



भारतीय दिवाला और शोधन अक्षमता बोर्ड

Insolvency and Bankruptcy Board of India

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**STUDY MATERIAL  
FOR THE EXAMINATION  
IN THE DISCIPLINE OF  
PLANT AND MACHINERY**

**PREPARED BY:**

**CENTRE FOR VALUATION STUDIES,  
RESEARCH AND TRAINING ASSOCIATION  
(CVSRTA)**





सत्यमेव जयते

# भारतीय दिवाला और शोधन अक्षमता बोर्ड Insolvency and Bankruptcy Board of India

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## Preface

19<sup>th</sup> November, 2018

Institutions are the foundations of a well-functioning market economy. Professions constitute a key element of the institutional framework. The nature and extent of professionalisation, to a large extent, determines the competitive edge of nations and sustainability of prosperity.

2. In a market economy, market discovers price, which usually reflects the worth of an asset (or a liability). It discovers different prices for the same asset in different contexts. Thus, price is not absolute; it is context specific. Often it is neither feasible nor desirable to go through the market to discover the worth of an asset. In such cases, worth of an asset is estimated by a professional outside the market. The worth so estimated is 'value', which is what the price ought to be in the same context. If value of an asset is equal to its price, the valuation or value estimated is considered perfect. It requires specialised knowledge, considerable dexterity and the highest integrity on the part of a professional to take the asset through a simulated market in the given context to estimate its value, which is very close, if not equal, to the price. A market economy needs a cadre of such professionals for valuations of for a variety of purposes.

3. The valuation profession has a long history in India. Different statutes and authorities require valuation for different purposes and often prescribe the manner of such valuation. There have been several attempts in the past to develop holistically an institutional arrangement that develops and regulates the profession of valuers who can estimate the value of any asset with full responsibility. It took a concrete shape with enactment of the Companies Act, 2013. Section 247 of the Act provides that where valuation is required to be done under the provisions of the Act, it shall be valued by a person who, having the necessary qualifications and experience, and being a valuer member of a registered valuer organisation (RVO), is registered as a valuer.

4. The Central Government notified the commencement of section 247 of the Companies Act, 2013 with effect from 18<sup>th</sup> October, 2017. It also notified the Companies (Registered Valuers and Valuation) Rules, 2017 (Rules), which provide for a complete framework for development and regulation of the profession of valuers and the manner of valuation, including valuation standards and Code of Conduct for registered valuers. The Central Government delegated its powers and functions under section 247 of the Act to the Insolvency and Bankruptcy Board of India (IBBI) and specified the IBBI as the Authority under the said Rules.

5. Subject to meeting other requirements, an individual is eligible to be a registered valuer, if he (i) is a fit and proper person, (ii) has the necessary qualification and experience, (iii) is a valuer member of an RVO, (iv) has completed a recognised educational course as member of an RVO, (v) has passed the valuation examination conducted by the IBBI, and (vi) is recommended by the RVO for registration as a valuer. A partnership entity or a company is also eligible for registration subject to meeting the requirements. The Rules prescribe that with effect from 1<sup>st</sup> February, 2019, every valuation required under the Companies Act, 2013



and the Insolvency and Bankruptcy Code, 2016 needs to be conducted by valuers registered with the IBBI.

6. The IBBI performs the functions of the Authority under the Companies (Registered Valuers and Valuation) Rules, 2017. It recognises RVOs and registers valuers and exercises oversight over them. It has published the syllabus, format and frequency of the valuation examination for all three Asset Classes, namely, (a) Land and Building, (b) Plant and Machinery, and (c) Securities or Financial Assets, in consultation with the stakeholders. It conducts computer-based online valuation examinations every day from several locations across the country for all three Asset Classes. It has specified the details of educational course for the three Asset Classes, which a member of an RVO is required to complete before taking the valuation examination.

7. The international market is offering a large variety of books and training programmes for individuals wishing to become valuation professionals or provide any service in the valuation chain. However, there is a dearth of quality study material and faculty in Indian context. It is necessary to supplement the efforts of RVOs and the registered valuers - existing and prospective - by making available quality study material relevant to Indian context.

8. The Centre for Valuation Studies, Research and Training Association (CVSRTA) has developed this study material as per syllabus of the valuation examinations for two Asset Classes, namely, Land and Building and Plant and Machinery. I compliment the CVSRTA, and the Authors, Subject Editors and Language Editors for putting in very hard work to prepare such comprehensive study material for the benefit of valuation profession. I thank the CVSRTA for its offer to place this study material on the website of the IBBI for free download by users. I am sure, this study material will greatly support development of the fledgling valuation profession in the country and will be useful to those who wish to learn the subject, practise as a professional valuer or provide any other service in the valuation chain. It will motivate more inquisitive minds to delve deeper into various aspects from an interdisciplinary perspective, enriching the Indian literature on valuation in the days ahead.

9. The IBBI, however, does not recommend any reader to use this study material for any purpose, including preparation for valuation examinations, or any person to take any action or decision, commercial or otherwise, by using this study material. It urges the reader to do her own research and / or seek professional guidance as she may consider necessary for her purpose, while using this study material.

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Registered under Society's  
Registration Act, 1860,  
Maharashtra State, Mumbai  
under no. 816/2010, G.B.B.S.D.  
dated 30/03/2010

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Centre for Valuation Studies, Research and Training Association (CVSRTA) considers itself privileged to prepare the study material for the examinations in the disciplines of Land and Building as well as Plant and Machinery conducted by the Insolvency and Bankruptcy Board of India (IBBI) which will be beneficial to professionals in India.

CVSRTA is thankful to IBBI for giving an opportunity to prepare the material.

Kirit P. Budhbhatti  
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First Edition December 2018

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# PLANT AND MACHINERY

## SUBJECTS PRESCRIBED

- PRINCIPLES OF ECONOMICS
- BOOK KEEPING AND ACCOUNTANCY
- LAW – GENERAL (study material under preparation)
- INTRODUCTION TO STATISTICS
- ENVIRONMENTAL ISSUES IN VALUATION
- PROFESSIONAL ETHICS AND STANDARDS
- VALUATION OF PLANT AND MACHINERY
- LAW – PLANT AND MACHINERY
- PRINCIPLES OF INSURANCE AND LOSS ASSESSMENT
- INDUSTRIAL PROCESSES
- REPORT WRITING
- CASE STUDIES

Efforts to make the study material of Plant and Machinery is concentrated for those subjects which are generally not easily available in public domain. For common subjects like Valuation of Plant and Machinery, Various Approaches for Plant and Machinery Valuation, General Process needs to be adopted for Valuation, Leasing of Plant and Machinery, Case Laws, Report Writing, etc. are to be referred from following books:

- *Valuation on Plant & Machinery (Theory & Practice)* by Kirit P. Budhbhatti
- *Real Estate Valuation in Practice* by Kirit P. Budhbhatti
- *Writing a Report* by P. T. Hardikar
- *Valuing of Machinery and equipment, The fundamentals of appraising machinery and technical assets - 3<sup>rd</sup> edition* by ASA

# PRINCIPLES OF ECONOMICS

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## **ACKNOWLEDGEMENT**

Centre for Valuation Studies, Research & Training Association (CVSRTA) is thankful to the author of this subject Mr. Sunny Thomas for preparing the study material, editing the same and also surrendering his right in favor of CVSRTA to get copyright in favor of CVSRTA. CVSRTA is also thankful to Dr. Wahida Thomas for rendering the service as subject editor.

Kirit P. Budhbhatti

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## UNIT – I

### DEFINITIONS AND CONNOTATIONS

#### 1.1 INTRODUCTION

Economics can be divided into three parts, namely, descriptive economics, economic theory, and applied economics. In descriptive economics one collects together all the relevant facts about a particular phenomenon. While economic theory or analysis gives a simplified version of the way in which an economic system functions. Applied economics takes the framework of analysis provided by economic theory.

There are three broad assumptions namely assumptions regarding behaviour of individual. Economists are concerned with people as consumers and as businessmen. When economists discuss the actions of consumers, they assume that they behave rationally. It means that they try to maximize their satisfaction with minimum possible expenditure. In the same manner, economic theories assume that the businessmen try to maximize their profits. It is their economic rationality.

The second group of assumptions is about the physical structure of the world i.e. natural conditions. They always remain to be given. It is these conditions give rise to economic problem because resources are limited in relation to their demand. Therefore, goods and services are scarce in supply. The scarcity of resources leads to economic system and economic problem. What is worse is that the scarce resources have alternative uses. This makes all the more difficult for human being to solve economic problems.

The third group of assumptions relates to social and economic institutions. Under this group of assumptions, comes political stability. Without which neither consumers nor producers attain their goals. For economic prosperity, political stability is a must. Applied economists are often concerned with 'test' theory studying statistical and other evidence to discover if it appears to support particular economic theory. Hence, economics is concerned with a study of one of the aspects of human beings. It enquires into how a human being gets his income to satisfy his unlimited wants with limited means. It deals with day-to-day activities of human being relating to his efforts of maximizing his satisfaction. Therefore scope of economics centers around wants – efforts – satisfaction.

Economic problem begins with human wants and ends with satisfaction of those wants. Economics is concerned with every human being poor as well as rich. In nutshell it could be deduced that science of economics enquires into how a consumer attains his income and spends it in order to achieve maximum satisfaction with minimum efforts or expenses.

## 1.2 DEFINITION OF ECONOMICS

A good number of definitions of economics have been numerated but we shall be dealing with three main definitions given by Adam Smith who is considered to be the father of economics, Dr. Alfred Marshall and Prof. L. Robbins.

Adam Smith called economics as “Science of Wealth”. He emphasized wealth because in days of Adam Smith monarchy was in existence. The kings were interested in amassing wealth for their military operations. Hence, Adam Smith emphasized wealth. He paid attention exclusively to wealth. He totally neglected role played by man. Wealth has no significance if there is no man to make use of it. Wealth attains importance if it is considered in relation to man because wealth is not be all and end all of human life. It is simply a means to end and the end being the maximum welfare of the society.

According to Dr. Alfred Marshall “Economic is a study of man’s actions in the ordinary business of life; it enquires how he gets his income and how he uses it – Thus it is on one side a study of wealth and on the other, and more important side a part of the study of man.”

Dr. Marshall in his definition of economics makes it clear that in economics how human being earns his living by earning income and spending it for maximization of his welfare. Marshall shifted emphasis from wealth to man. Production of wealth and using it for his welfare is stressed by Marshall. Thus Marshall’s definition covers consumption, production, exchange and distribution. Marshall pays more attention to material welfare of man which is obtained by using economic resources rationally. Thus, Marshall accords secondary position to wealth. Economics concerns with ordinary men and women who are motivated by maximum advantages that is welfare. He holds that it is a social science which studies individual behaviour also. It is therefore economics ignores non-material aspects.

However, Marshall's definition is criticized by Prof. Lionel Robbins on the following grounds:

1. It is classificatory.
2. It is concerned with material welfare alone narrowing the scope of economics.
3. Marshall's definition totally neglects the non-material services.
4. No clear-cut distinction is made between ordinary business of life and extraordinary life.

Wealth and welfare cannot go together. Wealth like poison does not increase the welfare. Non-material things like love and affection also raises the human welfare, which Marshall totally neglected. Moreover concept of welfare is subjective. It varies from person to person, time to time and place to place. The term welfare may land us in the domain of ethics. Prof. Lionel Robbin held that economics is neutral between wants. Economics is not concerned with the causes of material welfare as such. It is for this reason Robbins held that Marshall's definition is narrow, classificatory and unscientific.

### **1.2.1 LIONEL ROBBIN'S DEFINITION**

"Economics is a science that studies human behaviour as a relationship between ends and scarce means which have alternative uses."

The following are the four pillars of Robbin's definition:

1. Economic is a science that studies economic aspect of man's life. From the social point of view, it is a normative science but from individual point of view, it is positive science.
2. **Wants unlimited**  
Human wants are unlimited. It is not possible to satisfy them all because means are limited. If one want is satisfied another crops up. Man is such an animal that he is never satisfied. He tries for variety and plenty. This applies to his all wants. Besides his basic wants, he wants to have a number of things such as comforts and luxuries. Since human wants are countless, as a rational being he or she has to be selective ones. He chooses to satisfy most urgent wants first postponing the satisfaction of less urgent wants. Hence, human wants are be all and end of all of economic activities.



3. **Limited means**

Though wants are unlimited, means to satisfy them are limited. Moreover they have alternative uses. That is why economic problem arises, because all goods are not free goods. That is why goods are paid to obtain them. Scarcity of resources gives rise to economic problem because these resources have alternative uses either for this or that. But one must know that it is not the absolute scarcity. It is in light of demand for it, is to be considered. For example rotten egg may be scarce in supply but since nobody demands it, it is plentiful in supply. Hence scarcity be considered in relation to demand only.

4. **Alternative uses of resources**

Means or resources are not only limited but they have alternative uses also. It means that they can be put to number of uses. Had they possessed fixed and specified use, economic problems would not have arisen. But multiplicity of uses of scarce means makes things all the more difficult. Hence, scale of preference of uses is to be made. Most urgent wants are to be satisfied first. In case of less urgent wants, satisfaction is postponed. This means that a rational choice is to be made between wants. Hence multiplicity of wants, scarcity of means and their alternative uses give rise to economic problem. Thus, L. Robbins held that economics tells us how a man makes use of his scarce resources having alternative uses for the satisfaction of his countless ends. Hence it involves choice making it all the more difficult that is why economics is called as a science of choice.

**1.2.2 Superiority of Robbin's Definitions**

Prof. L. Robbins definition of economic preferred to all other definitions. It is called as scarcity definition. It is considered to be scientific definition because it is independent of any classification. Secondly, all types of wants social as well as individual fall within the domain of economics. Thirdly, it has a widened the scope. Marshall had restricted it only to wealth and activities related to the material welfare of man. Fourthly, Robbins held that economics is only science and not arts. Lastly it is also held that economics is neutral between wants. It does not consider moral – immoral consideration. It is for the consumer to make rational choice between wants. This makes economics is a positive science.

### **Limitations**

Robbins definition though it is widely accepted and more scientific yet it is considered to be colourless, impersonal and neutral between wants. However, from the social point of view, economics cannot keep aside its normative appearance. The job of economics is also to advocate and condemn.

It also appears that L. Robbins has reduced economics only to valuation theory. Economics not only touches upon resource allocation or price determination but also study how the national income and employment are determined. Thirdly, Robbins definition does not cover theory of economic growth or development which has become an important branch of economics. The theory of economic growth deals with growth of economy but according to Robbins resources are given. He only discusses their allocation. Further more, Robbins definition does not deal with problem of plenty and also of unemployment. According to Robbins economics studies only the problem of scarcity. It also lacks human touch. L. Robbins made economics more abstract and complex making it more difficult. Hence it goes away from its utility for the common man because it must be concrete and realistic study.

### **1.2.3 Modern Views**

Of late economic thinking has gone a long way. Lionel Robbins held that economics is concerned with multiplicity of wants and scarcity of resources having alternative uses. But in modern times, it is held that economics is much more than merely a theory of value and allocation of resources. It was Lord J.M. Keynes who brought about a change in economic thinking by advocating government participation in economic development of the country. Now economics is looked upon as the study of the administration of limited resources and of the determinant of employment and income. Thus, besides, theory of value, it studies how the levels of income and employment are determined. It means that modern economics studies the causes of economic fluctuations in order to achieve economic stability. In other words economics studies the factors affecting the size, distribution and stability of country's national income.

Second half of the twentieth century, saw growth theories occupying important place in the study of economics particularly with reference to poor countries. Therefore, one can conclude that a satisfactory definition of economics is one which includes in it theory of income, employment and growth in addition to theory of value or resource allocation.

### 1.3 Scope of Economics

Scope of economics as stated earlier is wants, efforts and satisfaction. Economics begins with human wants and ends with satisfaction of those wants. Man undertakes efforts to satisfy his innumerable wants. It studies only one aspect of man's life. All activities of man are centred around the satisfaction of his wants. Economics is concerned with satisfaction of wants. It is a social science and therefore tries to find out solutions to social problems like unemployment of natural resources, raising national income through planned economic development. Acceleration of economic growth has become main thrust of economic development in these days.

Economic is a science. Science is defined as a systematized body of knowledge. Economics, too, has its rules, regulations and laws in which it binds itself. Now, the question is whether economics is a positive or normative science. Positive science is one which deals with the facts as they are while normative science is one which deals with the facts as they should be or ought to be. Positive economics attempts to describe and analyze the existing situation rather than suggesting how to change it. But many times economists do often make normative statements. Instead of explaining how the economy actually operates, they suggest, how it should operate. Especially, where problems of the economy are concerned, economists abandon the objectivity of positive economics and make normative statements. It is in this context, that we suggest what the government's economic policy ought to be. How government should act to raise the level of employment etc. Physics, chemistry, geology and biology are the positive sciences as they deal with the facts as they are while social sciences like economics, psychology, sociology, political science etc. deal with the facts as they should be. Thus, economics is both positive as well as normative science. While dealing with individual economic problems, it is a positive science and while dealing with social problem it becomes normative science.

The study of economics incorporates it in its scope, consumption, production, exchange and distribution of natural resources. It concerns with economic growth leading to raising national income and its equitable distribution along with balanced economic development. Now-a-days economics' scope is widened so much that maximization of economic welfare has become the main goal of the economic activities.

