the blanks with appropriate words.

1. Social cost = Private Cost + _____ Cost
2. _____ is the per unit revenue received from the sale of a commodity
3. _____ is the revenue earned by selling one additional unit of a commodity
4. Total sale proceeds of a firm are termed as _____ when fixed inputs are held constant.
5. _____ is the addition to total cost due to the addition of one unit of output
6. Average Variable Cost is per unit _____ cost
7. The average cost of production is the _____ per unit of output
8. The cost of fixed inputs is called _____ costs
9. Total variable cost is the sum of amounts spent for each of _____ used
10. More modern and upgraded the technology implies _____ cost and vice versa.
11. There is an _____ relationship between size of plant and cost. As size of plant increases, cost falls and vice versa.
12. The Pains and sacrifices of labour are real _____ of production
13. _____ is the cost of producing any commodity in the next best alternative cost.
14. _____ costs are costs which have already been incurred.

15. _____ are the added costs of a change in the level of production or the nature of activity.

Answer key

- | | | |
|----------------------|--------------------|-----------------------|
| 1. External | 2. Average Revenue | 3. Marginal Revenue |
| 4. Total Revenue | 5. Marginal Cost | 6. Variable |
| 7. Total Cost | 8. Total Fixed | 9. Variable Input |
| 10. Lesser | 11. Inverse | 12. Cost |
| 13. Opportunity Cost | 14. Sunk | 15. Incremental Costs |

(D) State whether the following statements are True or False.

1. Prime costs are variable or direct costs.
2. Long run costs encompass no changes in the size and kind of plant.
3. Short run costs are those associated with fixed utilization of fixed plant or other facilities,
4. Future costs are those costs which are to be incurred in the near future.
5. Past costs are implicit costs incurred in the past.
6. Opportunity cost of a particular product is the value of the foregone alternative product that resources used in its production, could have produced.
7. Actual costs are those that do not involve financial expenditure incurred for acquiring inputs for producing a commodity.
8. There is a direct relationship between price of inputs and cost
9. There is an inverse relationship between output level and cost.
10. There is a direct relationship between size of plant and cost.

Answer key:

- | | | | | |
|---------|----------|----------|----------|------------|
| 1. True | 2. False | 3. False | 4. True | 5. False |
| 6. True | 7. False | 8. True | 9. False | 10. False. |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. Pains and sacrifices of labour are real cost of production
(A) Adam Smith (B) Koutsoyianis
(C) Stigler (D) Marshall

2. The added costs of a change in the level of production or the nature of activity.

(A) Sunk Costs	(B) Incremental Costs
(C) Explicit	(D) Implicit
3. The cost which changes with change in output is

(A) Fixed	(B) Semi Variable
(C) Variable	(D) None Of Above
4. Those costs which can easily be identified by a producing unit are.

(A) Controllable	(B) Non Controllable
(C) Non Traceable Costs	(D) Traceable Costs
5. Those costs which cannot be altered in any way are

(A) Total Cost	(B) Average Cost
(C) Sunk Costs	(D) Variable Cost
6. The sum of total fixed cost and total variable cost for each output level.

(A) Average Cost	(B) Average Variable Cost
(C) Total Cost	(D) Marginal Cost
7. The sum of average variable cost and average fixed cost

(A) Total Cost	(B) Average Cost
(C) Sunk costs	(D) Variable Cost
8. The cost of producing an additional unit of output.

(A) Average Cost	(B) Average Variable Cost
(C) Total Cost	(D) Marginal Cost
9. The sum of all sales receipts or income of a firm.

(A) Average Revenue	(B) average Price
(C) Total Revenue	(D) Marginal Revenue
10. The revenue earned by selling one additional unit of a commodity.

(A) Average Revenue	(B) Average Cost
(C) Total Revenue	(D) Marginal Revenue

Answer Key:

- | | | | | |
|------|------|------|------|-------|
| 1. A | 2. B | 3. C | 4. D | 5. C |
| 6. C | 7. B | 8. D | 9. C | 10. D |

(D) Very Short Answer Type Questions

1. What do you mean by Cost function?
2. What do you mean by Factors determining the cost?
3. What do you mean by Actual Cost?
4. What do you mean by Opportunity Costs?
5. What do you mean by Past Costs?
6. What do you mean by Future cost?
7. What do you mean by short run cost?
8. What do you mean by long run cost?
9. Write two attributes of Controllable.
10. Write any one difference between Explicit and Implicit Costs

2. Short answer type questions

1. What do you mean by Cost function? Write any two features of Cost function.
2. Explain the attributes of Cost function.
3. What do you mean by total cost? Write the formula to calculate total cost.
4. What do you mean by Total, Average and Marginal Costs?
5. What do you mean by Private, External and Social Costs?
6. What do you mean by Controllable and Non-Controllable Costs?
7. Differentiate between Explicit and Implicit Costs?
8. What do you mean by average cost? How it is calculated?
9. Write the difference between total revenue and total cost.
10. Write differences between total revenue and marginal revenue.