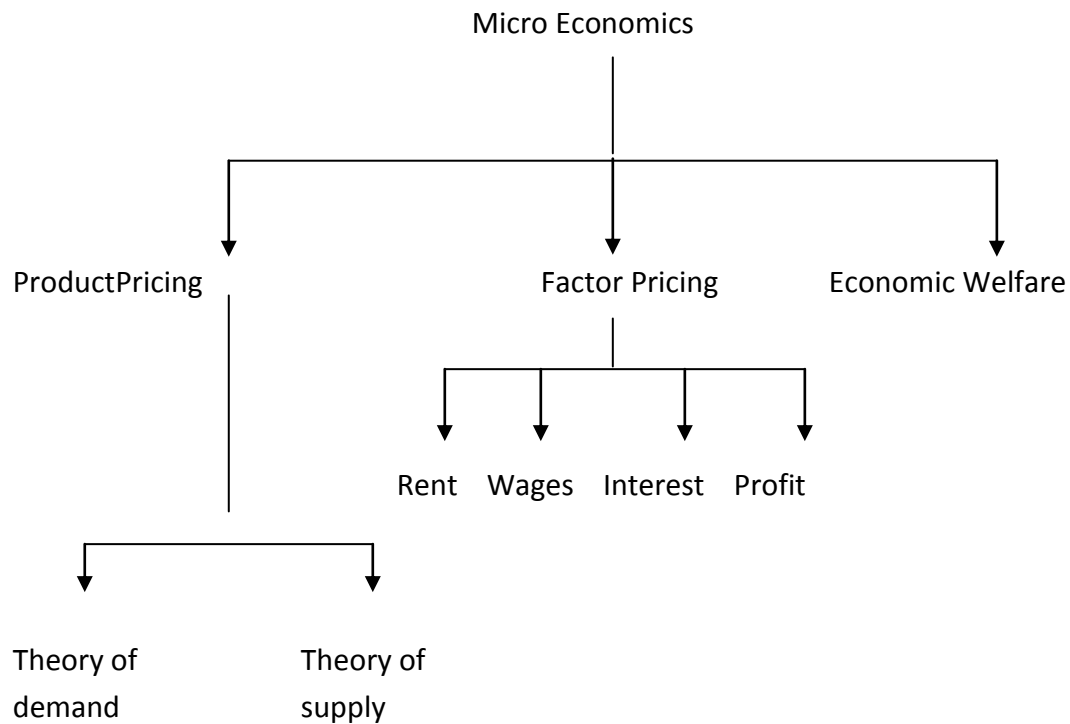
The knowledge of economics has gone so far that it reached a stage when its facts have been collected and carefully analyzed and laws or general principles explaining to facts have been laid down. This makes economics a positive science.

It is also considered an Art because it lays down and formulates to guide people who want to achieve a certain aim. The aim may be removal of poverty or raising production of goods and services in the country. Economics does help us in solving many day-to-day practical problems. It is not mere a theory. It has great practical use. Therefore, one can conclude that economics is both a science and an art also.

#### **1.4 Micro-Economics**

British Economist named Adam Smith is the founder of micro-economics which deals with individual behaviour such as markets, firms and households. According to Smith, economic benefit comes from the self-interested actions of individuals. K.E. Boulding holds, "Micro-economics is the study of particular firms, households, prices, wages, incomes, industries and commodities, etc.". In micro-economic, we study how the various cells of economics organism namely individual consumers and producers reach their equilibrium positions. In other words, in micro-economics, we make microscopic study of the entire economy. However, it must be noted that the micro-economics does not study the economy in its entirety, instead under this branch of economics, we study equilibria of thousands of units of the economy. Prof. Lerner rightly observes, "Micro-economics consists of looking at the economy through a microscope as it were to see how millions of cells in the body of economics viz. individuals or the firms as producers play their part in the working of the whole economic organization.





The scope of micro-economics includes in it production, consumption and distribution or any other activity tends to be carried out with the highest efficiency so as to maximize social welfare. It also studies every constituents of the circular flow of income. In other words micro-economics is the application of partial equilibrium analysis to economic problems. Micro-analysis are useful for price determination and allocation of resources, determination of economic policies, international trade, linear programming and optimum utilization of resources.

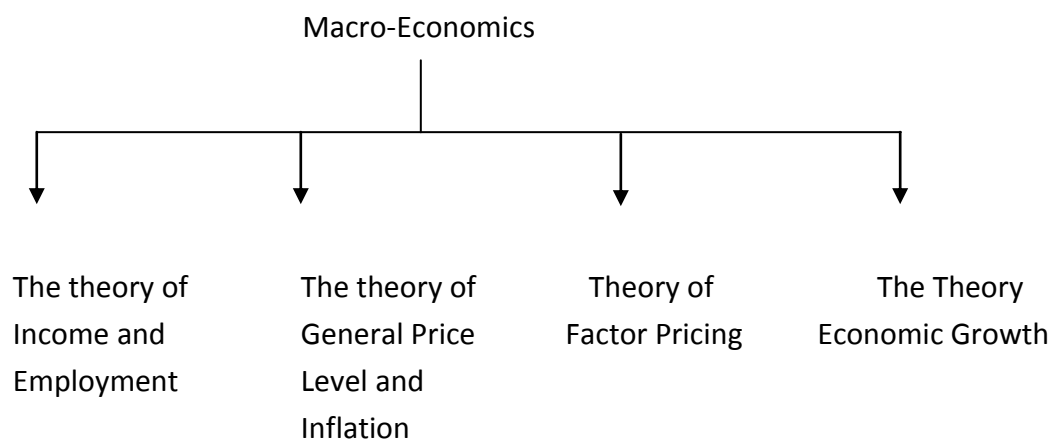
Limitations of micro-economics – it does not throw any light on the collective activity. The analysis is based on unrealistic assumptions which may result into doubtful conclusions.

## 1.5 Macro-Economics

It deals with aggregates. It is concerned with total demand, supply, output, income and so on. Hence macro-economics is a study of aggregates and averages. It is the study of economic system as a whole. It directly concerns with relations among large aggregate such as national income, general price level, total output, consumption, employment, savings, investment, demand and supply. These relations indicate the behaviour of economic system as a whole. J.M. Keynes holds that macro-economics concerns itself with those aggregates which relate to the whole economy.

Prof. Paul Samuelson rightly remarks, "There is really no opposition between micro and macro economics. Both are absolutely vital; and you are only half educated if you understand one while being ignorant of the other."

The scope of macro-economics is very wide and it assumed added importance since the publication of J.M. Keynes, General Theory of Employment, Interest and Money in 1936. It is considered to be policy making economics. The study of macro-economics includes, the theory of income, employment, general price level, theory of factor pricing, economic growth and inflation and deflation.



### **Importance of Macro-Economics**

1. The study of macro-economics enables the government to frame the correct and effective economic policy.
2. It proves to be more helpful in economic planning.
3. It helps developing micro-economic theories.
4. It also enables one to have international comparison.
5. Lastly it is absolutely essential to have knowledge of macro-economics to make correct decisions.

### **Limitations**

Use of macro-economics analysis complicates the process of the study of prices, savings, investment, factor pricing etc. Secondly all aggregates are not identical and therefore macro-study will become rather difficult. Thirdly, statistical data and techniques are the soul of the study of macro-variables. Therefore, if reliable data is not available decisions based on such data proved to be wrong. In the fourth place, it cannot be said that only one variable is affected from the changes leaving all other variables unaffected.

According to Prof. K.E. Boulding, “Micro-economics follows the method of slicing whereas macro-economics uses the method of humping.”

### **1.6 Connotations**

If we probe a little deeper, however, we find that economics is really not so much about money as about some things which are implied in the use of money. Three of these – exchange, scarcity, and choice are of special importance. Let us take them in turn.

### **1.6.1 Exchange**

Money implies exchange. It is in fact the medium of exchange. In a primitive community, where exchanges are rare, we can dispense with money and resort to direct barter. Money is unnecessary so long as we are at the stage of trying to satisfy all our wants by our own efforts, growing our own wheat, milling our own flour, baking our own bread, and only now and again exchanging, say, wheat for a ploughshare or a calf for a millstone. But immediately we begin to specialize, and cease to produce goods for our own use, money becomes indispensable if exchanges are to take place smoothly. Exchange becomes triangular – we convert goods into money and money into other goods, instead of simply bartering goods for goods. If exchanges did not take place in this apparently circuitous way, no one who specialized in making bricks or bowler hats would relish a morning's shopping. The grocer might have no use for bricks, and match-sellers would hesitate to accept the hundredth part of a bowler hat. A walletful of money goes so much further than other walletfuls!

Nowadays, therefore, exchange rarely takes the form of direct barter. Instead, we do business with money. We buy what we want with money, sell for money, fix prices in terms of money, are paid our wages, salaries, or dividends in money, save money, and measure our wealth in money. But the problems which present themselves to us in terms of money are exactly similar to the problems raised by direct barter. There is a surface difference between money-exchange and barter-exchange, but no difference in principle. Economics, therefore, does not limit itself only to money-problems but studies exchange-problems of all kinds. It is, in fact, about exchange rather than about money, for exchange underlies the use of money.

#### **Exchange Implies Interdependence**

When one exchange, we have stopped being self-sufficing and have become dependent in those from whom we buy and to whom we sell. Our fortunes are linked with theirs. If they are poor or unemployed then we are likely to be in danger of poverty and unemployment ourselves. Famine and flood in one part of the world can create scarcity and distress thousands of miles away by cutting off supplies of foodstuffs and raw materials. We are all within the circle of exchange. Yet this interdependence rarely occurs to us : it is so easy to overlook the implications of exchange.



Consider, for example, some everyday event like the purchase of a packet of cigarettes. I take from my pocket a small piece of metal – probably Mexican silver alloyed with Canadian nickel – and offer it to a total stranger who accepts it with alacrity. In exchange, I receive a cardboard packet whose contents are the product of workers from all over the globe – Norwegian lumbermen, Turkish peasants, Malayan tin-miners, American inventors. I draw also on the services of British workers scattered over the country. The packing of the cigarettes has been done in Bristol; the cellophane wrapper and silver paper come from London; the paper round the cigarettes from Swindon; the stiffener, or cigarette card, from Glasgow. But about all these workers, through whose efforts I am able to smoke my cigarettes, I am amazingly ignorant. I do not trouble to inquire whether they include cannibals, racketeers, Jew-baiters; whether they are mean, grasping, or dissolute; or whether their daily earnings are less than 1d or over £100. Their creed, their way of living, their income, the colour of their skin, do not interest me. I can drive my bargain with them without even knowing that they exist. The cash-nexus that binds us is the loosest of bonds. It leaves me free to pursue my own interest, undeterred by any sense of moral obligation to other workers as fellow-citizens. They satisfy my wants and earn the means of satisfying theirs. And that, to most of us, might seem to be the end of the matter.

But not to the economist. It is precisely these exchange-bargains which he sets out to investigate. Why, he asks, do people exchange at all? What advantages does society reap from leaving people free to satisfy their wants by exchange? When exchange is fair and when unfair? Is it in the social interest that exchanges dictated by mutual self-interest should be left unregulated by the State? Or, if regulation is desirable, on what principles should the State intervene?

### **1.6.2 Scarcity**

The use of money implies scarcity. Money itself must be scarce or it will cease to be used. If the supply of money is increased without limit it will soon lose value and in the end no one will accept it. Whatever passes as money, therefore, must necessarily be scarce. So also – and this is the important point – must be the things that money will buy. We only exchange one scarce thing for another. We do not pay for air and earth and water unless somehow they are stinted just as the supply of money is stinted.

The fact of scarcity makes it necessary for us to economise, i.e., to make the most of what we have. We have constantly to be counting the cost, weighing up alternatives, and going without one thing so as to be able to buy more of another. Nominally it is money that we economise, for what we have to decide is whether to spend money on this or on that. What we are really doing, however, is to economise the things that money will buy. We try to buy, with our limited income, the collection of goods and services which gives us most satisfaction. We are faced with the fact that these goods and services are scarce, and we have to accommodate this scarcity as best we can to our wants and needs. Similarly, in earning money we have to husband our scarce time and energy in order to obtain as large a return as possible (in money or in amenities and personal satisfaction) for our efforts. On some men, of course, the pressure of scarcity and want bears harder than on others. On the millionaire, for example, the pressure is negligible; he can almost always neglect considerations of cost. But for others the necessity of making ends meet enforces constant self-denial.

### **1.6.3 The Economic Problem**

What is true of each of us is true also of society as a whole. There is an economic problem of making the *social* income go as far as possible. The goods produced and services rendered in any country in the course, say, of a year, are limited in amount and insufficient to maintain a standard of more than moderate comfort if equally distributed amongst the inhabitants of the country. The goods and services at the disposal of the country in other words, are scarce in relation to the demand for them. There are very few things that can be provided free of charge, even in a rich country. We can make as much use as we like of public libraries and parks and roads. But we cannot help ourselves to books and motor-cars, much less to food and clothing. The more of one thing is offered to us, the less can we have of other things. We cannot have more of all simultaneously. If A is free, B will be all the dearer. The provision of free motor-cars, - for example, would lead to an expansion of the automobile industry and the transference to it of engineers, materials, and machinery from a host of other industries. Motor-cars would be more abundant; but other things would be scarcer. Only if we set a very high value on motor-cars (like the value which we set on good roads, or schooling, or health services) will we be prepared to face the cost of offering them free.

This balance between value and cost is forced on us wherever we are faced with a shortage of supplies relatively to our wants. The things which we value highly and which cost little to produce will be provided first and in large quantities. What costs a great deal and is of comparatively little value will not be produced at all. We have to decide what commodities, and how much of each, to produce; and our decision will rest upon our estimates of cost and value. The decision is one that must be taken in every society, whether it be Russia or the United States, Italy or Malaysia. The way in which the decision is taken, and the kind of people who take it, are, of course, very different in different countries. The responsibility may rest with a bureaucracy or with the mass of “consumers.” One country may have a State Planning Commission; another may rely on the laws of supply and demand. Whatever the economic system, the decision is one that cannot be avoided. There is an economic problem which has to be solved by dictatorships and democracies, “planned” and “unplanned” societies alike. Want and scarcity are universal, and so, too, is the problem of accommodating the one to the other.

In some countries the problem may be solved more satisfactorily than in others. But there is no question of one social system bringing plenty and another condemning us to scarcity. Man’s wants are insatiable, and there would continue to be scarcity under any social system. If, for example, we all had twice as large an income as at present – an advance which could not be brought about immediately by any conceivable change in our social system – the annual income of the average British worker would still be under £600, and from this sum a large slice would be taken in taxation, and a further slice would have to be put aside as savings. Such an income would probably fall short of the aspirations of most people and could be reached only by exertions which would be decidedly irksome. The conflict between scarcity and want would continue to be felt.

Scarcity, like exchange, raises problems for the economist. He tries to formulate the principles on which our limited productive resources can be used to the fullest advantage. He studies how unemployment, for example – an obvious waste of labour power – can be reduced or eliminated; how the community’s savings can be made to find their way into productive investments, how the land can be cultivated in the best interests of society. He studies; too, on what principles we should allocate resources between different industries so as to produce a maximum of all commodities in the right proportion of each; and how the output of commodities should be distributed between those who help to make them.

These are problems which cannot be confined within the narrow bounds of pure economics. They extend into politics, ethics, and even religion. But we can get a better view of them from the heights of economic theory than from any other standpoint. Since this better view will still be coloured by our personal convictions, it will not of itself remove differences in outlook. But it will give us a wider perspective and open our eyes to the more remote implications of our problems.

#### **1.6.4 Choice**

The use of money also implies choice. We have to choose between the many claims on our purse when we spend money, and between the many uses to which we might put our time and energy in earning it. We cannot spend the same evening in the cinema and in the theatre. We must choose one form of entertainment or the other. We may have to choose, also, between spending an extra shilling or so on a seat and spending the same shilling later on cigarettes.

Our choice, of course, is not always made rationally. That is, we do not always weigh up carefully the possible ways in which we might spend our money. We are much more lighthearted and irrational in buying sweets, for example, than we are in renting a house. We buy, very, often, impulsively or through habit or force of example. Or we may buy because our “sales resistance” has crumpled at the sounding of some advertiser’s trumpet. It is irrational to pay more than is necessary for a thing; and yet hardly a day passes but we buy goods without asking their price, or cannot be bothered to look for cheaper brands. We do not take the trouble to find out where prices are lowest; or we take excessive trouble to save a trifling sum, like the wealthy man who walks to save a penny fare. We do not budget for so much on clothes, so much on amusements, so much on food, so much on our savings account, and so on, but spend haphazard so long as the money lasts. Or at least that is what large numbers of us do.

Perhaps, however, the careful housewife – and the tradition amongst economists are to think of housewives, as the persons who hold the purse-strings – is more rational in her buying. The economic woman may be less of an abstraction than the economic man!



The way in which we make a choice is of great importance to the economist. For he cannot tell how much weight to place on the preferences expressed in the spending and earning of money until he knows how far these preferences are *rational* (i.e., based on full knowledge and formed after reflection). If for instance, people persist in buying an expensive brand of cigarette it is important to know whether they buy it out of a liking for that particular brand or because they are ignorant of cheaper brands with the same flavour or because of snob-appeal in the advertisements. Until the psychology of cigarette-smokers is explained to us, we cannot say whether the production and the sale of these high-priced cigarettes involve a social waste. If smokers are rational there *may* still be a waste (for instance the price may be kept high by a monopoly). But if they are irrational, there is certainly a waste; they are paying more than they would if they were in possession of all the facts.

In economics we begin by assuming that choice is rational. The so-called “economic man” is simply one who is completely “rational” in satisfying his wants, and pays no regard to the interests of others. It is, of course, an abstraction from the facts to assume that men are self-interested and rational. But to make this kind of abstraction is the only satisfactory procedure open to us. If we assume that people are self-interested and rational, we can predict how they will behave given a certain monetary inducement, and we can work out an analysis of action and reaction.

For instance, if similar goods are on sale at different prices, or similar jobs advertised at different rates of pay, we know that men will, other things being equal, purchase the cheaper goods, and apply for the better-paid job. If we could not make such generalizations, if men were quite irrational, then we should never “get anywhere” in economics. So we begin by assuming that choice is deliberate and rational, without, however, overlooking the part played by impulse, custom, and inertia. Later, we may study the psychology of choice more closely; analyzing what shapes our expectations and desires, and sifting what is basic in our wants from what is superficial or conventional. But to begin with, we ignore these difficulties, take people’s desires for granted, and assume that choice is rational.

In the economic system as we know it, choice rests largely with the individual. His preferences go to determine what is to be produced and what is not. Every penny spent on A is a vote in favour of the production of A; every refusal to buy B is a vote against the production of B. It is the free choice of individual consumers between the goods, competing on the market that determines what industries can carry on at a profit. The industries that cannot show a profit are not carried on at all. Those that show excessive profits attract competition and expand until people's wants – as indicated by the price which they are prepared to pay – are more adequately met.

That is, if competition is possible and effective. But if some commodity is monopolized, consumers may be powerless to get what they want (and will pay for) in the proper quantity. They show their readiness to cast votes for more of the commodity by offering high prices for it. But the election is disregarded. No one is willing to stand against the monopolist. So he is able to preserve an excessive scarcity by keeping people out of his line of business. He makes things scarcer than people want them to be and earns high profits by doing so.

Thus a country like ours does not deliberately decide what industries fit best with its advantages and needs and on what scale they should be carried on. The decisions that might otherwise rest with a central planning authority take shape instead in the market. One industry expands and another contracts as consumers alter their preferences and purchases. The scarce productive resources of the community are not always rationed between the different industries by some Planning Commission. They flow into the channels lubricated by the expenditure consumers.