3. Long Answer Type Questions.

1. Explain the Relationship between Total Revenue, Average Revenue and Marginal Revenue.
2. Explain the Relationship between Total cost, Average cost and Marginal cost.
3. Differentiate between Average revenue and marginal revenue and discuss the relationship between them.
4. Discuss the various concepts of cost.
5. Discuss the various concepts of revenue.
6. With the help of table and diagram explain the average cost, marginal cost and total cost.

Chapter 13

Forms of Market

Learning Objectives:

After studying this chapter, the student should be able to understand:

- *Introduction to Market*
- *Meaning and characteristics of Market*
- *Forms of Market*
- *Meaning and Characteristics of Perfect Competition*
- *Meaning and Characteristics of Monopoly*
- *Meaning and Characteristics of Monopolistic Competition*
- *Comparison between Different Forms of Markets*
- *Meaning and Characteristics of Oligopoly*

13.0 Introduction to Market

Generally, a market is taken as a place where commodities are bought and sold. Market is a place where there are large number of buyers and sellers, big and small shops, stalls and hawkers selling their products. But in economics market doesn't mean a place. The market is a set of buyers and set of sellers for a particular product at a particular price. Market may be local or regional, national or international. Buyers are willing to buy and sellers are willing to sell at a particular price for their commodity. For example gold market, tea market, wheat market etc.

13.1 Meaning of Market

The concept of a **market** is any structure that allows buyers and sellers to exchange any type of goods, services and information. A market is defined as the sum total of all the buyers and sellers in the area or region under consideration. The value, cost and price of items traded are as per forces of supply and demand in a market. The market may be a physical entity, or may be virtual. It may be local or global, perfect and imperfect. **Market, is a means by which the exchange of goods and services takes place as a result of buyers and sellers being in contact with one another, either directly or through mediating agents or institutions.** In economics market is not necessarily a place but it is entire area where buyers and sellers are in close contact. It's not important whether they meet personally or not. For example now a days most of the shopping is done online like Ebay, Snapdeal, Fashion And You, Amazon, Flipkart etc. are online shopping websites. Customer views the product online and buys according to his choice. He neither meets nor personally contact the seller. Even the seller is not aware who the buyer of his product is.

1.2 Some Definitions of Market

- ❖ "Economists understand by the term market not any particular market place in which things are bought and sold but the whole of any region in which buyers and sellers are in such free intercourse with each other that the price of the same goods tends to equality easily and quickly." **Cournot**
- ❖ "A market is that mechanism by which buyers and sellers are brought together. It is not necessarily a fixed place." **J.C. Edwards**
- ❖ "The term market refers not necessarily to place but always to a commodity and the buyers and sellers who are in direct competition with one another." **Chapman**

13.2 Characteristics of Market

In economics, market has a special meaning. It doesn't mean a particular place where buyers and sellers come together to sell and buy products. Rather it means entire area where buyers and sellers are scattered but are still in close contact. The main characteristics of market are discussed below in detail:

- i. **Area:** It does not refer to fixed location. Market refers to whole area of operation of demand and supply. It does not refer to any particular place or region where buyers and sellers are located. Rather it means entire area where buyers and sellers are spread and are in close contact with each other.
- ii. **Buyers and Sellers:** Every market needs both buyer and seller. So there should be buyer to buy the product and similarly the seller to sell that product. Absence of any one doesn't constitute market. Buyers and sellers may be at different places.
- iii. **One commodity:** For a market there must be the existence of one commodity for which there are buyers and sellers. Every commodity has its own market like labour market, sugar market, grain market etc.
- iv. **Free Competition:** In market there should be free competition which means buyers and sellers are free to choose the product. Buyer wants cheapest product while seller wants highest price for his product. So buyer and seller set the price where buyer is ready to buy and seller is ready to sell. This situation is called equilibrium. Due to this there will be a uniform price for one commodity throughout the market.
- v. **One Price:** Generally it is remarked that in a market one price prevails which is the main feature and testimony of a market.

13.3 Forms of Market

Market may be classified on the basis of competition in the market in three main forms:

- i. Perfect Competition
- ii. Imperfect Competition: Imperfect Competition is further divided into three parts that are: Monopolistic, Oligopoly And Duopoly
- iii. Monopoly

It can also be explained with the help of diagram 13.1.

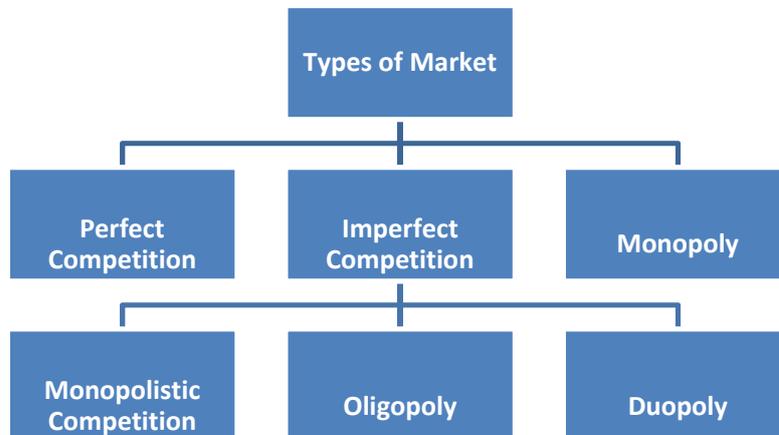


Diagram 13.1 Types of Market

13.3.1 Perfect Competition

It is such a market structure where there are large number of buyers and sellers of a homogeneous product and the price of the product is determined by the industry. There is one price that prevails in the market. All firms sell the product at the prevailing price. In this type of market structure price is set by industry and firms adopt the same price as set by the industry. *Industry in economics means all those firms which are selling homogeneous products.* For example all the sugar manufacturing firms when clubbed together are termed as sugar industry. *Firm is a individual unit which is manufacturing sugar.* There could be a cement industry and firms in cement industry are Ambuja Cement, Birla Cement, JK Cement etc.

Definition of Perfect Competition

- ❖ "Perfect competition is a market in which there are many firms selling identical products with no firm being large enough relative to the entire market to be able to influence market price." **Leftwitch**
- ❖ "Perfect competition describes a market in which there is complete absence of direct competition among economic groups." **Ferguson**
- ❖ "Perfect competition prevails when the demand for the output of each producer is perfectly elastic." **Mrs. Joan Robinson**

Characteristics of Perfect Competition

Perfect competition is that form of market structure in which there are large number of buyers and sellers selling homogeneous products. The main characteristics of this form of market are as under:

i. Large Number of Buyers and Sellers: There are large number of buyers and sellers of a commodity under perfect competition but each buyer and each seller is so small in comparison with entire market of product that he cannot influence the market price by changing the quantity of the product sold by him.

ii. Homogeneous Product: The second important characteristic of the perfectly competitive market is that the products sold by the various firms are homogeneous. The products are homogenous in the sense that they are perfect substitutes from the buyer's point of view. The sellers do not spend on advertisement and publicity etc. because all the firms sell homogeneous product.

iii. Absence of Artificial Restrictions: The third major characteristic of the perfect competition is the non-existence of any artificial restrictions on the demands, supplies, and prices of goods and factors of productions in the market. There must not be any external intervention in price fixation and any controls on the product.

iv. Free Entry and Exit: The fourth characteristic of perfect competition is free entry and free exit for the firms under perfectly competitive market. The firms are free to enter or to exit from the industry whenever they want to do so. Any firm can enter or leave the industry at any time as there are no legal restrictions.

v. Perfect Knowledge about the Market: There is perfect knowledge on the part of buyers and sellers about market conditions. The buyers and sellers are fully aware of the price prevailing in the market. Due to this awareness all the firms charge one price from the buyers.

vi. Perfect Mobility of the Factors of Production: The existence of perfect mobility of the factors of production is another important characteristic of the perfect competition for its smooth functioning. It means all the factors of production are perfectly mobile under perfectly competitive market. Factors will move to the industry which pays the higher remuneration.

vii. Non-Existence of Transportation Cost: A perfectly competitive market also assumes the characteristic of non-existence of transport costs as uniform price prevails throughout the market. It is essential that there is no transportation cost across different areas of the market. Thus, the existence of a single uniform price is an essential feature of a perfectly competitive market and a single uniform price for the same product cannot exist in the market if transportation costs are taken into account.

viii. Uniform Price: In perfect competition the sellers charge same price for their product from the buyer. Therefore uniform price exists in the market.

ix. Absence of Selling Cost: In perfect competition there are no selling costs. Seller does not spend on advertising for sale. All the products available in the market are homogeneous and customer is aware of products and their prices. Due to this seller do not spend on selling cost.