But is it desirable that the individual should retain so much freedom of choice? What if consumers are irrational or incapable of judging between competing goods? Would it be better to appoint a State Planning Commission with power to decide what kind of goods should be produced and what kind of jobs workers should be encouraged to take up? Should each man's daily rations be assigned to him as the average man's daily work is at present? With whom should choice rest, and through what agencies is it best exercised? Here is another batch of problems for the economist.

Now it is clear that scarcity is more fundamental than exchange. It is, in fact, as a result of our efforts to deal with scarcity (i.e. to economise) that exchange arises. We try to ration our limited means among the innumerable wants that compete for satisfaction and find that we can make our limited means go farther by striking bargains with our neighbours. We give what we have in relative abundance – muscle or brain, professional knowledge or organizing ability – for what is comparatively scarce, what we could not do, or could not afford to do, ourselves. We sell our time and energies and spend our earnings on what others have laboured to produce.

In doing so, we are offering goods or services in which our talents show to greatest advantage (or least disadvantage) for the goods or services which others are specially fitted to produce. We are supplementing our deficiencies – our imperfect versatility, for instance – our of the proficiencies of others.

Not only are we able to draw on the skill of others – skill which we may not possess at all – but we are also able to give our whole energies to a single task – one to which, either through practice or natural bent, we are far more fitted than those who engage in it only intermittently. By exchanging, we are making our efforts go further towards meeting our wants. We are reducing the pressure of scarcity and achieving economy.

## **1.7 SOCIETY'S TECHNOLOGICAL POSSIBILITIES**

Each economy has a stock of limited resources – labour, technical knowledge, factories and tools, land, energy. In deciding *what* and *how* things be produced, the economy is in reality deciding how to allocate its resources among the thousands of different possible commodities and services. How much land will go into growing wheat? Or into housing the population? How many factories will produce computers? How many will make pizzas? How many children will grow up to play professional sports or to be professional economists or to program computers?

Faced with the undeniable fact that goods are scarce relative to wants, an economy must decide how to cope with limited resources. It must choose among different potential bundles of goods (the *what*), select from different techniques of production (the *how*), and decide in the end who will consume the goods (the *for whom*).

### 1.7.1 Inputs and Outputs

The answer these three questions, every society must make choices about the economy's inputs and outputs. **Inputs** are commodities or services that are used to produce goods and services. An economy uses its existing *technology* to combine inputs to produce outputs. **Outputs** are the various useful goods or services that result from the production process and are either consumed or employed in further production. Consider the "production" of pizza. We say that the eggs, flour, heat, pizza oven, and chef's skilled labour are the inputs. The tasty pizza is the output. In education, the inputs are the time of the faculty, the laboratories and classrooms, the textbooks, and so on, while the outputs are educated and informed citizens.

Another term for inputs is **factors of production**. These can be classified into three broad categories: land, labour, and capital.

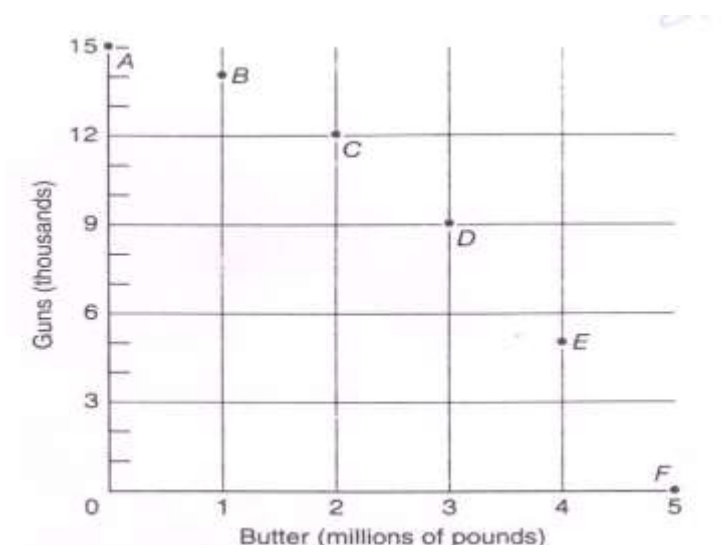
- **Land** – or, more generally, natural resources – represents the gift of nature to our productive processes. It consists of the land used for farming or for underpinning houses, factories, and roads; the energy resources that fuel our cars and heat our homes; and the non-energy resources like copper and iron ore and sand. In today's congested world, we must broaden the scope of natural resources to include our environmental resources, such as clean air and drinkable water.
- **Labour** – consists of the human time spent in production – working in automobile factories, tilling the land, teaching school, or baking pizzas. Thousands of occupation and tasks, at all skill levels, are performed by labour. It is at once the most familiar and the most crucial input for an advanced industrial economy.
- **Capital resources** form the durable goods of an economy, produced in order to produce yet other goods. Capital goods include machines, roads, computers, hammers, trucks, steel mills, automobiles, washing machines, and buildings. As we will later see, the accumulation of specialized capital goods is essential to the task of economic development.

Restating the three economic problems in terms of inputs and outputs, a society must decide –

- (1) *what* outputs to produce, and in what quantity;
- (2) *how* to produce them – that is, by what techniques inputs should be combined to produce the desired outputs; and
- (3) *for whom* the outputs should be produced and distributed.

### 1.8 The Production-Possibility Frontier

Societies cannot have everything they want. They are limited by the resources and the technology available to them. Take defense spending as an example.



**Figure 1 : The Production Possibilities in a Graph**

This figure displays the alternative combinations of production pairs from **Table 1**.

#### Alternative Production Possibilities

Possibilities	Butter (millions of pounds)	Guns (Thousands)
A	0	15
B	1	14
C	2	12
D	3	9
E	4	5
F	5	0

**Table 1 : Limitation of Scarce Resources Implies the Guns-Butter Tradeoff**

*Scarce inputs and technology imply that the production of guns and butter is limited. As we go from A to B ... to F, we are transferring labour, machines, and land from the gun industry to butter and can thereby increase butter production.*

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Countries are always being forced to decide how much of their limited resources go to their military and how much goes into other activities (such as new factories or education). Some countries, like Japan allocate about 1% of their national output to their military. The United States spends 5% of its national output on defense, while a fortress economy like North Korea spends up to 20% of its national output on the military. The more output that goes for defense, the less there is available for consumption and investment.

Let us dramatize this choice by considering an economy which produces only to economic goods, guns and butter. The guns, of course, represent military spending, and the butter stands for civilian spending. Suppose that our economy decides to throw all its energy into producing the civilian good, butter. There is a maximum amount of butter that can be produced per year. The maximal amount of butter depends on the quantity and quality of the economy's resources and the productive efficiency with which they are used. Suppose 5 million pounds of butter is the maximum amount that can be produced with the existing technology and resources.

At the other extreme, imagine that all resources are instead devoted to the production of guns. Again, because of resource limitations, the economy can produce only a limited quantity of guns. For this example, assume that the economy can produce 15,000 guns of a certain kind if no butter is produced.

There are two extreme possibilities. In between are many others. If we are willing to give up some butter, we can have some guns. If we are willing to give up still more butter, we can have still more guns.

A schedule of possibilities is given in **Table 1**. Combination F shows the extreme where all butter and no guns are produced, while A depicts the opposite extreme where all resources go into guns. In between – at E, D, C, and B – increasing amounts of butter are given up in return for more guns.

How, you might well ask, can a nation turn butter into guns? Butter is transformed into guns not physically but by the alchemy of diverting the economy's resources from one use to the other.



We can represent our economy's production possibilities more vividly in the diagram shown in **Figure 1**. This diagram measures butter along the horizontal axis and guns along the vertical one. We plot point *F* in **Figure 1** from the data in **Table 1** by counting over 5 butter units to the right on the horizontal axis and going up 0 gun units on the vertical axis; similarly, *E* is obtained by going 4 butter units to the right and going up 5 gun units; and finally, we get *A* by going over 0 butter units and up 15 gun units.

If we fill in all intermediate positions with new rust-colored points representing all the different combinations of guns and butter, we have the continuous rust curve shown as the *production-possibility frontier*, or *PPF*, in **Figure 2**.

The **production-possibility frontier** (or *PPF*) shows the maximum amounts of production that can be obtained by an economy, given its technological knowledge and quantity of inputs available. The *PPF* represents the menu of goods and services available to society.

### **Putting the *PPF* to Work**

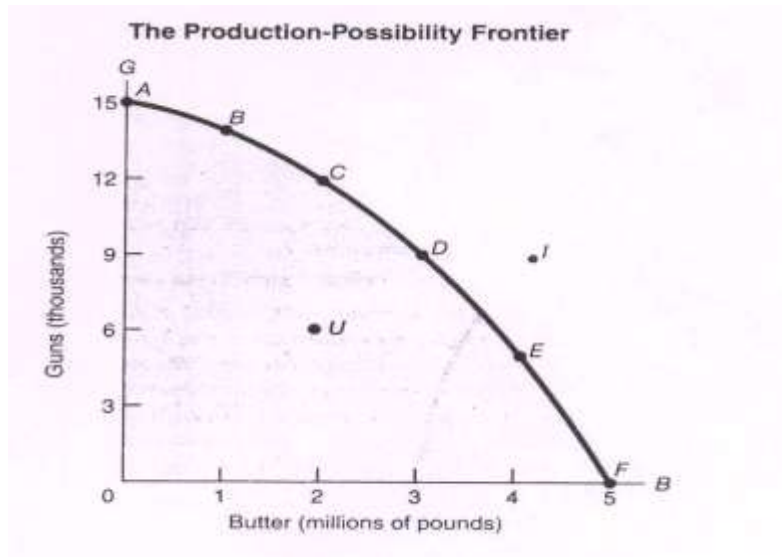
The *PPF* in **Figure 2** was drawn for guns and butter, but the same analysis applies to any choice of goods. Thus, the more resources the government uses to build public goods like highways, the less will be left to produce private goods like houses; the more we choose to consume of food, the less we can consume of clothing; the more society decides to consume today, the less can be its production of capital goods to turn out more consumption goods in the future.

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### **Figure 2 : A Smooth Curve Connects the Plotted Points of the Numerical Production Possibilities**

This frontier shows the schedule along which society can choose to substitute guns for butter. It assumes a given state of technology and a given quantity of inputs. Points outside the frontier (such as point *I*) are infeasible or unattainable. Any point inside the curve, such as *U*, indicates that the economy has not attained productive efficiency, as occurs when unemployment is high during severe business cycles.

1.9



**Exercise :**

1. How would you define Economics? How it is related to human wants?
2. How would you differentiate between Micro-economics and Macro-economics?
3. What do you understand by Production Possibility Frontier? Explain with diagram.
4. Explain the role of exchange, scarcity and choice as issues in economics.

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## UNIT – II

### CONSUMPTION

#### 2.1 INDIFFERENCE CURVES ANALYSIS

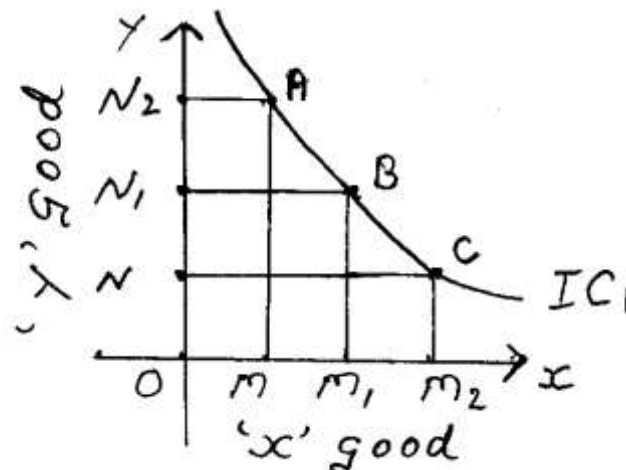
The technique of indifference curves was first used by Prof. Edgeworth, but he used it only to show the possibilities of exchange between the two persons. A decade later Prof. Irvin Fisher of America tried to develop a theory of consumer's equilibrium based on ICs analysis but he did not go beyond substitutes and complementary goods. It is so because they believed in cardinal measurement of utility. Then Prof. Pareto developed his theory of demand based on ordinal measurement of utility. But credit goes to Prof. J.R. Hicks and Dr. R.G.D. Allen of Great Britain of introducing ICs technique in demand analysis. Prof. J.R. Hicks published a book named 'Value and Capital (1939) in which he made use of ICs techniques. This technique is developed to mark an improvement over utility approach. It is based on new assumptions. After having criticized Marshall, J.R. Hicks stated ICs approach based on ordinal measurement of utility. Since, utility is psychic and cannot be measured in cardinal numbers such as 1, 2, 3, 4 etc., Prof. J.R. Hicks and Dr. R.G.D. Allen made use of ordinal numbers like 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> etc. to measure the level of satisfaction since utility is subjective and state of mind.

#### 2.2 What is an IC?

The indifference curve is a conceptual curve at which every point represent the combination of goods at x-axis and y-axis, which would place a consumer at a point of indifference as to which combination to choose. Every combination at each point of the curve gives him the equal satisfaction. That is why he is indifferent to any particular choice and the curve is called indifference curve.

An IC is defined as one which joins all those combinations of two goods such as 'x' and 'y' goods which yield same level of satisfaction to the consumer or which occupy the same position in the consumer's scale of preference. In other words, it is a curve which joins all those combinations of two goods yielding same level or equal level of satisfaction to the consumer. The curve which represents all those points on it which yield equal level of satisfaction is called IC because the consumer is indifferent between the combinations of two goods since they yield him the same level of satisfaction.

The Figure given below depicts the ICs curve yielding equal level of satisfaction from combinations of 'x' and 'y' goods.



The combinations of 'x' and 'y' goods A, B, and C lie on IC, yielding the equal level of satisfaction to the consumer. Though they yield same level of satisfaction the quantity of 'x' and 'y' goods differ at each combinations. As the consumer moves from A to C combination, he consumes more of 'x' and less and less of 'y'. Similarly, when he moves from C to A combination he prefers 'y' to 'x'. It all depends upon his tastes and preferences as to which good is to be consumed more or less.

### 2.3 Assumptions of ICs Analysis

ICs approach is based on following assumptions:

1. Like Marshallian approach the ICs approach also takes the assumption of rationality. Rationality implies that the consumer possesses all the relevant information to make his rational decision of maximization of satisfaction.
2. Ordinal measurement of utility is the second important assumption of ICs. Since utility cannot be measured in objective cardinal numbers like 1, 2, 3, 4 .. 5 etc. because it is psychic, it is to be measured in ordinal numbers such as 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, etc.

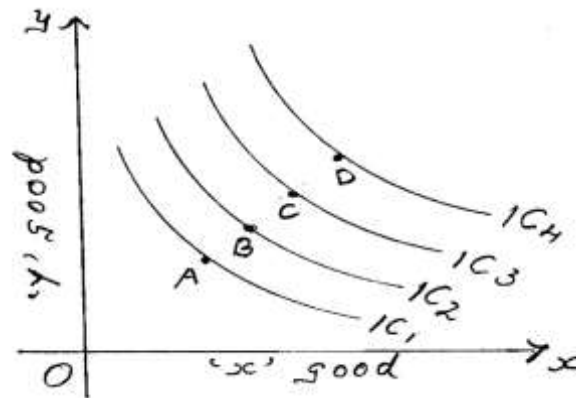
3. Assumption of continuity - This assumption falls under the domain of geometry, yet it forms core of ICs analysis. Continuity implies the consumer is capable of ordering or ranking all the possible combinations of two goods in accordance with satisfaction they yield to him. He can move from low level of satisfaction to a high level of satisfaction provided his money income permits him to do so.
  
4. Assumptions of transitivity - It implies that if the consumer prefers 'A' combination of two goods to B and B to C it means he prefers A to C. Similarly if he is indifferent between A and B. B and C, it means that he is indifferent between A and C. In other words under this approach, the consumer's preference is valid for every successive pairs in the curve.
  
5. The ICs approach is based on weak ordering form of preference hypothesis. Thus, the weak ordering form of hypothesis recognizes the relation of preference as well as indifference. Strong ordering believes in only one relationship and that is preference.

#### **2.4 The Scale of Preference**

The rational consumer always makes his purchases in the light of his scale of preferences. It refers to valuation of goods and services independent of their market prices. In short it involves choices of buying goods and services. Each consumer develops his own scale of preference independent of others. It differs from person to person based on everybody's level of income and tastes and preferences.

#### **2.5 IC's Map**

An IC's map is an important tool of this approach. It represents complete description of the consumer's tastes and preferences. As long as consumer's tastes and preferences remain constant, IC's map also remain constant. It refers to a set of ICs or a family of ICs representing different levels of satisfaction. Each IC represents different level of satisfaction. A higher IC represents a higher level of satisfaction and a lower IC represents a lower level of satisfaction, but how much higher or lower is not indicated because ICs approach is based on ordinal measurement of utility. The scale of preference of the ICs analysis replaces the utility schedules of Marshall's approach. The following ICs map is drawn based on hypothetical tastes and preferences.



ICs No.1, 2, 3 and 4 represent different levels of satisfaction. Hence combination 'A' represents the lowest level of satisfaction while 'D' represents the highest level of satisfaction.

## 2.6 Price Line or Budget Line

Price line represents the money income of the consumer given the prices of goods and services. Prices of goods and money income are the two constraints of the price line. If the money income changes (rise or fall), prices remaining constant price line shifts upward or downward as the case may be. If the prices change, money income remaining constant, price line still changes. Price line is also called as the budget line because it provides various opportunities to the consumer costing the same money expenditure.

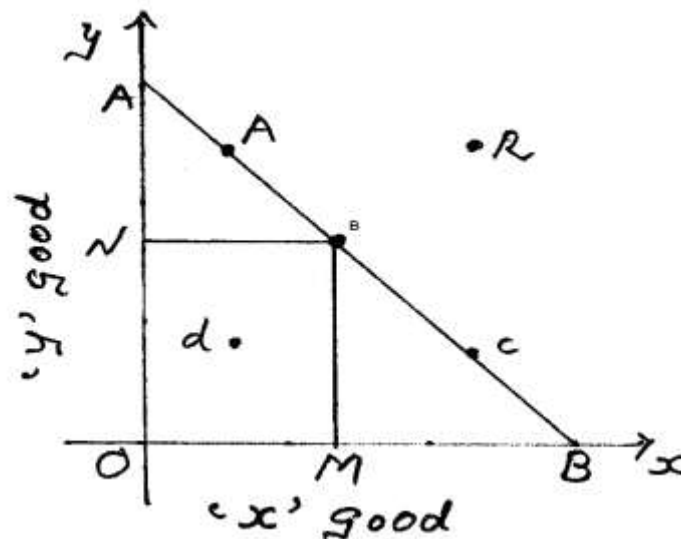
### Assumptions of Budget Line

1. Prices of goods and services are given and remain constant through out.
2. The consumer tries to maximize his satisfaction with given money income and set of prices of 'x' and 'y' goods.
3. He has limited income which he spends on 'x' and 'y'.
4. Tastes and preferences of the consumer remain constant.
5. Goods are divisible and their units are homogeneous.