Diagram 13.2 Features of Perfect Competition

13.3.2 Meaning of Monopoly

Monopoly is that form of market structure where there is a single seller of the product. There is no close substitute of the product available in the market. There are restrictions on entry and exit of firms in market. In this form of market structure firm and industry are same because there is a single seller of the product. Therefore whatever price is set is accepted in the market. . Here one firm is selling the product and has full control over the supply of the product e.g. the supply of electricity by the Rajasthan State Electricity Board or Postage Stamps, Post Cards, Envelopes Indian Postal Orders etc. are supplied by the Postal Department. This is such a situation of market where, there is only one producer of a commodity with no close substitutes. Other examples can be LPG, Railways, Metro Trains, etc.

Definition of Monopoly

- ❖ "A pure monopoly exists when there is only one producer in a market. There are no direct competitors." **Ferguson**
- ❖ "Monopoly is a market situation in which there is a single seller, there are no close substitutes for commodity it produces, and there are barriers to entry." **A. Koutsoyiannis**
- ❖ "A pure monopoly is defined as the firm that is also an industry. It is the only supplier of some particular commodity for which there exists no close substitute." **Baumol**

Characteristics of Monopoly

- i. Single Seller:** There is only one firm under monopoly but the buyers of the product are in large number, consequently, no buyer can influence the price of the product.
- ii. Firm And Industry Are Same:** Firm represents the industry as a whole which has complete control over the supply of product. There being only one firm, the distinction between the firm and the industry is no longer in existence.
- iii. Restriction on Entry:** Under monopoly market structure no other firm can enter the market. It implies the absence of actual entry. The barriers to the entry may be artificial, legal, natural, economic, institutional, technological etc.
- iv. Absence of Close Substitutes:** There are no close substitutes of the product. Monopoly cannot continue if there is availability of substitute goods.

v. Price Maker: Monopolist has full control over the supply of the commodity. Monopolist is a price maker not the price taker.

vi. Price Discrimination: Price discrimination means charging different price of same product from different customers. For example per unit price of electricity is different for commercial use and household use. Product is same, electricity but its price is different for household customer and commercial customer. Monopolist can practice price discrimination due to single seller.

vii. No Supply Curve: Monopolist decides its supply curve according to demand for its product. Firm produces only that much product which are demanded in the market. So there is no supply curve.

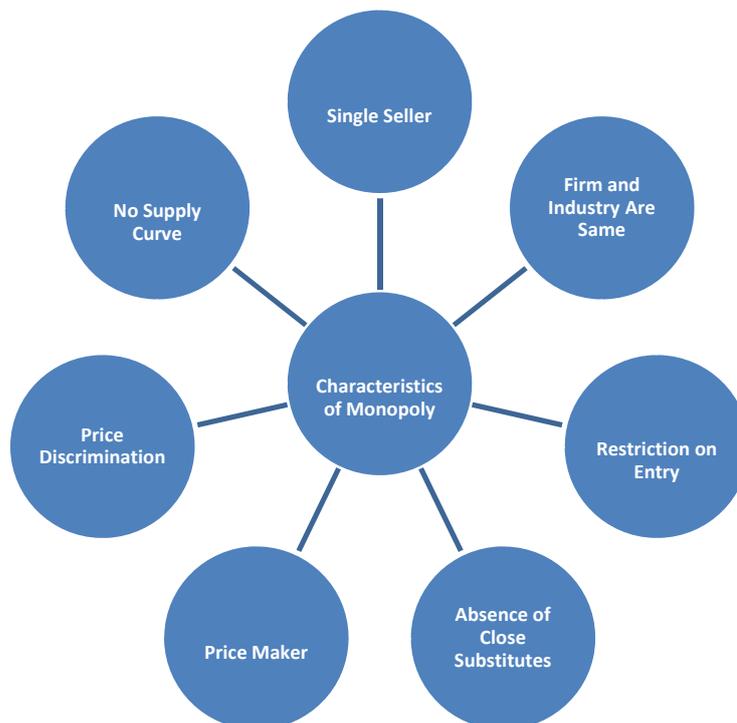


Diagram 13.3 Characteristics of Monopoly

13.3.3 Monopolistic Competition

Monopolistic competition is that form of market structure in which there are large numbers of small sellers producing similar products but differentiated products. Monopolistic competition is a blend of both perfect competition and monopoly. Both monopoly and perfect competition are extreme situations. Monopolistic competition is similar to perfect competition in a way that there are large number of small sellers. And it is different because products are not homogeneous, Products are differentiated. Product differentiation may be on the basis of brand name, trade mark, patent, colour, size etc of the product. Monopolistic competition also has the feature of monopoly in a way that due to product differentiation every seller has monopoly for its market share. Every brand has its own market. So it can be said that monopolistic competition is hybrid of monopoly and perfect competition.

Definition of Monopolistic Competition

- ❖ "Monopolistic competition is a market structure found in the industry where there are large numbers of small sellers, selling differentiated but close substitute products." **J.S. Bains**
- ❖ "Monopolistic competition is a market situation where there are many producers but each offers a slightly differentiated product." **Lim Chungyoh**
- ❖ "The term monopolistic competition refers to the marked structure in which the sellers do have a monopoly (they are the only seller) of their own product, but they are also subject to substantial competitive pressures from sellers of substitute product." **Baumol**

There are various soft drink manufacturing companies. Each has its own brand name like Coke, Pepsi, Thums Up, Fanta, Limca etc. it may be the case that Coke consumer may not like Fanta And Limca due to its colour or flavour.

Characteristics of Monopolistic Competition

Monopolistic competition is a mid-way between perfect competition and monopoly. Under perfect competition the number of sellers is very large and unlimited and under monopoly there is only single seller of the product, while under monopolistic competition the number of sellers is relatively limited. The main features of monopolistic competition are as under:

i. Large Number of Sellers: There are a large number of firms or sellers operating under monopolistic competition but a relatively small fraction of the total market is shared by each firm or seller.

ii. Product Differentiation: The second distinct feature of monopolistic competition is product differentiation. The number of firms is large but their products differ from one another in colour, shape, size, brand, chemical composition, quality, trade mark, packaging, durability etc. For example, different firms produce different kinds of bathing soap e.g. Hamam, Lux, Lifebuoy, Rexona, Liril, Dove, Ganga, Pears, etc. but these products are close substitutes but still different from each other.

iii. Freedom of Entry and Exit: Under monopolistic competition the firms are relatively free to enter the industry and to exit from the industry, but they have no absolute freedom of entry in the industry. New firms are free to enter into the market with new brands as close substitute of the existing brands.

iv. Non-Price Competition: Under monopolistic competition firms compete with one another without changing the price of their products. The firms attract the potential buyers by offering them gifts, coupons, credit schemes, selling schemes and other services. Thus, the firms compete with one another on non-price front.

v. Price Policy: Every firm has its own price policy. Every firm decides its own price for the products. There is no uniform price of the products as the products are different from each other. Every product has unique selling feature. It may be its colour, packing, size, gifts etc.

vi. Less Mobility: There is no perfect mobility of factors of production and of goods and services in practical life. The factors are less mobile because of psychological reasons and disparity among the regions.

vii. Imperfect Knowledge: Under monopolistic competition the buyers and sellers do not have perfect knowledge about the market conditions. The buyers and sellers of the products and owners of the factors of production are ignorant about the prices of the products and factor services.

viii. Selling Costs: Under monopolistic competition each firm wants to promote the sales of its products by incurring selling costs. The expenditure incurred on advertisement and publicity to increase sales is called selling cost. The selling

cost shift the demand for a firm's product and the rival firms also react by incurring more and more selling costs.

ix. Close Substitutes: Under monopolistic competition the products are not homogeneous products but they are close substitutes to each other which tends to create competition among the firms regarding their products.

x. Group Equilibrium: Under monopolistic competition the industry is not said to be in equilibrium but there is a position of group equilibrium for the group as a whole e.g. soap manufacturing group combine a group of soap manufacturers and that group itself needs to be in equilibrium position. Group denotes the collection of firms producing non-identical but close substitutes products.