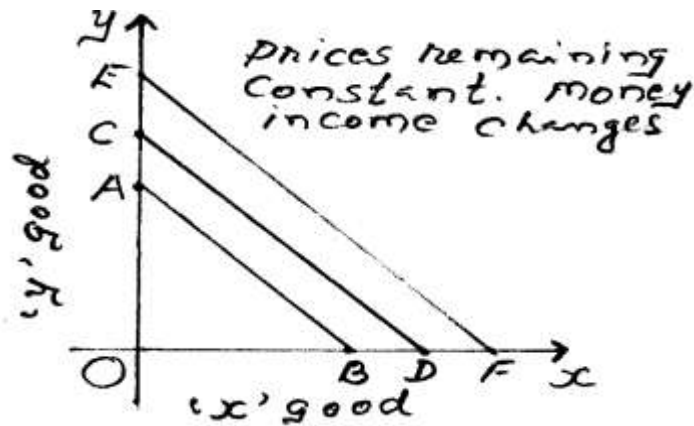
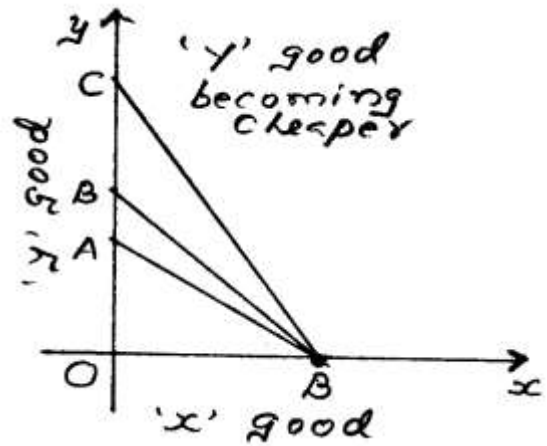
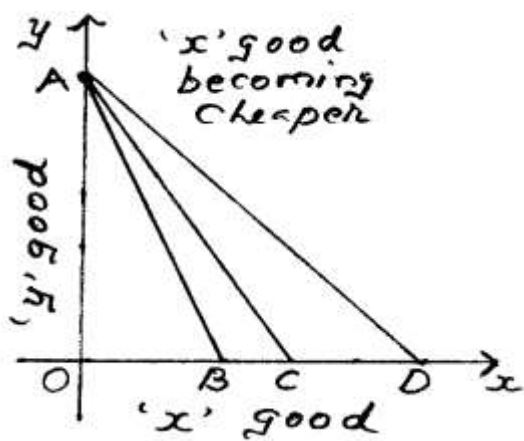
Given the above assumptions, the consumer has to choose that combination of 'x' and 'y' goods which will lie on the given price line. Any combinations lying on the same price line, will cost the consumer the same money expenditure though quantity of 'x' and 'y' goods is different at different combinations.



The consumer cannot choose any combination beyond AB price line because his limited money income does not permit him to do so nor he would choose any combinations inside the  $\triangle AOB$  because in that case he may not be spending his entire money income. Therefore, he would choose that combination which would lie only on price line AB. In the graph, it is shown the consumer chooses B combination which gives him maximum satisfaction with the given money income. He does not choose either A or C combinations because in that case he may not be spending his entire income. At the same time combination R is beyond reach of the consumer. 'd' combination does not allow him to spend his entire income. Hence, it is out of question. That is why he chooses B combination which gives him maximum satisfaction and permits him to spend his entire income on 'x' and 'y' goods.



The price line shifts if prices of goods change or money income changes prices remaining constant. The following three diagrams depicts the position of the price line.



The slope of the price line is measured and always equal to price ratio of both the goods.

$$\text{The slope of price line AB} = \frac{AO}{OB} = \frac{P_x}{P_y}$$

## 2.7 Consumer's Equilibrium

A consumer is said to be in equilibrium when he is buying such a combination of two goods as leaves him with no tendency to rearrange his purchases. In other words, he would choose that combination which would give him the maximum satisfaction with the given money income and prices of goods and services.

### Assumptions

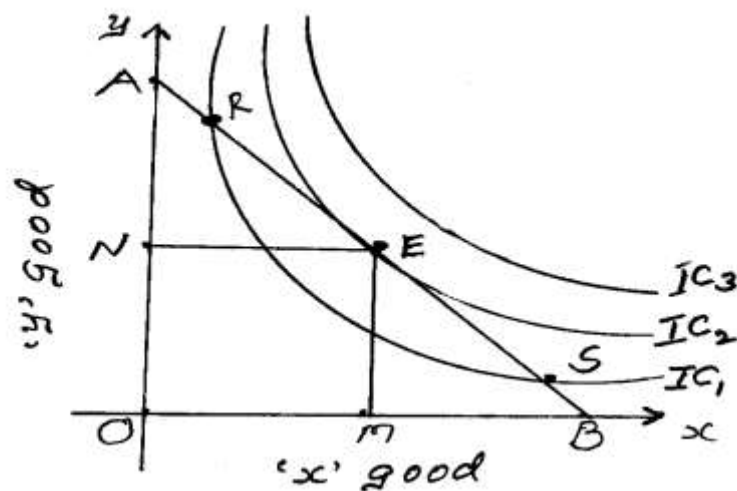
1. The consumer has his IC map exhibiting his scale of preference
2. The consumer has limited money income which he spends on 'x' and 'y' goods.
3. The consumer is rational. It means that he knows market conditions. He tries to maximize his satisfaction.
4. Goods are divisible and their units are identical.
5. Prices of goods are given and they remain constant.

### Conditions for Equilibrium

1. The consumer would attain his equilibrium at a point where price line is tangent to the highest possible IC. In other words, the slope of the price line and IC curve must be the same at the point of equilibrium. The slope of the price line is represented by the ratio of prices of goods i.e.  $\frac{P_x}{P_y}$  while slope of the IC is represented by  $MRS_{xy}$ .

Thus at the point of equilibrium 
$$= \frac{P_x}{P_y} = MRS_{xy} \text{ or } MRS_{xy} = \frac{P_x}{P_y}$$

2. The second condition is that IC curve must be convex at the point of equilibrium, then only satisfaction of the consumer would be maximum. This is depicted in the following diagram:



### Marginal Rate of Substitution (MRS<sub>xy</sub>)

MRS between two goods is an important tool of ICs analysis. It refers to the rate at which one good is substituted for another at margin without altering the level of satisfaction. Thus, MRS<sub>xy</sub> represents the amount of 'y' good which the consumer has to give up for the gain of one more unit of 'x' good so that his level of satisfaction remains the same. The MRS between two goods always falls as the quantity of one good is increased.

The consumer is in equilibrium at 'E' point where IC<sub>2</sub> is tangent to the price line AB. The consumer buys ON quantity of 'y' good and OM quantity of 'x' good maximizes his satisfaction. At 'E' point both conditions of equilibrium are fulfilled i.e.  $MRS_{xy} = \frac{P_x}{P_y}$  and also MRS<sub>xy</sub> is declining or IC<sub>2</sub> is convex to the origin. That is why the consumer is in equilibrium at 'E' combination. He is not in equilibrium at 'R' point because it is here  $MRS_{xy} > \frac{P_x}{P_y}$  and in case of 'S' combination  $MRS_{xy} < \frac{P_x}{P_y}$ .

Combinations 'R' and 'S' place him on lower IC. Therefore, the consumer is permanently in equilibrium at 'E' point where both the conditions of equilibrium are fulfilled.

The equality between  $MRS_{xy} = \frac{P_x}{P_y}$  is essential condition for equilibrium but not sufficient condition. The sufficient condition is that at the point of equilibrium MRS<sub>xy</sub> must be falling or IC must be convex to the origin. Then only the consumer would be maximizing his satisfaction.

## **2.8 Income Effect**

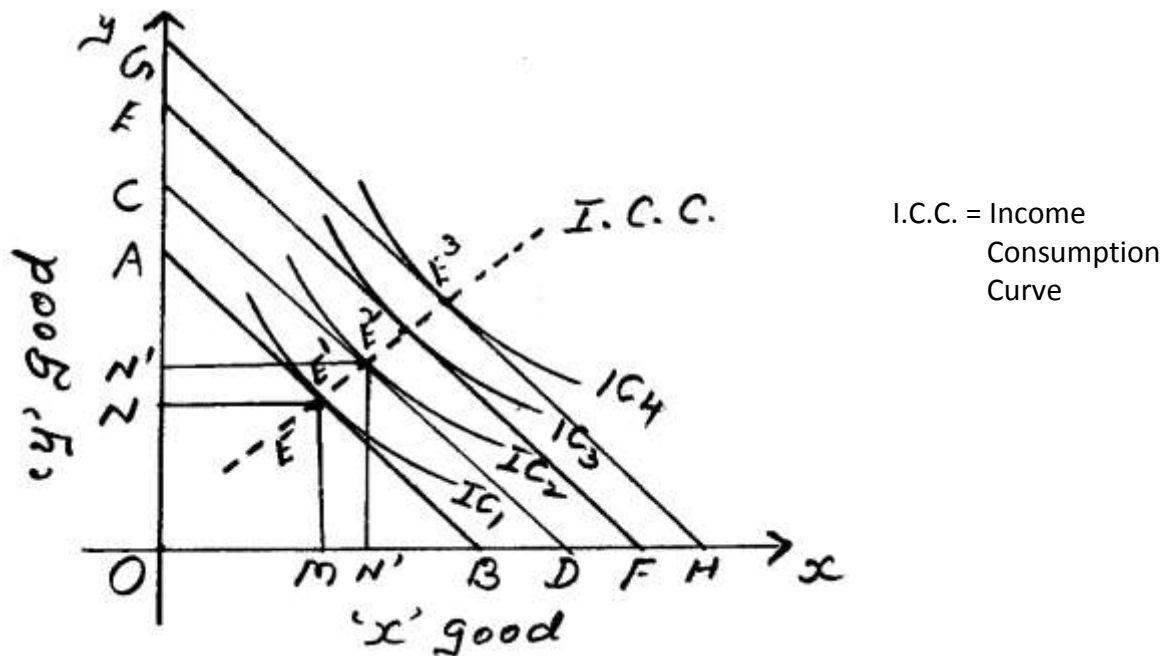
The consumer may become better off or worse off because of a change in his money income. Prices of goods and services remaining constant. His satisfaction will either increase or decrease based on larger or smaller size of money income at his disposal. The result of this type is called as income effect. In other words, it refers to a change in his level of satisfaction on account of a change in his money income. Under income effect consumer is allowed to become either better off or worse off as the case may be. If the income increases he will buy more of both the goods and thus will become better off. In the same manner his income may fall, as result of which he would buy less of both the goods, which would reduce his level of satisfaction making him worse off prices remaining constant. When he becomes better off, he will reach on higher IC and when he becomes worse off he will be placed on lower IC.

Income effect can be negative also if the commodity is inferior. Even after increase in income he may buy less quantity of the commodity, which is inferior. However it is difficult to name certain goods to be inferior. What is inferior to one person may not be inferior to other person. Therefore, taste and preferences along with size of money income label certain goods as inferior one.

### **Assumption of Income Effect**

1. Money income alone changes; rise or fall.
2. Prices of goods and services remain constant throughout.
3. Consumer is rational and tries to maximize his satisfaction.
4. Tastes and preferences remain constant.
5. The consumer has no control on market conditions.

In the light of the above assumptions let us examine the income effect in case of normal good with a diagram below:



Income effect is to be studied with the help of ICs' map and price line. ICs number one to four represents consumer's ICs map highlighting his tastes and preferences whereas price lines AB, CD, EF and GH present different levels of money income. As the money income of the consumer increases, he moves from IC<sub>1</sub> to IC<sub>4</sub> consuming more of both the goods and becoming better off. And when his money income falls from GH to AB price line he is shunted to lower and lower ICs, thus making him worse off as he buys less and less of both the goods. The consumer attains equilibrium at E, E<sup>1</sup>, E<sup>2</sup> and E<sup>3</sup> tangency points on AB, CD, EF, GH price lines as his money income goes on increasing. He becomes better and better off. When his money income falls he becomes worse off when he becomes better off, he is placed on higher ICs and in case of worse he is placed on lower ICs. Thus under income effect the consumer is allowed to become either better off or worse off.

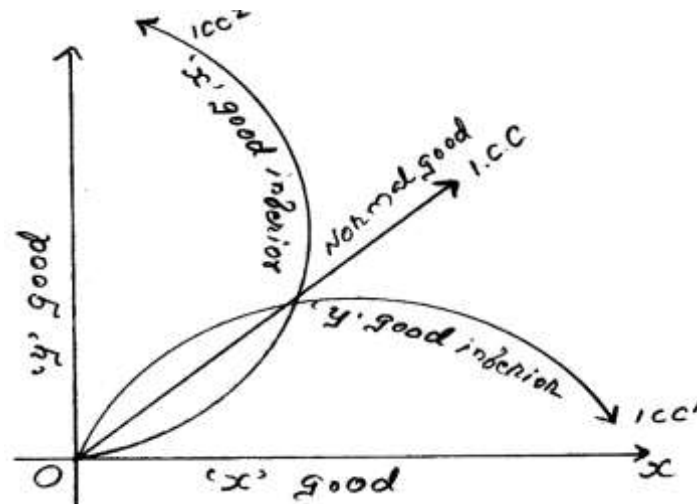


## 2.9 Income Consumption Curve (I.C.C.)

Since, the price line represents the money income of the consumer or in other words, his purchasing power, the price line in its each point represents the affordability of the limited purchasing power within which the means of income. The combination of goods at E point will give him the maximum satisfaction because, it is at this point it will touch the indifference curve.

The other points of which are beyond his reach with his limited income. The combination of 'X' and 'Y' goods at point E will be his obvious choice because it satisfies both his affordability as well as preference. Similar points of intersection can be considered at the successive price line.

A line which is drawn through all the equilibrium points such as E,  $E^1$ ,  $E^2$  and  $E^3$  is called as income consumption curve. It shows how the consumer's purchases react to change in money income when prices remain constant. If the prices were different the ICC would take different shape and position. It is also defined as the locus of equilibrium points at different levels of consumer's money income. It traces out income effect on the quantity of goods purchased. I.C.C. can be positive or negative. It is positive when an increase in money income is accompanied by increase in consumption of goods and services and negative when an increase in money income is accompanied by reduction in consumption of goods. If I.C.C. slopes backwards towards 'y' axis, then 'x' good is inferior good and if it slopes towards 'x' axis, 'y' good is inferior. In case of normal goods it slopes upwards. The following diagram depicts the shapes of I.C.C.



One thing must be noted that IC approach does not tell which goods are inferior. It merely describe the phenomenon.

## 2.10 Substitution Effect

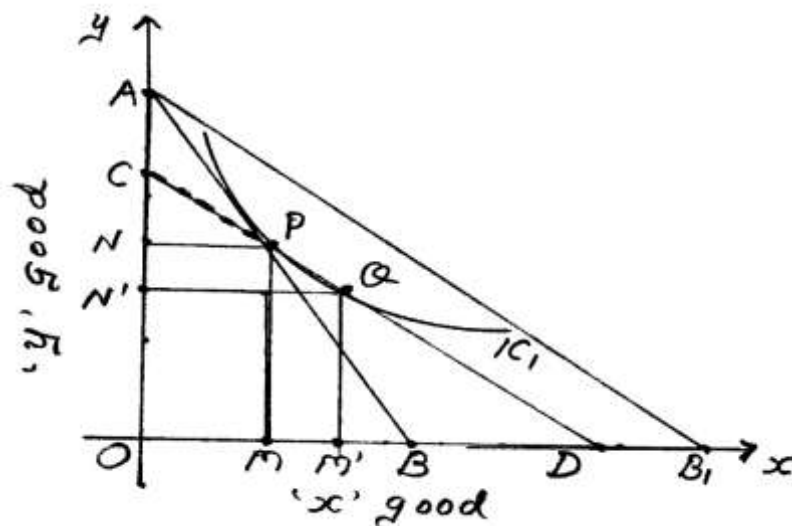
While explaining income effect, we held that prices remain constant but it is not a realistic assumption. Prices always change and therefore consumer's real income undergoes changes. It may rise or fall. When prices rise, real income of the consumer falls, money income remaining constant.

Likewise when prices fall, real income of the consumer rises. But under substitution effect we shall be analyzing the effect of fall in price of one of the goods, real income of the consumer keeping it constant. In other words when prices rise or fall, the consumer's money income is also changed in such a way that he is neither better off nor worse off than before so he will find it worth his while to buy more of that good which has become relatively cheaper.

He will substitute relatively cheaper good for relatively costlier good. The result of this type is known as a substitution effect.

In substitution effect, the consumer's real income remains the same but he rearranges his purchases in such a way that he is neither better off nor worse off than before as a result of change in price of one of the goods. The following diagram illustrates the phenomenon.

In the above figure, AB is the original price line. IC is tangent at 'P' point so the consumer is in equilibrium at 'P' point where both the conditions of equilibrium are fulfilled. The consumer consumes ON quantity of 'y' good and OM quantity of 'x' good. Now we suppose the price of 'x' falls and 'y' remains constant. That is why AB, new price line is drawn to show fall in price of 'x' good. Now 'x' has become relatively cheaper and 'y' good relatively costlier. If his money income kept intact, he will become better off.



But under substitution effect consumer is not allowed to become better off. Therefore, his money income is cut in such a way that his real income remains the same. So that he is neither better off nor worse off. To show cut in money income, a new price line CD is drawn parallel to AB, price line to keep his real income intact. Now he will choose that combination which will lie on CD price line.

Since 'x' has become relatively cheaper he will buy more of 'x' good and less of 'y' good. In other words, he will substitute relatively cheaper good for relatively costlier good by rearranging his purchases in accordance with change in prices. Thus, he substitutes MM' quantity of 'x' good for NN' quantity of 'y' good and attains his new equilibrium at Q point on CD price line and on the same IC curve. He moves from 'P' equilibrium to 'Q' equilibrium in favour of 'x' good.