Diagram 13.4 Features of Monopolistic Competition

13.5.4 Comparison between Different Forms of Markets

Basis Of Difference	Perfect Competition	Monopolistic Competition	Monopoly
Buyers And Sellers	There are large number of buyers and sellers.	There are large number of buyers and sellers.	There is a single seller but large number of buyers.
Product	Products are homogeneous.	Products are differentiated.	Products may be homogeneous or differentiated.
Price	Price is uniform.	Price is not uniform	Products is not uniform
Entry And Exit Of Firms	There is free entry and exit of firms	There is no absolute freedom of entry and exit.	There are barriers to entry
Market Knowledge	Buyers have perfect knowledge about the market.	Buyers have imperfect knowledge about the market.	Buyers have imperfect knowledge about the market.
Factor Mobility	Factors of production are perfectly mobile.	Factors of production are not perfectly mobile.	Factors of production are not perfectly mobile.
Selling Costs	Selling costs are not required.	Selling costs are very significant.	Selling costs are not required.
Price Control	The firm has no control over price.	The firm has partial control over price	Firm has full control of price.
Transport Costs	There are no transport costs.	There are transport costs.	There are transport costs.

13.3.5 Oligopoly

Oligopoly is that form of market structure in which there are few sellers, producing either homogeneous or differentiated products. It is also called as 'competition among few'. There are few firms operating in the market. Price and output policy of each seller is interdependent. The main feature of this type of market is its kinked shaped demand curve. Kinked shape demand curve means that demand curve is divided into two parts a) elastic and b) inelastic.

Definition of Oligopoly

- ❖ "Oligopoly is a market situation in which number of firms in an industry is, so small that each must consider the reactions of rivals in formulating its price policy." **Mc. Connel**
- ❖ "An oligopoly is a market situation in which each of small number of interdependent, competing producers' influences but does not control the market." **Grinois**
- ❖ "Oligopoly is a market structure characterized by a small number of firms and a great deal of interdependence." **Mansfield**

Characteristics of Oligopoly

The various features of oligopoly are discussed as follows:

i. Relatively Small Number of Sellers: There are relatively small numbers of sellers under oligopoly market structure selling identical or differentiated products. Each seller controls a large part of the demand and the policies of every seller influence the price and output of the industry as a whole.

ii. Interdependence of the Firms: Under the oligopoly market structure all the firms are sailing in the same boat and every tilting position influence each of the firm as well with equal proportion. No firm can be neutral. They depend on each other while determining the price and output of the firm.

iii. Price Rigidity and Price War: Price rigidity and price war are the common features of an oligopoly market structure. Each firm retaliates and acts according to the actions of the other firms and a tug of war starts between them which is known as 'Price War' which further paves way to price rigidity.

iv. Difficulty in Entry and Exit: Under oligopoly the entry and exit of the firms is banned. The new firms cannot enter the market as the old firms have complete hold over the market conditions and the firms are also reluctant to leave because of the huge investment made by them.

v. Selling Costs: Under oligopoly market structure, each firm pursues an aggressive and defensive marketing strategy to control the market.

Advertisement is an important method used by the oligopolists to control the bigger part of the market.

vi. Indeterminateness of the Demand Curve: Under oligopoly market structure the shape of the demand curve is broken and is indeterminate because the firms cannot assume that the rival firms will not make a change in their price policy in response to change in price affected by it. Thus, the fact that the reaction pattern of the rival firms is indeterminate leaves the demand curve in an indeterminate position.

vii. Complex Market Structure: The market structure of oligopoly is quite complex. As there is a possibility of rival firms to end rivalry by working out some policy of collusion and the collusive oligopoly manifests itself in the form of combination of rival firms to fix the same price and also share in output as in case of cartels. Besides it, non-collusive oligopoly is also found in practice which presents a complex market structure.

viii. Kinked Shape Demand Curve: The main feature of this type of market is its kinked shaped demand curve. Kinked shape demand curve means that demand curve is divided into two parts a) elastic and b) inelastic.



Diagram 13.5: Characteristics of Oligopoly

In Indian context if we talk, there are certain examples of oligopoly. For example in fast food if we talk about burgers there are Mc. Donalds, KFC, King Burger. In electronics we have Samsung, LG, Videocon etc. Oligopoly in mobile service providers Vodafone, Airtel, Tata, BSNL.

Chapter at a Glance:

- **Introduction to Market:** In economics market doesn't mean a place. The market is a set of buyers and set of sellers for a particular product at a particular price.
- **Meaning of Market: Market,** a means by which the exchange of goods and services takes place as a result of buyers and sellers being in contact with one another, either directly or through mediating agents or institutions.
- **Definition of Market:** "A market is that mechanism by which buyers and sellers are brought together. It is not necessarily a fixed place." **J.C. Edwards**
- **Characteristics of Market:** The main features of market are it's not always a physical place, need of buyer and seller, one commodity and price of product.
- **Forms of Market:** Market may be classified on the basis of competition in the market in three main forms: Perfect Competition, Imperfect Competition and Monopoly. Imperfect Competition is further divided into three parts that are: Monopolistic, Oligopoly And Duopoly
- **Meaning of Perfect Competition:** It is such a market structure where there are large number of buyers and sellers of a homogeneous product and the price of the product is determined by the industry.
- **Definition of Perfect Competition:** "Perfect competition is a market in which there are many firms selling identical products with no firm being large enough relative to the entire market to be able to influence market price." **Leftwitch**
- **Characteristics of Perfect Competition:** The main features of perfect competition are there are large number of buyers and sellers, selling homogeneous products at uniform price; all firms are price taker while industry sets the price. There are no entry and exit barriers in this type of market.
- **Meaning of Monopoly:** Monopoly is that form of market structure where there is a single seller of the product. There is no close substitute of the product available in the market.

- **Definition of Monopoly:** "Monopoly is a market situation in which there is a single seller, there are no close substitutes for commodity it produces, and there are barriers to entry." **A. Koutsoyiannis**
- **Characteristics of Monopoly:** The main features of monopoly are single seller, firm and industry is same, firm is price maker, there are restrictions on entry and exit in this type of structure.
- **Meaning of Monopolistic:** Monopolistic competition is that form of market structure in which there are large numbers of small sellers producing similar products but differentiated products. Monopolistic competition is blend of both perfect competition and monopoly.
- **Definition of Monopolistic:** "The term monopolistic competition refers to the marked structure in which the sellers do have a monopoly (they are the only seller) of their own product, but they are also subject to substantial competitive pressures from sellers of substitute product." **Baumol**
- **Characteristics of Monopolistic:** The main features of monopolistic competition are few sellers, products are differentiated, and selling costs are significant in this type of structure.
- **Meaning of Oligopoly:** Oligopoly is that form of market structure in which there are few sellers, producing either homogeneous or differentiated products.
- **Definition of Oligopoly:** "Oligopoly is a market structure characterized by a small number of firms and a great deal of interdependence." **Mansfield**
- **Characteristics of Oligopoly:** The main features of Oligopoly are few sellers, producing either homogeneous or differentiated products, kinked shaped demand curve, selling costs are there.

Exercise for Practice

1. Objective Type Questions:

(A) Fill in the blanks with appropriate words.

1. The term _____ refers not necessarily to place but always to a commodity and the buyers and sellers who are in direct competition with one another.
2. For market there must be existence of one _____ for which there are buyer and seller.
3. _____ is such a market structure where there are large number of buyers and sellers of a homogeneous product.

4. _____ is that form of market structure in which there are few sellers, producing either homogeneous or differentiated products.
5. The term _____ refers to the market structure in which the sellers do have a monopoly (they are the only seller) of their own product, but they are also subject to substantial competitive pressures from sellers of substitute product.
6. _____ is a market situation in which there is a single seller, there are no close substitutes for commodity it produces, and there are barriers to entry.
7. The main feature of _____ type of market is its kinked shaped demand curve.
8. Under monopolistic competition the buyers and sellers do not have _____ knowledge about the market conditions.
9. Under _____ competition the buyers and sellers do have perfect knowledge about the market conditions.
10. Price rigidity and _____ are the common features of an oligopoly market structure.
11. In monopoly factors of production are not perfectly _____.
12. In perfect competition the firm has no control over _____.
13. In _____ competition selling costs are very significant.
14. In _____ competition selling costs are not significant.
15. In _____ products may be homogeneous or differentiated.

Answer key

- | | | |
|------------------|-----------------------------|------------------------|
| 1. Market | 2. Commodity | 3. Perfect competition |
| 4. Oligopoly | 5. Monopolistic competition | 6. Monopoly |
| 7. Oligopoly | 8. Perfect | 9. Perfect |
| 10. Price War | 11. Mobile | 12. Price |
| 13. Monopolistic | 14. Perfect | 15. Monopoly |

(B) State whether the following statements are True or False.

- a. A market is that mechanism by which buyers and sellers are brought together. It is necessarily a fixed place.
- b. Oligopoly is a market structure characterized by a small number of firms and a great deal of interdependence
- c. Perfect competition is a market in which there are many firms selling differentiated products.
- d. Monopoly is a market situation in which there is a single seller, there are no close substitutes for commodity it produces, and there are barriers to entry.