The amount by which his money income is changed so that he is neither better off nor worse off than before is called as the compensating variation in income. In other words, it is a change in money income of the consumer which is just sufficient to compensate him for a change in the price of 'x' good. Hicks Allen substitution effect takes place on the same IC whereas Slutsky's substitution effect takes place on a different IC. Substitution effect is always positive. It is positive because general tendency of the people is that to buy that good more which is relatively cheaper and that good less which is relatively costlier.

### **2.11 Price Effect**

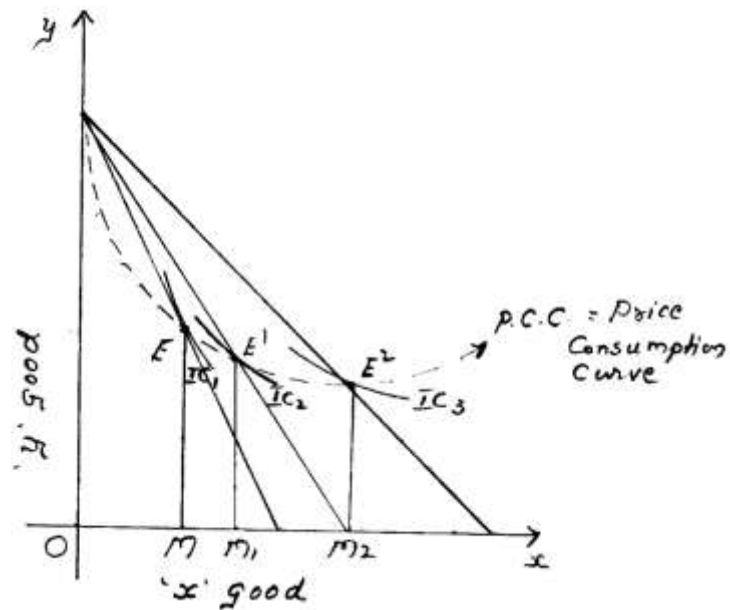
Price effect studies the effect of a change in real income of the consumer on his purchases. A change in real income may be either an increase or a decrease in the real income of the consumer due to fall or rise in prices of goods. Therefore, under price effect the consumer is allowed to become either better off or worse off as the case may be.

#### **Assumptions**

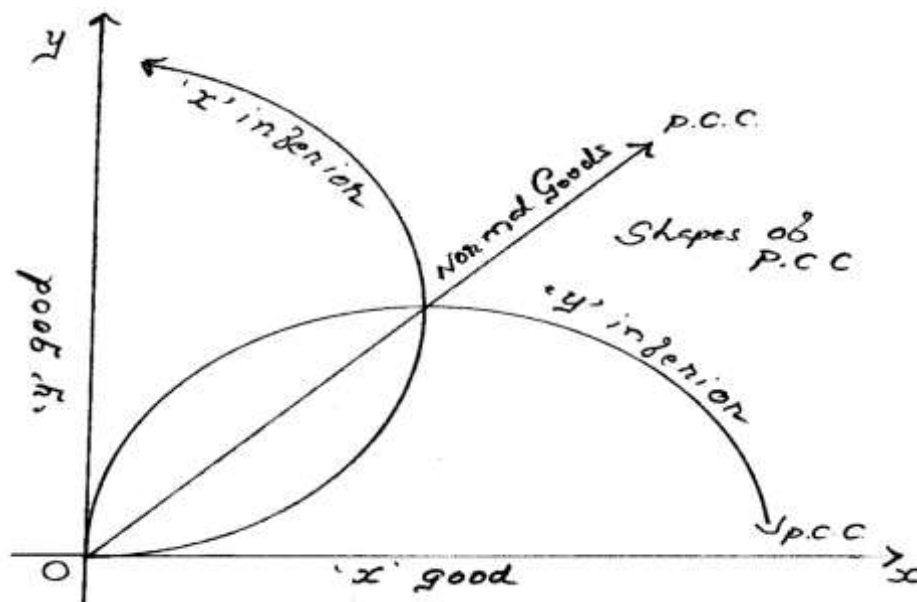
1. Money income remains constant
2. Prices rise or fall; as result of which real income of the consumer rises or falls
3. The consumer spends his entire money income
4. The consumer is rational
5. Price of 'x' falls and price of 'y' remain

When price of 'x' falls, real income of the consumer rises. This means that with the same money income he can buy more of both the goods and becomes better off. An increase in real income produces two effect simultaneously viz. income effect and substitution effect. Thus the price effect is the combination of income effect and substitution effect. Under price effect, the consumer is allowed to become either better off or worse off as the case may be.

We suppose price of 'x' falls and price of 'y' remains constant. Therefore 'x' becomes relatively cheaper in terms of 'y' and 'y' costlier in terms of 'x'. Since substitution effect is always positive, the consumer will buy more and more of 'x' good as price continues to fall. Price lines AB, AB<sub>1</sub>, AB<sub>2</sub>, AB<sub>3</sub> show fall in price of 'x' good. Therefore, the consumer becomes better and better off and reaches higher and higher ICs. The following diagram illustrates the phenomenon.



The curve which passes through all the equilibrium points such as E,  $E^1$  and  $E^2$  is called as price consumption curve. It traces out the price effect on the purchase of the consumer. It shows how changes in price of 'x' good will affect the consumer's purchases of 'x', price of 'y', tastes and preferences and money income remaining constant. It is locus of equilibrium points at different levels of prices or real income. The P.C.C. may shift backward towards 'y' axis if 'x' good becomes inferior or it may slope downward towards 'x' axis if 'y' good is inferior and it may slope upward if both the goods are normal goods.



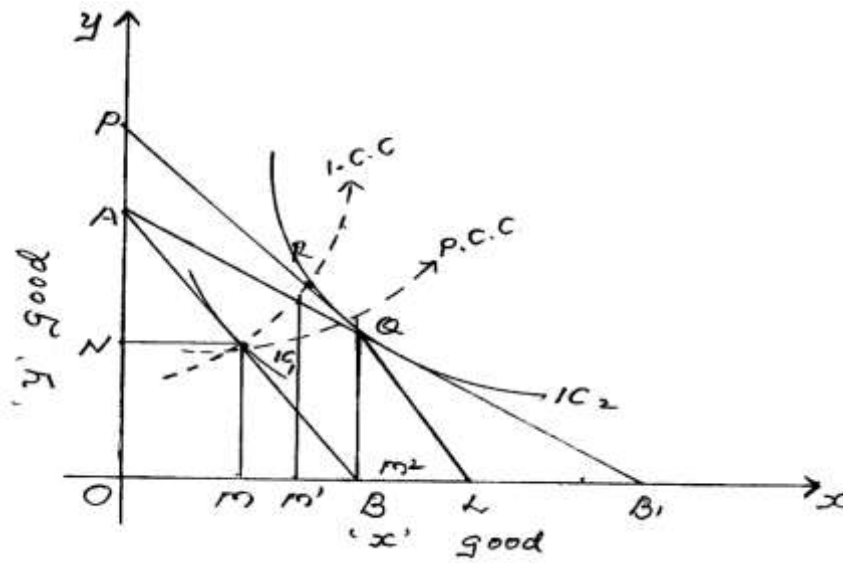
## 2.12 Breaking up Price Effect

Price effect is combination of income effect and substitution effect. Substitution effect is always positive but nothing can be said about income effect. It can be negative also. Therefore, it is necessary to decompose price effect into income effect and substitution effect. When price of 'x' falls, the consumer's real income increase, money income remains constant. Therefore, the consumer either buys more quantity of both the goods or relatively cheaper good and will become better off. When he becomes better off I.C.C. curve takes him on a higher IC. This shows income effect is positive. Now, he buys more of both the goods. He reaches second IC. His movement from IC<sub>1</sub> to IC<sub>2</sub> is due to positive income effect. However, he won't be at 'R' point in equilibrium permanently as  $MRS_{xy} > \frac{P_x}{P_y}$  at 'R' equilibrium. Moreover, substitution

effect is stronger than income effect. Therefore, he substitutes some units of 'x' good for some units of 'y' good. It is done because 'x' has become relatively cheaper and 'y' relatively costlier as a result of fall in price of 'x' good. It is a general tendency of the consumer to buy that commodity more which is relatively cheaper. That is why he slides down along the IC<sub>2</sub> towards right. Now he moves from 'R' equilibrium to 'Q' equilibrium point on IC<sub>2</sub>. the movement from 'R' to 'Q' is due to positive substitution effect. Thus, price effect is made of income effect and substitution effect.

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

This phenomenon is illustrated in the following diagram:



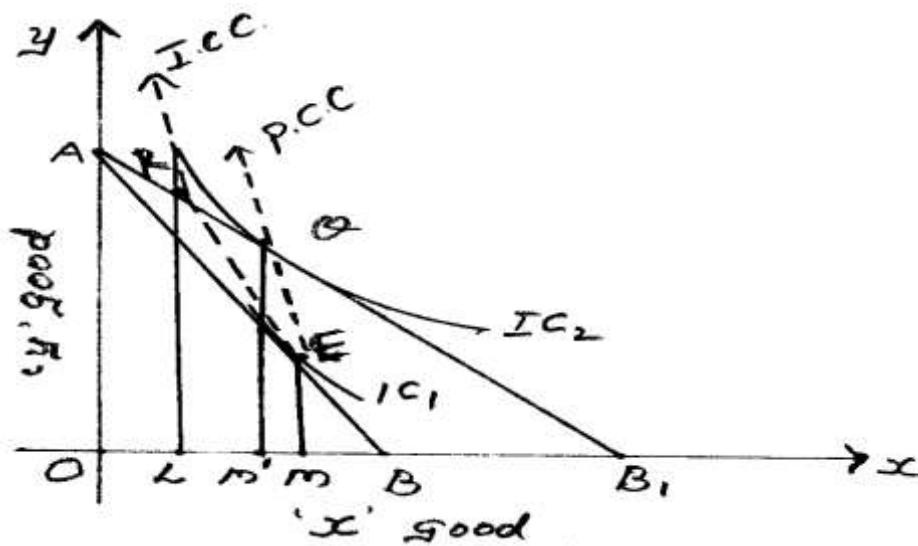
Price effect = I.E. + S.E.

$$MM_2 = MM_1 + M'M^2$$



### 2.13 Giffen's Good

In case of Giffen's good negative income effect is so large that it outweighs completely positive substitution effect as a result of which consumer buys less than before. The following diagram depicts the phenomenon.



P

$$\begin{aligned}
 E &= \text{Strong negative I.E.} + \text{P.S.E.} \\
 &= -LM + LM' \\
 &= -M'M
 \end{aligned}$$

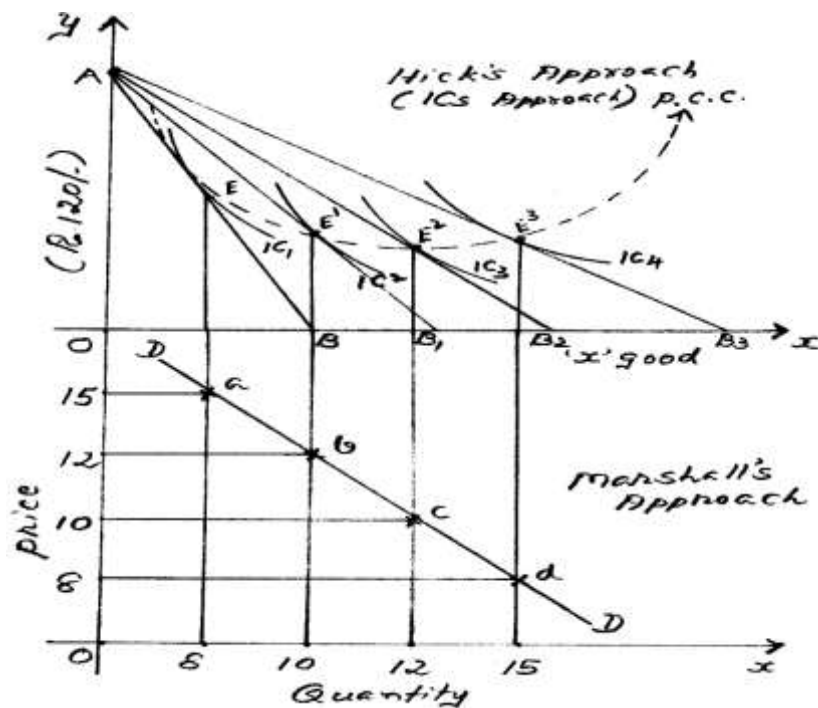
### 2.14 Derivation of Demand Curve from the P.C.C.

The P.C.C. of the indifference curve approach does not directly relate price with quantity demanded. It does not explicitly express price in money terms. It is so because in the IC analysis price is not explicitly shown on 'y' axis. On the other hand Marshall's demand curve explicitly relates price with quantity demanded. Thus, the demand curve showing the relationship between quantity demanded of a good at its various alternative prices can be derived from the P.C.C. of the indifference curves approach. Instead of price of a good being measured in terms of money, it is measured in terms of a good. For example we measure price of 'x' good in terms of 'y' good and price of 'y' in terms of 'x' good.

Thus the P.C.C. also expresses the same relationship i.e. inverse between price and quantity demanded in case of normal good and direct in case of inferior and Giffen's goods. The following diagram depicts the derivation of demand curve from the P.C.C.

#### Assumptions

1. The consumer possesses Rs.120/- as his money income
2. Price lines AB, AB<sub>1</sub>, AB<sub>2</sub>, AB<sub>3</sub> are different alternative price lines representing Rs.15/-, Rs.12/-, Rs.10/- and Rs.8/- per unit.



The above graph shows that the P.C.C. curve of the IC analysis is the same as Marshall's demand curve. Normally demand curve slopes downward from left to right due to positive income effect. Both the positive effect extend demand for the good.

### **Limitations of ICs Analysis**

1. Unrealistic assumptions
2. Combination of two goods may lead to absurdity like shoes and shirts.
3. In case of more than two goods, IC analysis cannot be put to use.
4. The assumption of continuity is also not true.
5. No provision for uncertainty.
6. The approach is highly introspective rather than behavioural.
7. Prof. Robertson calls the IC approach as old wine in new bottle!

## **2.15 CONSUMER SURPLUS**

### **2.15.1 Law of diminishing utility:**

The concept of consumer surplus is based on theory of diminishing utility. The law of diminishing utility means that total utility increases at the decreasing rate after a point is reached in the consumption level. As we consume glasses of water when we are thirsty, the total utility from consuming second or the third glass of water may reflect in increase in total utility at an increasing rate. But after point, we are less inclined to take more water. The fourth glass of water may, therefore, add to our total utility only at decreased rate. That is what we call the marginal utility is less as we consume fourth one. The fifth glass of water correspondingly may yield a still less marginal utility. If we project the rate of decreasing utility in a geometrical curve, it represents the law of diminishing utility.

The idea of consumer's surplus was developed by French engineer economist A.J. Dupuit in 1844. But it was improved and popularized by English economist Dr. Alfred Marshall in 1879 in his book named "Pure theory of Domestic Values".

### **2.15.2 Meaning and Definition of Consumer's Surplus**

We buy goods and services because they give us utility. But at the same time we lose some utility in terms of money. Payment of prices means parting with money in exchange of goods and services. This causes disutility to the consumer. In the beginning utility gained is higher than the utility lost. Since the consumer being rational goes on buying units of the commodity as long as utility gained is higher than utility lost. In terms money paid. Utility goes on falling, as more units of the same commodity are consumed but utility of units of money remains constant. Thus a point will reach when utility gained is equal to utility lost in terms of price. At this point, the consumer stops purchasing additional units of that commodity. Beyond this point utility lost is greater than utility gained. In other words, a rational consumer buys the commodity only if he expects a surplus of utility and this surplus is called consumer's surplus. It is defined as the difference between the satisfaction gained and satisfaction lost. The satisfaction that the consumer obtains from the consumption of a commodity is measured by the price he would pay for it rather than go without it. While satisfaction he loses in procuring that commodity is measured in terms of price he actually pays for it. According to Dr. Alfred Marshall, "the excess of the price which he would be willing to pay rather than go without the thing over that which he actually does pay, is the economic measure of this surplus satisfaction. It may be called consumer's surplus." In other words, it can be called as the difference between the expected price for a commodity in terms of price and the actual price that the consumer pay for it rather than go without it.

### **2.15.3 Measurement of Consumer's Surplus**

It is derived from the demand curve or the marginal utility curve. The following diagram and table illustrate the concept. Let us suppose that our consumer has only five rupees to spend on apples. Price of apple is hundred paise per unit which remains constant. As the consumer goes on buying units of apple his utility gained is much more than the utility lost. At the 5<sup>th</sup> unit of apple, utility lost (100) becomes equals to utility gained (100 units). It is at this point he would stop buying further as beyond 5<sup>th</sup> unit, the utility lost would be greater than utility gained.

The following table explains the whole thing.

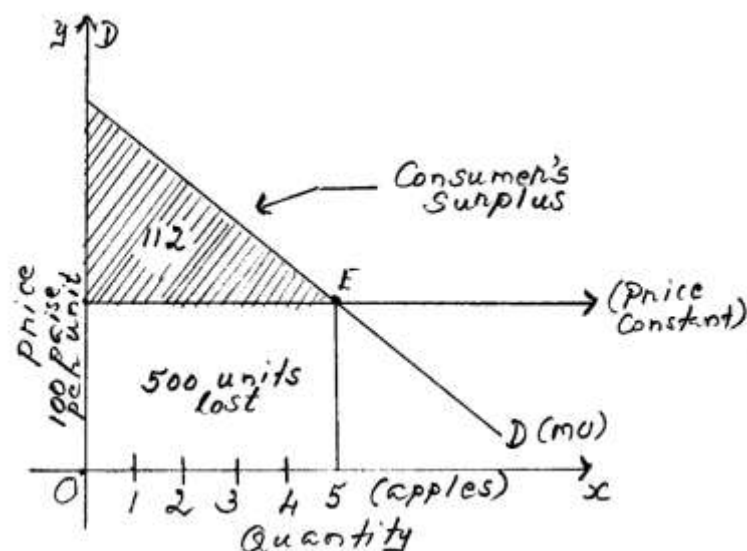
Units of Apple	No.	Price in Paise	Consumer's Surplus
1	150	100	50
2	130	100	30
3	120	100	20
4	112	100	12
5	100	100	0

Total - 5 Units - 612 - 500 = 112 Consumer's surplus

The surplus derived by him from five units of apple is 112. The total utility derived is 612 units and utility lost in buying five units is 500. Thus, total consumer's surplus is 612 - 500 = 112 units.

$$\begin{aligned}
 \text{C.S.} &= \text{Total utility gained} - \text{Total utility lost} \\
 &= 612 - 500 \\
 &= 112 \text{ units}
 \end{aligned}$$

But one must keep in mind the consumer's surplus derived from different commodities is different. Some commodities yield higher surplus than others. For instance, salt, match box, newspapers etc. People enjoy greater surplus on these commodities than luxury goods. The concept of individual consumer's surplus can very well be applied to the society as a whole.