- e. Price discrimination is the main feature of monopolistic competition.
- f. In oligopoly the demand curve is kinked shaped.
- g. Selling and transportation cost are very significant in perfect competition.
- h. Selling costs are very significant in monopolistic competition.
- i. Price war and price rigidity is main feature of perfect competition.
- j. Firm is price taker and industry is price maker in monopoly.

Answer key:

- | | | | | |
|----------|----------|----------|----------|------------|
| 1. False | 2. True | 3. False | 4. True | 5. False |
| 6. True | 7. False | 8. True | 9. False | 10. False. |

(C) Multiple Choice Questions: (Find the correct answer from the given)

1. The concept of a _____ is any structure that allows buyers and sellers to exchange any type of goods, services and information.

(A) Market	(B) communication
(C) Oligopoly	(D) duopoly

2. For market there must be existence of _____ commodity for which there are buyer and seller.

(A) One	(B) Two
(C) Three	(D) Four

3. Price rigidity and price war is the common features of which market structure.

(A) Perfect Competition	(B) Monopoly
(C) Oligopoly	(D) Monopolistic Competition

4. Under which form of competition firms compete with one another without changing the price of their products.

(A) Perfect Competition	(B) Monopoly
(C) Oligopoly	(D) Monopolistic Competition

5. Under which market structure the entry and exit of the firms is banned.

(A) Perfect Competition	(B) Monopoly
(C) Oligopoly	(D) Monopolistic Competition

6. Under which market structure the product are not homogeneous products but they are close substitutes to each other which tends to create competition among the firms regarding their products.

(A) Perfect Competition	(B) Monopoly
(C) Oligopoly	(D) Monopolistic Competition

7. which competition describes a market in which there is complete absence of direct competition among economic groups
 (A) Perfect Competition (B) Monopoly
 (C) Oligopoly (D) Monopolistic Competition
8. Under which competition each firm wants to promote the sales of its products by incurring selling costs.
 (A) Perfect Competition (B) Monopoly
 (C) Oligopoly (D) Monopolistic Competition
9. Firm represents the industry as a whole which has complete control over the supply of product.
 (A) Perfect Competition (B) Monopoly
 (C) Oligopoly (D) Monopolistic Competition
10. There is a large number of buyers and sellers of a commodity under perfect competition.
 (A) Perfect Competition (B) Monopoly
 (C) Oligopoly (D) Monopolistic Competition

Answer Key:

- | | | | | |
|------|------|------|------|-------|
| 1. A | 2. A | 3. C | 4. D | 5. C |
| 6. D | 7. A | 8. D | 9. B | 10. A |

(D) Very Short Answer Type Questions

1. What do you mean by market?
2. What do you mean by monopoly?
3. What do you mean by monopolistic competition?
4. What do you mean by perfect competition?
5. What do you mean by oligopoly?
6. What do you mean by kinked shaped demand curve?
7. What do you mean by price discrimination?
8. Write two features of monopoly.
9. Write two differences between monopoly and monopolistic competition.
10. Write any one difference between perfect competition and monopoly.

2. Short answer type questions

1. What do you mean by market? Write any two features of market
2. Explain the classification of market structures.
3. What do you mean by monopoly? Write any two basic features monopoly.

4. What do you mean by monopolistic competition? Write any two features.
5. What do you mean by perfect competition? Write any two features.
6. What do you mean by oligopoly? Write any two examples.
7. What do you mean by price discrimination? Explain with example.
8. What do you mean by price war?
9. Write features of monopoly and differentiate it with perfect competition.
10. Write differences between monopoly and monopolistic competition.
11. Write differences between perfect competition and monopoly.

3. Long Answer Type Questions.

1. "Perfect competition is a market in which there are many firms selling identical products with no firm being large enough relative to the entire market to be able to influence market price." Discuss.
2. Differentiate between various forms of market structure.
3. "Oligopoly is a market situation in which number of firms in an industry is, so small that each must consider the reactions of rivals in formulating its price policy." Discuss.
4. How does monopoly differ from monopolistic competition?
5. "Monopolistic competition is a market structure found in the industry where there are large numbers of small sellers, selling differentiated but close substitute products." Discuss.
6. Differentiate between perfect competition and monopoly.
7. "Monopoly is a market situation in which there is a single seller, there are no close substitutes for commodity it produces, and there are barriers to entry." Discuss.
8. Define market and various forms of market structure in detail.