Price is measured along 'ox' axis which is hundred paise per unit that remains constant and quantity demanded along 'oy' axis. Demand curve DD is based on MU schedule. The price of apples assumed to be fixed and remains constant for all units. Therefore, the consumer loses  $100 \times 5 = 500$  units whereas he gains  $150 + 130 + 120 + 112 + 100 = 612$  units. Hence consumer's surplus = Total satisfaction (u) - Total satisfaction sacrificed (DO) in buying apples  $\therefore 612 - 500 = 112$  units c.s.

### **Assumptions**

1. The fixed relationship between utility and satisfaction, but utility is different from satisfaction.
2. MU of money remains constant through out the process of exchange. No comparison is made in the absence of this assumption and it becomes difficult to measure the consumer's surplus.
3. The concept of consumer's surplus is based on cardinal measurement of utility which is not true.
4. DD schedule and MU schedule are assumed to be the same but they are not.
5. The concept ignores the differences in incomes, fashions, tastes and preferences between consumers.

### **Importance**

1. The concept is made use of public finance in the matter of taxation. Taxes are imposed on those commodities on which people enjoy very high consumer's surplus.
2. It helps producers to decide upon pricing policies.
3. It is also helpful to international trade.
4. International comparison of economic welfare can also be possible through consumer is surplus.

### **Limitations**

1. It is based on certain assumptions which are not tenable in actual life. Therefore, it is said that the concept is based on unrealistic assumptions.
2. Cardinal measurement of utility is not possible. Utility is psychic and hence cannot be quantified.
3. Marginal utility of money cannot remain constant.
4. It is also said utility is not independent. It is inter-dependent.
5. Differences in income, tastes and preferences cannot be ignored.
6. There is no definite relationship between utility and satisfaction as visualized by Marshall.

## UNIT III

### DEMAND AND SUPPLY

#### 3.1 DEMAND

In economics, demand has a distinct meaning. Supposing, you desire to have a car, but you do not have enough money to buy it. Then desire will remain just a wishful thinking; it will not be called demand. If you have enough money, you do not want to spend it on car, demand does not emerge. The desire becomes demand only when you are ready to spend money to buy the car. Thus, Demand for a commodity refers to the desire to buy a commodity backed with sufficient purchasing power and willingness to spend. Hence demand is equal to desire plus purchasing power plus willingness to pay. Demand for a commodity is always refers to price. At higher price quantity demanded will be low, and at lower price quantity demanded will be high.

#### Demand schedule:

It is a numerical tabulation, showing the quantity that is demanded at different prices. It expresses the relation between price and demand of a commodity. A demand schedule can be of two types –

- Individual Demand Schedule
- Market Demand Schedule

#### Individual Demand Schedule:

Individual demand schedule is defined as the quantity of a given commodity which a consumer will buy at all, possible price, at a particular period of time.

**Table 3.1-Individual demand schedule for Apples**

Price of Apples (Rs.)	Quantity demanded (Kg)
10	4
20	3
30	2
40	1

In the above table we can see that as the price of apples increases, quantity demanded is decreases.

### Market demand Schedule

In every market, there are several consumer of a commodity. Market demand schedule is one that shows total demand of all the consumers in the market at different price of the commodity.

**Table 3.2 - Market demand schedule for Apples**

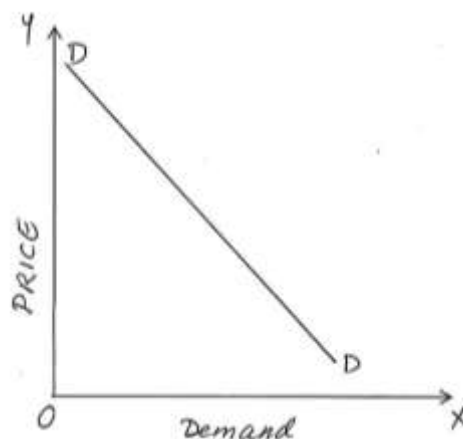
Price (Rs.)	Ravi's Demand	Sahil's Demand	Market Demand
10	4	5	4+5=9
20	3	4	3+4=7
30	2	3	2+3=5
40	1	2	1+2=3

Table 3.2 shows that with the rise in the price of apples the market demand for apples is decreasing.

### Demand Curve

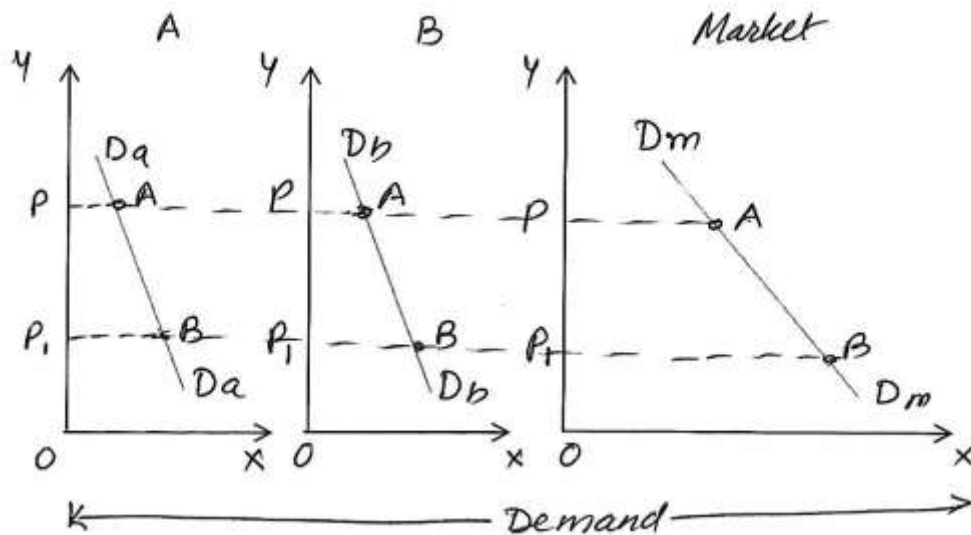
Demand Curve is the graphical representation of demand schedule expressing the relation between different quantities demanded at different possible prices of the commodity. There are two type of demand curve:

- Individual Demand Curve: It is a curve showing different quantities of a commodity that one particular buyer is ready to buy at different possible price of the commodity at a point of time. Individual demand curve is shown in figure 3.1-





- Market demand Curve: The market demand consists of the total quantity demanded by each individual in the market. The market demand curve is formed by computing the horizontal summation of the individual demand curves for all consumers. This process is illustrated in Figure 3.2.
- We take a hypothetical case in which there are only two consumers in the market



namely, Mr Ravi and Mr Sahil. The total quantity demanded in the market is just the sum of the quantities demanded by each individual. The market demand curve is derived by adding together the quantities demanded by all consumers at each and every possible price.

Both individual and market demand curves slope downward from left to right indicating an inverse relationship between price and quantity demanded of goods.

**Determinants of demand:**

Demand function is show the relation between demand for a commodity and its various determinants. The determinants are also known as the factors which affect demand of a commodity. It shows how demand is related to different factors like price, income etc. the demand function can be expressed as follows-

$$D = f(P, P_r, Y, T, FE, S, W, \dots\dots)$$

**where,**

P – Price of the commodity

P<sub>r</sub> – Price of related goods

Y – Income of the consumer

T – Taste and preference

FE – Future expectations of the consumers

S – Size and composition of the population

W – Weather condition

The determinants are explain below -

- i) Price of the Commodity:** Quantity demanded and the price of the commodity is inversely related. It means that with the rise in the price of commodity, quantity demanded decreases and with the fall in the prices there is a rise in the quantity demanded.
  
- ii) Price of the related goods:** Demand for a commodity is also influenced by change in the price of related goods. There are two types of related goods - Substitutes and Complements. **Substitute Goods** are those goods which can be the goods which can be used in place of each other, such as tea and coffee. If an increase in the price of one causes a rise in the demand for the other then the two goods are substitutes. On the other hand the complementary goods are those goods which are consumed together.

If an increase in the price of one goods causes the reduction in the demand for the other then the two goods are complementary goods. Car and petrol are complimentary goods.

**iii) Income of the consumers:** Normally there is a direct relationship between the income of the consumer and his demand for the commodity. For a **normal good** with the rise in consumer's income demand will rise and vice versa. Goods like television sets, cars, clothes etc are considered normal goods. If the demand for a goods decreases with the rise in consumers income then that goods are known as **Inferior Goods**. For e.g. coarse grain like Jowar, Bajra, Maize, etc. If the income of the consumer rises she will reduce the consumption of these goods.

If the demand increases with an increase in income and thereafter it remains constant irrespective of the level of income then the goods in question are known as **necessities** for example salt, match box, etc.

**iv) Consumer's Taste and Preference:** Consumer's demand for the goods is greatly influenced by the taste and preferences which in turn depend on social customs, habits, fashion, etc.

**Consumer's Expectation:** If a consumer expects a fall in the price of a commodity in a near future, then he will postpone his present demand and if he anticipates a rise in price then he will increase his current demand. For instance if you are thinking about purchasing a computer and you obtain information that may lead to a rise in the future price then you will buy the computer today itself. However, a reduction in the expected future price will result in a reduction in current demand.

If expected future income rises, demand for many goods today is likely to rise. On the other hand, if expected future income falls, individuals may reduce their current demand for goods so that they can save more today in anticipation of the lower future income.

**v) Size and Composition of Population:** Larger the population, larger is likely to be the number of consumers thus greater will be the demand. The composition of population refers to number of children, adults, males, females, etc. in the population. If the number of children are more in the population then more of baby products will be demanded whereas in an education township like Vallabh Vidya nagar in Anand district of Gujarat where 50 to 60 per cent of the population is of students (between the age group of 18 to 24 years) more of stationary, hostels, fast foods etc will be demanded. The type of people inhabiting the country will also influence the consumer demand. Since the market demand curve consists of the horizontal summation of the demand curves of all buyers in the market, an increase in the number of buyers would cause demand to increase. As the population increases, the demand for food, houses, cars and virtually all other commodities, is expected to increase. A decline in population will result in a reduction in demand.

**vi) Weather condition:** Another factor which affects demand is the weather conditions. For example during summer there will be greater demand for sun glasses, cotton wears, ice creams etc, whereas during rainy season the demand for umbrellas and raincoats will increase.

**Law of Demand:** Law of demand expresses the functional relationship between the price of commodity and its quantity demanded. It states that the demand for a commodity is inversely related to its price, other things remaining constant. In other words a fall in price of a commodity will lead to a rise in demand of that commodity and a rise in price will lead to fall in demand. Thus there is an inverse relationship between the price of a good and the quantity demanded in a given time period, ceteris paribus.

**Assumption:**

The law of demand is based on certain assumptions. These are as follows -

- a. There is no change in the Income of the people.
- b. Taste, preference and habits of consumers unchanged.
- c. Prices of related goods i.e., substitute and complementary goods remaining unchanged
- d. There is no expectation of future change in price of the commodity.
- e. The commodity in question is not consumed for its prestige value.

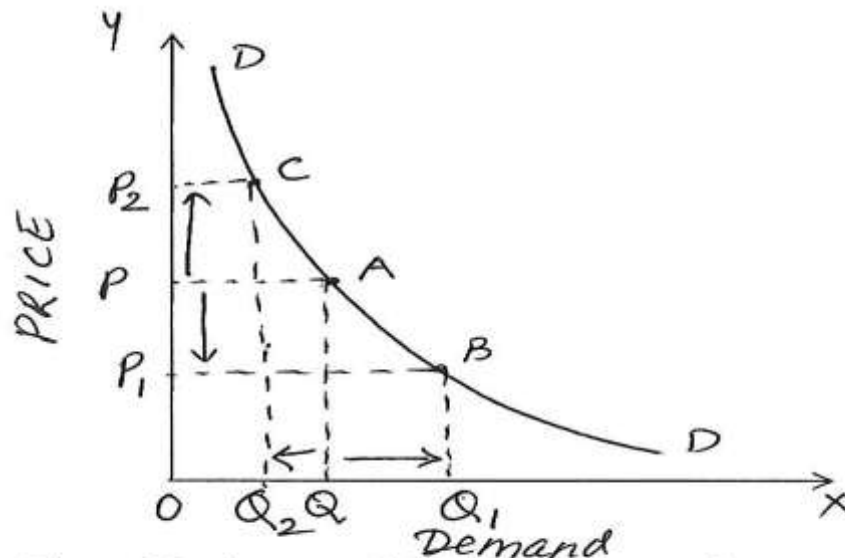


Figure 3.3 – inverse relationship between price and quantity demanded

As shown in figure 3.3 the relationship between price and quantity demanded is represented by a demand curve. At price  $OP$  the quantity demanded is  $OQ$  when the price increase from  $OP$  to  $OP_1$  quantity demanded decreases from  $OQ$  to  $OQ_1$ . Thus when the price increases, demand decreases and vice versa. Demand curve slopes down ward from left to right showing inverse relationship between price and quantity demanded. This downward slope of demand curve is expression of law of demand.

**Reasons for downward slope of demand curve:**

Downward slope of demand curve indicates that consumers buy more of a commodity at lower prices and vice versa. Thus, there is Negative relationship between price and quantity demanded. The reasons for downward slope of demand curve are –

**(i) Law of Diminishing Marginal Utility:** This law states that when a consumer buyers moreunits of same commodity, the marginal utility of that commodity continues to decline. The consumer will buy more of that commodity when price falls. When lessunits are available the utility will be high and consumer will prefer to pay more for that commodity.Thus the demand would be more at lower prices and less at a higher price and so thedemand curve is downward sloping.

**(ii) Income effect:** As the price of the commodity falls the real income of the consumer will increase and consumer can increase his consumption. He will spend less to buy the same quantity of goods. On the other hand, with a rise in price of the commodities the real income of the consumer will reduce and consumer will buy less of that good.

**(iii) Substitution Effect:** When the price of a commodity falls, the price of its substitutes remaining the same, the consumer will buy more of that commodity and this is called the substitution effect. The consumer will like to substitute cheaper good for the relatively expensive good. On the other hand, with a rise in price the demand falls due to unfavorable substitution effect. It is because the commodity has now become relatively expensive which forces the consumer's to buy less.

**iv) Number of uses of a Good:** Goods which can be put to a number of uses like milk which can be used for making tea, curd, cold drinks, paneer etc. When the price of milk commodity is higher, it will sparingly used. On the other hand, if the price of milk decreases consumer will use it for a variety of purposes leading to a rise in demand. Thus the demand for the product with the change in price is determined by the number of uses of a commodity.

**v) Change in number of buyers:** Lower price will attract new buyers and higher price reduces the buyers. Such buyers are known as marginal buyers.

Owing to the above mentioned reasons the demand falls when price rises and so the demand curve is downward sloping.

**Exceptions to the law of demand:**

Law of demand has some exceptions as well. There are some goods whose demand increases when price rises and decrease when price falls. They are –

- i) Conspicuous Goods** These are the goods which are purchased by the consumers to project their status and prestige. Expensive cars, diamond jewellery, etc. are such goods. The conspicuous goods are purchased more at a higher price and less at a lower price.
  
- ii) Giffen Goods** : Giffen goods named after Sir Robert Giffen. These are inferior goods whose demand increases even if there is a rise in price. For e.g.: - coarse grain, clothes, etc.
  
- iii) Share's speculative Market** : It is often found that people buy shares of those companies whose price is rising in anticipation of further rise in price. Whereas, they buy less shares in case the prices are falling as they expect a further fall in price of such shares. Here the law of demand fails to apply.
  
- iv) Bandwagon effect:** Here the consumer demand of a commodity is affected by the taste and preference of the social class to which he belongs to. If sports car fashionable among business community, then as the price of sports cars rises, these consumers may increase the demand for such goods to project their position in the society.
  
- v) Veblen Effect:** Many a times consumer judge the quality of a product by its price. Consumer feels that a higher price means better quality and lower price means poor quality. So the demand goes up with the rise in price for example branded consumer goods.

### 3.2 Change in Quantity Demanded and Change in Demand

A change in **quantity demanded** refers to increase or decreases in quantity purchased of a commodity in response to decrease or increase in its price, other things remain constant. It is expressed through movement along the demand curve. On the other hand a **change in demand**, refers to increase or decrease in quantity demanded of a commodity in response to change in factors other than price. It is expressed through shift in demand curve-forward shift or backward shift.

#### (a) Movement of Demand curve or Extension and Contraction of Demand or change in quantity demanded.

With the change in the price of a commodity the quantity demanded will increase or decrease depending upon the fall or rise in the price of a commodity alone, ceteris paribus. This is called movement along the demand curve or extension or contraction of Demand. As shown in figure 3.4, when the price increases, other factors affecting demand remain constant, the quantity demanded will decrease and vice versa

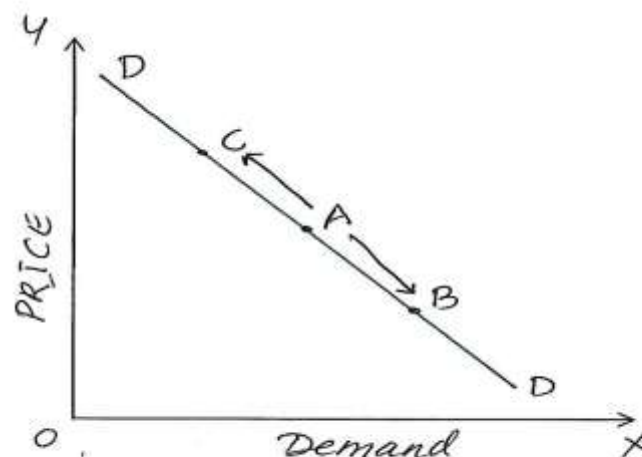


Figure 3.4: Change in quantity demanded



The figure 3.4 show that when price increases from  $OP$  to  $OP_1$  the demand decreases from  $OQ$  to  $OQ_1$ . Thus with the fall in price there is a movement on the demand curve from point  $A$  to point  $B$ . Similarly with the rise in price from  $OP$  to  $OP_2$  the quantity demanded decreases from  $OQ$  to  $OQ_2$  causing a shift from point  $A$  to point  $C$  on the demand curve. The increase in demand due to fall in price is also called extension of demand. The reduction in quantity demanded due to increase in price is known as contraction.

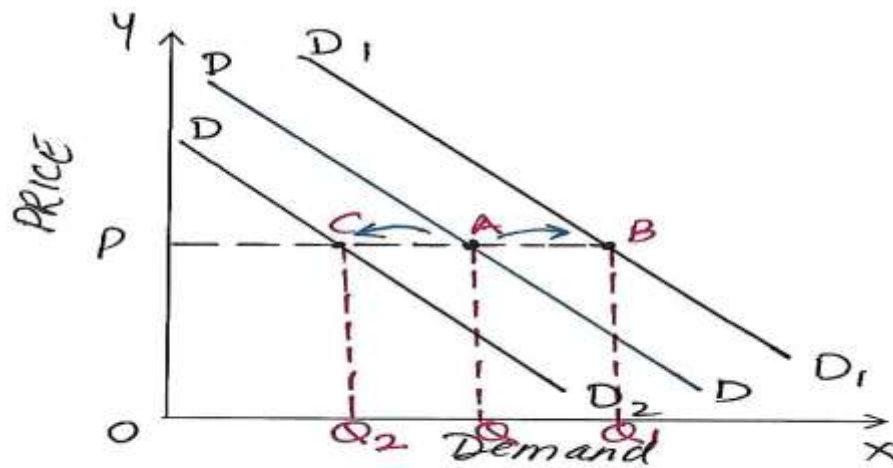


Figure 3.5: Shift in Demand

**Change in Demand or shift of demand or Increase and Decrease in demand:**

When the quantity demanded a commodity increases or decreases due to change in factors other than price of the product like income of the consumer, price of related goods, etc. it is known as change in demand or shift in demand.

In Figure 3.5 DD is the original demand curve and the consumer in buying OQ units of the commodity at price OP. For example with an increase in the income of the consumer, price of the product remains constant, the demand increases the new demand curve is  $D_1D_1$ . This new curve is an outward shift in the demand curve and shows an increase in the demand for the product from OQ to  $OQ_1$ . Similarly due to the fall in the income of the consumer, the demand curve will shift inward from DD to  $D_2D_2$ . Quantity of good purchased will reduce from OQ to  $OQ_2$ . This is called decrease in demand.

Thus in the above figure quantity demanded has increased from OQ to  $OQ_1$ , the price of commodity remaining constant at OP. This is shown by a right ward shift of the Original demand curve to form new demand curve  $D_1D_1$ . This is called increase in demand. The left ward shift from the original demand curve DD to  $D_2D_2$  is known as decrease in demand, price of the product remains same at OP.

### **3.3 THEORY OF SUPPLY**

Supply is defined as a quantity of a commodity offered by the producer to be supplied at a particular price and at a certain time. Same as demand supply has three elements namely quantity of commodity, particular price and particular time.

The term 'supply' is different from 'stock' of a commodity. The total amount of the commodity which a seller can bring out for sale in the market is his stock. However, producer often does not offer his entire stock for sale in the market. Supply has been defined as that part of the stock of a commodity which is offered for sale at a particular price during a period of time. For example a farmer produces 500 tons of potatoes during a given period. He may offer only 300 tones for sale at Rs 1000 per ton. In this case the stock of potatoes is 500 tons but supply is only 300 tones at a given price.

### **Individual Supply and Market Supply**

Individual supply refers to the quantity of a commodity which a producer is willing to produce and offer for sale. On the other hand, the quantity which all producers are willing to produce and sell is known as market supply. If, at a given price, producer A is willing to sell 200 units of a commodity and producer B is willing to sell 500 units, and then if there are only two firms producing this particular commodity, market supply will be 700 units.

### **Law of supply**

Law of supply states that, other things remaining constant, as the price increases quantity supplied will increase and with the decrease in price the supply will reduce. Thus there is a positive relationship between price of a commodity and its quantity supplied. More is supplied at higher price and less at the lower price. The law of supply is based on following assumptions -

### **Assumption of the law of supply**

- (1) Prices of the factors of production are constant.
- (2) Price of the related goods remain constant
- (3) Technique of production is constant.
- (4) No change in the Objectives of the firm
- (5) Producers do not expect any change in the future price of the product.

The law can be explained with the help of following supply schedule and supply curve.

### **Supply Schedule**

Supply schedule is a table which shows various quantities of a commodity offered for sale at different possible prices of that commodity. There are two types of supply schedule –

- (i) Individual supply schedule, and
- (ii) Market supply schedule.

- (iii) An individual supply schedule shows the different quantities of a commodity that a producer would offer for sale at different prices.

Table 3.3 shows a hypothetical individual supply schedule of apples. When the price of apples is Rs 10 per Kg the producer is interested in selling only 1 kg of apples. As the price rises, supply increases. Thus higher the price higher is the supply.

**Table 3.3. Individual supply schedule of Apples**

Price of Apples (Rs.)	Quantity supplied (Kg)
10	1
20	2
30	3
40	4

**Market supply schedule:** Market supply refers to supply of all the producers in the market producing a particular commodity. Firm is an individual unit producing a commodity. A group of firms producing a similar good is called an Industry. Thus, market supply schedule is also referred to supply of the industry as whole.

**Table 3.4: Market Supply schedule.**

Price of Apples (Rs.)	Supply by Producer 'A' (Units)	Supply by Producer 'B' (Units)	Market supply
10	1	0	$1+0=1$
20	2	5	$2+5=7$
30	3	10	$3+10=13$
40	4	15	$4+15=19$

From the above table we see that when price of apples is Rs.10 per Kg, then the producer A will supply only 1 kg of apples whereas producer B is not interested any quantity. When price increase to Rs.20, producer 'A' supplies 2 kg and producer 'B' supplies 5 units.

Thus the market supply is  $2 + 5 = 7$  Kg of apples. When the price rises to Rs 30 per kg of apples, market supply increases to 13 kg. Thus at higher price the market supply will increase.

**Supply curve:** Supply curve is a graphic presentation of supply schedule. Supply curve has positive slope which indicates positive relationship between price of a commodity and its quantity supplied.

Same as the supply schedule, supply curve can be divided into

- (i) Individual supply schedule and
- (ii) Market supply schedule.

**An individual supply curve** is a graphical representation of supply schedule of an individual producer in the market. It slopes upwards, indicating positive relationship between price of a product and its quantity supplied. The individual supply curve is given in figure 3.6

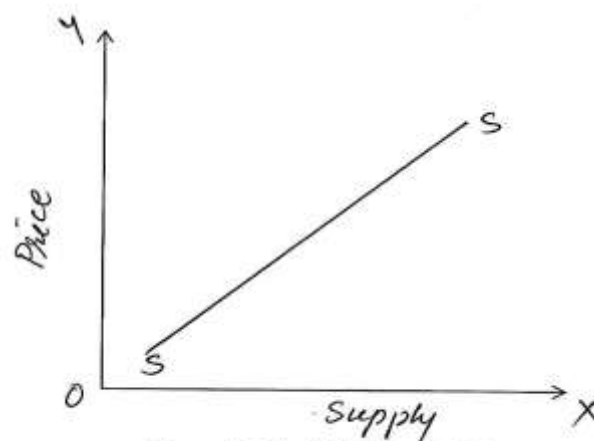
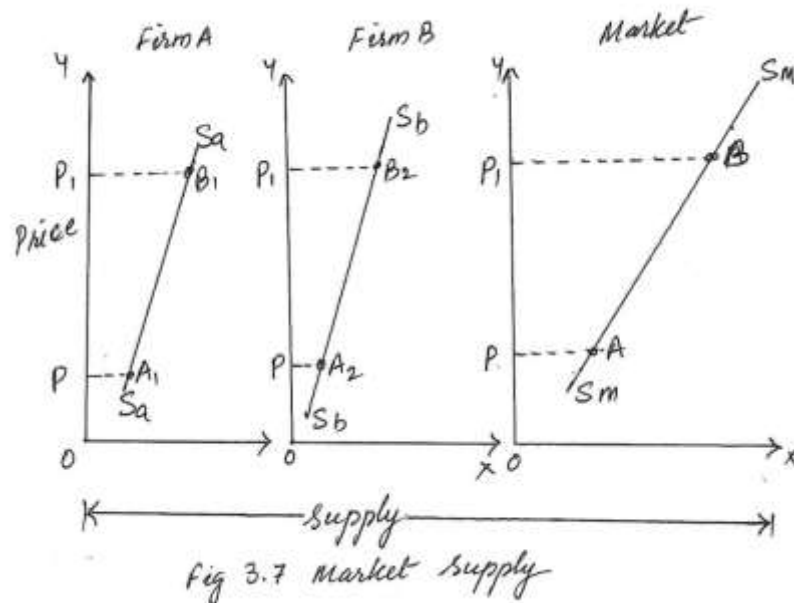


Figure 3.6: Individual Supply Curve

In the above figure, SS is the supply curve which has a positive slope. It shows that more of a commodity is supplied at a higher price.

**Market supply curve** as shown in figure 3.7 is the horizontal summation of all individual supply curves. This is also known as the supply curve of the industry as a whole. Supply curve SS is of producer A and S1S1 is the supply curve of producer B.



For deriving the market supply curve, same as the market demand curve explained earlier in this chapter we add the individual supply curves horizontally.

### Factor Determining supply or supply function

Supply function represents the functional relationship between supply of a commodity and its various determinants. The supply of a commodity mainly depend on the objective of the firm, price of the commodity, price of related goods, price of factors of production and the state of technology.

Supply function can be written as –

$$S = f(P, O, Pr, F, T, G, \dots)$$

Where

P- Price of the commodity

O – Objectives of the firm

Pr – Price of related goods

I – Input Prices

T – State of Technology

G – Government Policies

E- Future expectation of the prices

F – Number of sellers in the market

N – Natural Factors

The above mentioned determinants of supply are explained below –

- (i) Price of the commodity (P):** With change in the price of the product the supply changes. When the price increases, producer increase the supply and vice versa. With no change in cost of production, higher the price, higher will be the profit margin. This will encourage the producers to supply larger quantity at higher prices. When the price decline the supply will also decline.
- (ii) Objectives of the firm (O):** Firms have several objectives such as profit maximization, sales maximization, employee satisfaction maximization etc. If the objective is to maximize profit, then higher the profit from the sale of a commodity, the higher will be the quantity supplied by the firm and vice-versa. Thus, the supply of goods will also depend upon the priority of the firm regarding these goals and the extent to which it is prepared to sacrifice one goal to the other.
- (iii) Expectation about future prices (E):** If the producer expects an increase in the future price of a commodity, then the present supply will reduce as producer will stock the goods to sell in future at higher prices. On the contrary if he expects a fall in future prices then he will increase the present supply.
- (iv) Input Prices (I):** Supply depends upon the prices of inputs like raw materials, labour and other inputs. Any rise in the input cost will reduce the profit margin and ultimately lead to a lower supply. However, with the fall in input prices, profit margin will increase and the supply will also increase.

- (v) **State of Technology (T):**An improved and advanced technology is used for the production of a commodity will reduce its cost of production and increases the supply. On the contrary, outdated and old technology will increase the cost of production and reduced supply.
- (vi) **Government policies (G):**Policies of Government such as fiscal policy which leads to imposition of taxes,excise duty, sales tax etc will affect the production of commodities and supply adversely. Any reduction in the taxes will increase the supply. Subsidy policy also influences the supply of a commodity. When government increase the subsidy the profit margin will increase and supply will increase.
- (vii) **Prices of the related goods (Pr):**An increase in the prices of related goods other commodities makes the production of that commodity whose price has not risen relatively less attractive we thus, expect that other things remaining the same, the supply of one good falls as the price of other goods rises. For instance a farmer produces bananas as well as potatoes his farm. If the price of potatoes increases he will grow more of potatoes and less of bananas. Hence the supply of bananas will reduce.
- (viii) **Number of Sellers in the market (F):**Market supply is the sum total of the supply by number of individual suppliers. Larger the number of the firms in the market the greater will be the supply. A decrease in the number of firms reduces the supply and vice versa.
- (ix) **Natural factor (N):**Natural factors too affect the supply. In case of natural calamities like flood, drought, earthquake etc. the supply of a commodity especially of agricultural products is adversely affected.



### Exceptions to the Law of Supply

- (i) **Agricultural Goods:** For agricultural goods it is not possible for the supply to be adjusted to market conditions. As the production and supply of agricultural goods is largely dependent on natural factors like rainfall, temperature etc. and it is mostly seasonal in nature it cannot be increased with a rise in price.
- (ii) **Rare Objects:** The supply of certain commodities like rare coins, classical paintings, old manuscripts, etc. cannot be increased or decreased with the change in price. Therefore, such goods have inelastic supply.
- (iii) **Labour Market:** with a rise in wages workers will work for less number of hours, and will prefer leisure over work. Thus in the labour market, the behavior of the supply of labour goes against the law of supply.

### Change in Quantity Supplied and Change in Supply

A change in **quantity supplied** refers to change in quantity purchased of a commodity in response to change in price, other things remain constant. It is expressed through movement along the Supply curve. On the other hand a **change in Supply** refers to change in quantity supplied of a commodity in response to change in factors other than price of the commodity. It is expressed through shift in Supply curve-forward shift or backward shift.

#### (a) Movement of Supply curve or Extension and Contraction of Supply or change in quantity Supplied.

With the change in the price of a commodity the quantity supplied will increase or decrease depending upon the rise or fall in the price of a commodity alone, ceteris paribus. This is called movement along the Supply curve or extension or contraction of Supply. As shown in figure 3.4, when the price increases, other factors affecting Supply remain constant, the quantity supplied will decrease and vice versa.

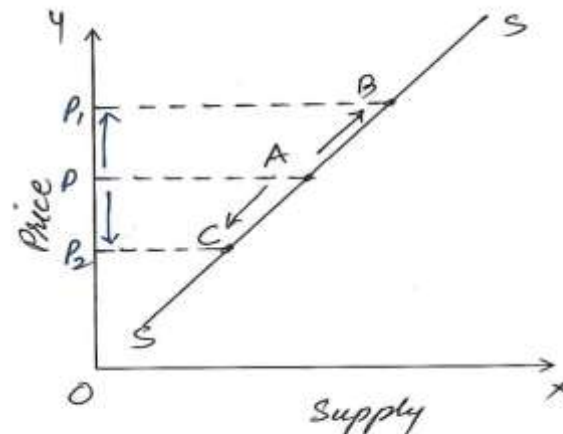


Figure 3.8: Change in quantity Supplied

The figure 3.8 show that when price increases from  $OP$  to  $OP_1$  the Supply increases from  $OQ$  to  $OQ_1$ . Thus with the rise in price there is a movement on the Supply curve from point  $A$  to point  $B$ . Similarly with the fall in price from  $OP$  to  $OP_2$  the quantity Supplied decreases from  $OQ$  to  $OQ_2$  causing a shift from point  $A$  to point  $C$  on the Supply curve. The increase in Supply due to rise in price is also called extension of Supply. The reduction in quantity supplied due to fall in price is known as contraction.

#### **Change in Supply or shift of Supply or Increase and Decrease in Supply:**

When the quantity supplied of a commodity increases or decreases due to change in factors other than price of the product like price of related goods, prices of inputs etc. it is known as change in supply or shift in supply.

In Figure 3.9  $SS$  is the original Supply curve and the consumer in buying  $OQ$  units of the commodity at price  $OP$ . If the input cost reduces, price of the product remains constant, the supply will increase, and the new supply curve is  $S_1S_1$ . This new curve is an outward shift in the supply and it shows an increase in the supply for the product from  $OQ$  to  $OQ_1$ . Similarly due to the rise in input cost, price of the product remaining same, the supply curve will shift inward from  $SS$  to  $S_2S_2$ . Quantity of good purchased will reduce from  $OQ$  to  $OQ_2$ . This is called decrease in Supply.

Thus in the above figure quantity supplied has increased from  $OQ$  to  $OQ_1$ , the price of commodity remaining constant at price  $OP$ . This is shown by a right ward shift of the original supply curve to form new supply curve  $S_1S_1$ . This is called increase in supply.

The left ward shift from the original supply curve  $SS$  to  $S_2S_2$  is known as decrease in Supply, price of the product remains same at  $OP$ .

### **3.4 EQUILIBRIUM OF DEMAND SUPPLY AND PRICE DETERMINATION**

Equilibrium means a state of balance. The term equilibrium in Economics means the state in which there is no tendency on the part of consumers and producers to change. Market equilibrium is a situation of the market in which demand for a commodity is equal to supply of the commodity at a particular price. Hence when there is equilibrium between demand and supply of a commodity at a particular price, there is neither excess demand nor excess supply. At this position the prevailing price is called the equilibrium price and the corresponding quantity supplied/demand is called equilibrium quantity

#### **Determination of equilibrium price:**

According to Alfred Marshall demand and supply are the two blades of pair of scissors. Through intersection of demand and supply the equilibrium price and equilibrium quantity of a commodity is determined.

The force of demand and supply determine the price of a commodity. There is a conflict in the aim of producers and consumers. Consumers are interested in buying the goods at the lowest price to maximize satisfaction and producer aim at selling the goods at the highest price to maximize profit. Equilibrium price will be determined where quantity demanded is equal to the quantity supplied. This called market price. The determination of equilibrium price is explained with the help of a schedule given in table 3.5 and figure 3.10.

**Table 3.5 – Equilibrium Price**

Price of Apples (Rs.)	Quantity demanded (Kilogram)	Quantity supplied (Kilogram)
10	4	0
20	3	1
30	2	2
40	1	3

Table 3.5 gives a hypothetical schedule which depicts different price and the respective quantity demanded and supplied. When the prices increases from Rs 10 to Rs 40, the quantity demanded decreases from 4 Kg to 1 Kg and the quantity supplied increases from nothing to 4 Kg respectively. At price Rs 10 the quantity demanded is 4 Kg and suppliers are not interested in supplying at all. Thus at lower price consumers will demand more and suppliers will supply less. At price Rs 40 per Kg demand is 1 Kg and supply is 4 Kg. With an increase in price the demand decrease and supply increases. We can observe in table 3.5 at price at price Rs 30 the quantity demanded is equal to quantity supplied, and that is the equilibrium price and equilibrium quantity is 2 Kg. At prices less than Rs 30 there is an excess of demand over supply and at price higher than Rs 30 per Kg the supply is more than demand.

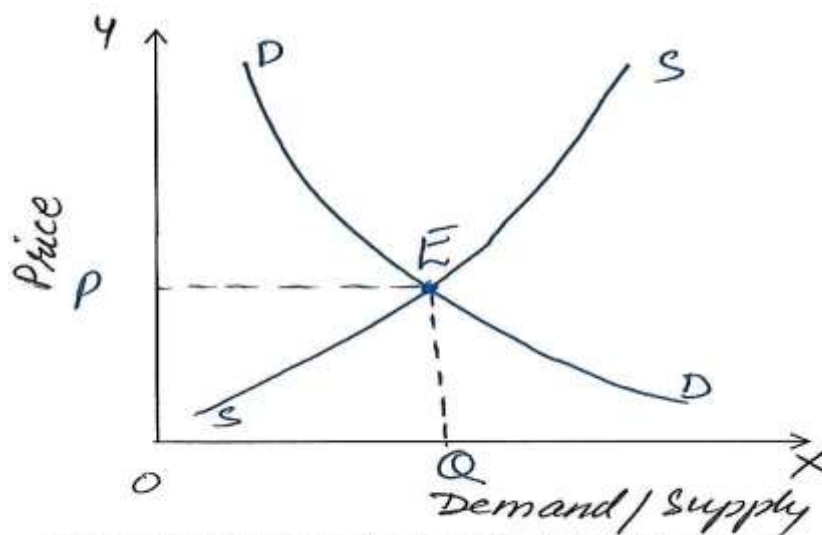


Figure 3.10: Determination of Equilibrium price

In figure 3.10 price is measured on Y axis and quantity demanded and supplied taken on X-axis price per unit. DD is the demand curve and SS is the supply curve. The demand curve and supply curve intersect each other at point E. At the equilibrium point E the quantity demanded is equal to the quantity supplied i.e. PE and therefore the equilibrium price is OP the equilibrium quantity is OQ.

Above this equilibrium price OP, at  $OP_1$  the quantity demanded decrease to  $P_1G$  and quantity supplied increase to  $P_1H$ . At price higher than equilibrium price there is an excess of supply over demand GH. At price  $OP_2$ , which is lower than the equilibrium price quantity supplied decreases to  $P_2I$  and quantity demanded increases to  $P_2K$ . Hence at price lower than the equilibrium price there is an excess of demand over supply.

**Effect of change in supply and demand:**

The equilibrium price and quantity changes with the shift in supply curve demand remaining same or shift in demand curve supply remaining same or shift in both. The change in equilibrium due to change in demand with no change in supply can be seen in figure 3.11, which shows price on Y axis and quantity demanded and supplied on x axis.

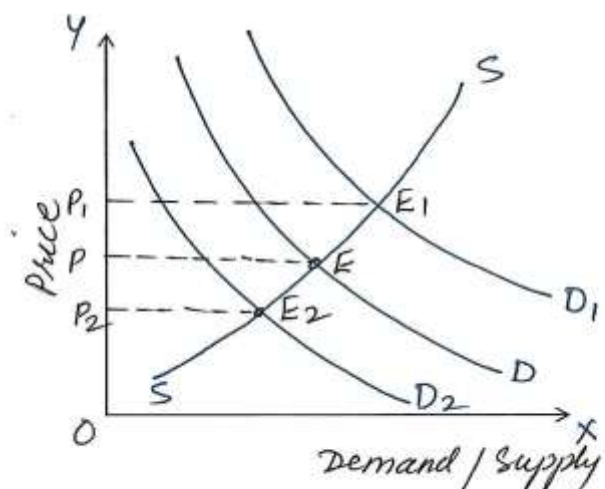


Figure 3.11: Effect of change in demand on equilibrium price

Demand curve DD intersects supply curve SS at point E, which determines the equilibrium price OP and equilibrium quantity OQ. With an increase in demand the demand curve shifts from DD to  $D_1D_1$ . And the new equilibrium is at  $E_1$ . Thus with the increase in demand supply remaining same there is an increase in the price to  $OP_1$ . When the demand decreases from DD to  $D_2D_2$  an inward shift in the demand curve the equilibrium shifts to  $E_2$  leading to a reduction in the equilibrium price. With the increase in demand the equilibrium price increase and vice versa.

The effect of change in the supply is shown in figure 3.12, where price on Y axis and quantity demanded and supplied on x axis.

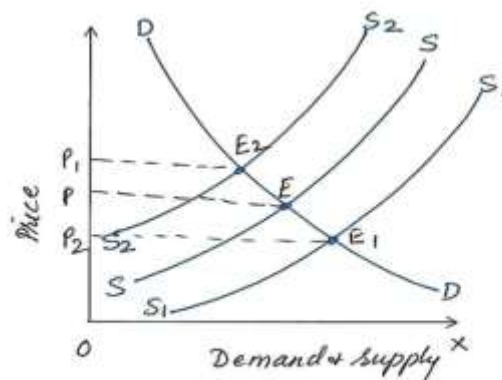


Figure 3.12: Effect of change in supply on equilibrium price

Demand curve DD intersectssupply curve SS at point E, which determines the equilibrium price OP and equilibrium quantity OQ. With an increase in supply the supply curve shifts from SS to  $S_1S_1$ . And the new equilibrium is at  $E_1$ . Thus with the increase in supply demand remaining same there is a reduction in the price to  $OP_1$ . When the supply decreases from SS to  $S_2S_2$  an inward shift in the supply curve the equilibrium shifts to  $E_2$  leading to an increase in the equilibrium price to  $OP_2$ . Thus with the increase in supply the equilibrium price decrease and vice versa.

Thus we learnt that

- i)** When the demand increases equilibrium price will increase,
- ii)** When the demand decreases equilibrium price will decrease,
- iii)** When the supply increase equilibrium price will decrease, and
- iv)** When the supply decreases equilibrium price will increase.

### **3.5 Importance of Time Element**

Marshall, who propounded the theory that price is determined by both demand and supply, also gave a great importance to the time element in the determination of price. Time elements is of great relevance in the theory of value, since one of the two determinants of price, namely supply, and depends on the time allowed to it for adjustment. It is worth mentioning that Marshall divided time into different periods from the viewpoint of supply and not from the viewpoint of demand.

Time is short or long according to the extent to which supply can adjust itself. Marshall felt it necessary to divide time into different periods on the basis of response of supply because it always takes time for the supply to adjust fully to the changed conditions of demand.

The reason why supply takes time to adjust itself to a change in the demand conditions is that nature of technical conditions of production is such as to prohibit instantaneous adjustment of supply to changed demand conditions. A period of time is required for changes to be made in the size, scale and organisation of firms as well as of the industry.

Another point is worth noting. When Marshall distinguished short and long periods he was not using clock or calendar time as his criterion, but 'operational' time in terms of economic forces at work. In this regard, as said above, supply forces were given the major attention and a time was short or long according to the extent of adjustment in the forces of supply. The greater the adjustability of the supply forces, the greater the length of the time irrespective of the length in clock-time.

**Time can be divided into following three periods on the basis of response of supply to a given and permanent change in demand:**

**1. Market Period:**

The market period is a very short period in which the supply is fixed, that is, no adjustment can take place in supply conditions. In other words, supply in the market period is limited by the existing stock of the good. The maximum that can be supplied in the market period is the stock of the good which has already been produced.

In this period more good cannot be produced in response to an increase in demand. This market period may be a day or a few days or even a few weeks depending upon the nature of the good. For instance, in case of perishable goods, like fish, the market period may be a day and for a cotton cloth, it may be a few weeks.

**2. Short Run:**

Short run is a period in which supply can be adjusted to a limited extent. During the short period the firms can expand output with given equipment by changing the amounts of variable factors employed. Short periods is not long enough to allow the firm to change the plant or given capital equipment. The plant or capital equipment remains fixed or unaltered in the short run. Output can be expanded by making intensive use of the given plant or capital equipment by varying the amounts of variable factors.



### 3. Long Run:

The long run is a period long enough to permit the firms to build new plants or abandon old ones. Further, in the long run, new firms can enter the industry and old ones can leave it. Since in the long run all factors are subject to variation, none is a fixed factor. During the long period forces of supply fully adjust them to a given change in demand; the size of individual firms as well as the size of the whole industry expands or contracts according to the requirements of demand.

**From above, it is clear that because of the varying response of supply over a period of time to a sudden and once-for-all increase in demand Marshall found, it necessary and useful to study the pricing process in:**

- a. The market period,
- b. The short-run and
- c. The long-run depending respectively upon whether the supply conditions have time to make (i) no adjustment, (ii) some adjustment of labour and other variable factors, and (iii) full adjustment of all factors and all costs. Therefore, Marshall explained how the equilibrium between demand and supply was established in three time periods and determined market price, short-run price and long-run price.

We thus see that the price that will prevail depends upon the period under consideration. If a sudden and a once-and-for all increase in demand take place, the market price will register a sharp increase, since supply cannot increase in the market period. In this market period, firms can sell only the output that has already been produced. However, in the short run some limited adjustment in supply will take place as a result of the firms moving along their short run marginal cost curves by expanding output with the increase in the amount of variable factors. Consequently, the short run price will come down from the new high level of the market price.

But this short-run price will stand above the level of original market price which prevailed before the increase in demand occurred. In the long run the firms would expand by building new plants, that is, by increasing the size of their capital equipment.

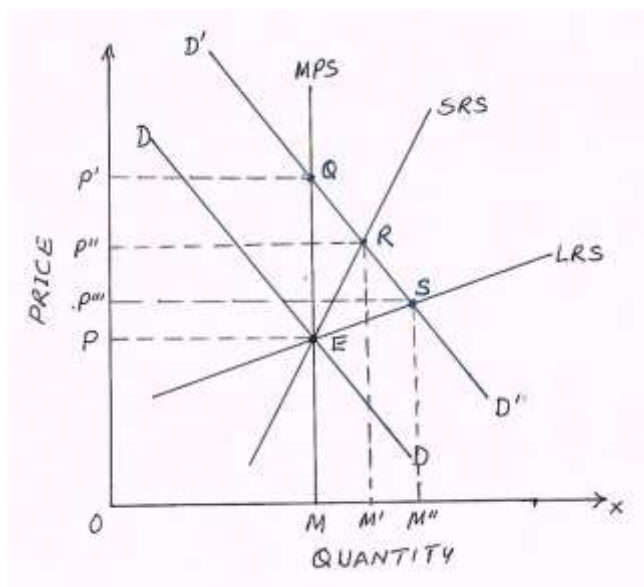
In other words, firms would expand along the long-run marginal cost curves. Besides, the new firms will enter the industry in the long run and will add to the supply of output. As a result of these long-run adjustments in supply, the price will decline.

Thus the long run price will be lower than the short-run price. But this long-run price will be higher than the original price which ruled before the increase in demand took place, if the industry happens to be increasing-cost industry.

The adjustment of supply over a period of time and consequent changes in price is illustrated in figure above where long-run supply curve LRS of an increasing-cost industry along with the market-period supply curve MPS and the short-run supply curve SRS have been drawn. Originally, demand curve DD and market-period supply curve MPS intersect at point E and price OP is determined. Suppose that there is a once- for-all increase in demand from DD to D'D'.

Supply cannot increase in the market period and remains the same at OM. Market-period supply curve MPS intersects the new demand curve D'D' at point Q. Thus, the market price sharply rises to OP''. Short-run supply curve SRS intersects the new demand curve D'D' at point R.

The short-run price will therefore be OP'' which is lower than the new market price OP'. As a result of the long-run adjustment the price will fall to OP''' at which the long-run supply curve LRS intersects the demand curve D'D'.



The new long-run price  $OP'''$  is lower than the new market price  $OP'$  and the short-run price  $OP''$ , but will be higher than the original price  $OP$  which prevailed before the increase in demand took place. This is so because we are assuming an increasing-cost industry. If the industry is subject to constant costs, the long-run price will be equal to the original price. Further, if the industry is subject to decreasing costs, the long-run price will be lower than the original price.

It follows from above that the price which prevails in the market depends upon the period under consideration. It is thus clear that the time plays an important role in the determination of price. Another significance of the time-period analysis of pricing is that it enabled Marshall to resolve the controversy current among economists whether it is demand or supply which determines price.

Marshall propounded the view that both demand and supply took part in the determination of price. But, "as a general rate", said Marshall, "the shorter the period which one considers the greater must be the share of our attention which is given to the influence of demand on value, and the longer the period more important will be the influence of cost of production on value.

Actual value at any time—the market value as it is often called—is often influenced by passing events and causes whose action is fitful and short-lived than by those which work persistently. But in the long run these fitful and irregular causes in a larger measure efface one another's influence so that in the long run persistent causes dominate value completely".

From the above quotation from Marshall it follows that in the market period, demand exercises a predominant influence over price but in the long run it is the supply which is of overwhelming importance as a determinant of price. Roughly speaking, we can say that in the market period it is the force of demand which determines price and in the long period it is the force of supply which governs price.

Thus those economists who held that value was governed by demand were in a way right and so were those who contended that cost of production (i.e., force working on the supply side) determines price. The difference in the two views was due to the fact that one group of economists was emphasising the determination of the market price over which demand has determining influence and over which cost of production does not exercise much influence, while the other group was stressing on the determination of long-run price over which cost of production has got paramount influence. It is thus clear that Marshall by putting forth the view that both demand and supply determine price by their interaction brought about synthesis between the views of earlier economists.

Both the two opposite views of earlier economists were in a way right but each was one-sided. Each view provided us with a force which governed price. The two forces of supply and demand furnished by the two opposing views were sufficient determining factors.

Therefore, Marshall gave equal importance to both demand and supply as determinants of price, though the influence of the two varied in different time periods. Marshall introduced time period analysis into pricing process to bring out the varying influence of each of two forces over price of the product in different time periods.

It follows from what has been said above that Marshall and modern economists following him study the effect of the varying response in supply in different time periods on price to a sudden and permanent change in demand conditions.

On the contrary, economists do not study the effect on price of the adjustment in demand over time in response to a change in supply conditions. The reason why we do not study adjustment in demand to a change in supply and consequent effect on price is better brought out in the worlds of Professors Stonier and Hague. "There is no reason why, if supply conditions change, demand conditions should change as well, or if they do, why they should change differently in the short run and the long run.

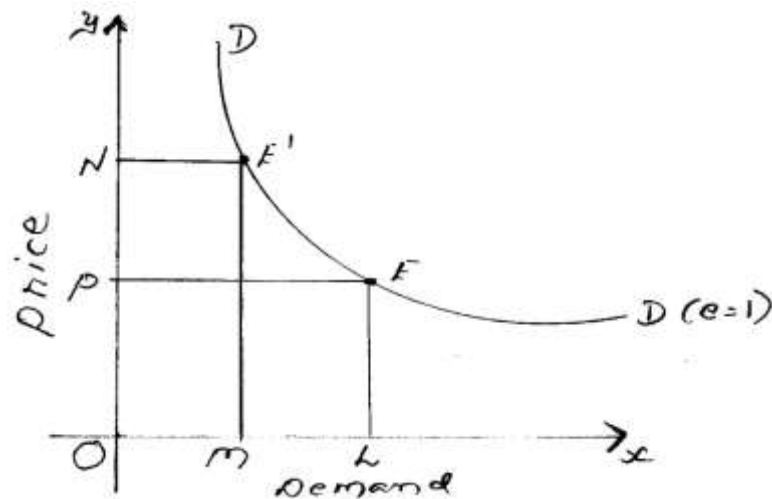
Changes in consumer's tastes are not dependent on technology in the way that supply conditions are. Admittedly, consumers' tastes may and probably will change as time goes on. But this will be a change of data and not a change induced by changed supply conditions.

There is no necessary reason why the long-run demand curve should differ from the short-run demand curve, however odd the behaviour of supply has been—we must expect that the longer is the period during which demand and supply are coming into equilibrium, the more changes will have time to take place. If we were to study the changes in demand and supply which would take place in respect to any change of data during many successive very short periods of time, we should find that we had introduced unnecessary and intolerable detail into the analysis.”

We shall explain below in detail the market-period equilibrium, short-run equilibrium, long-run equilibrium between demand and supply and thus the determination of market price, short-run price and long-run price under conditions of perfect competition.

### **3.16 Elasticity of Demand**

The law of demand fails to tell us as to what extent demand for a commodity vary when there is a change in price. In other words, the law of demand merely indicates the direction to which demand moves when there is a change in price. But concept of elasticity explains the exact change in demand when there is a change in price. The price elasticity of demand is defined as “The degree of responsiveness or sensitiveness of demand to a change in price of a commodity or service.”



Algebraically, it is stated as

$$e(p) = \frac{\Delta Q}{Q} \div \frac{\Delta P}{P}$$

Where  $\Delta$  = means a change  
 $Q$  = Quantity  
 $P$  = Price  
 $e(p)$  = Price elasticity of demand

There are five cases of price elasticity of demand.

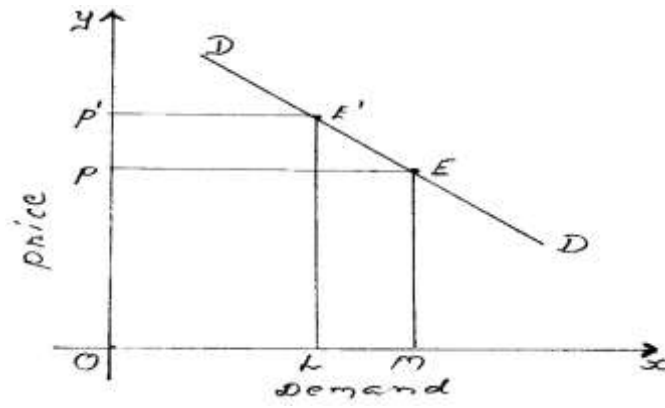
### 1. Unitary elastic demand (e = 1)

Demand is said to be unitary elastic when proportionate change in price is equal to proportionate change in quantity demanded of any commodity. The value of the elasticity is equal to one (e=1) in such cases demand curve is convex to the origin as shown in the diagram.

$$e(p) = \frac{\Delta Q}{Q} \div \frac{\Delta P}{P} = \frac{ML}{OL} \div \frac{NP}{OP} = \frac{ML}{OL} \times \frac{OP}{NP} = 1$$

### 2. Relatively elastic demand (e > 1)

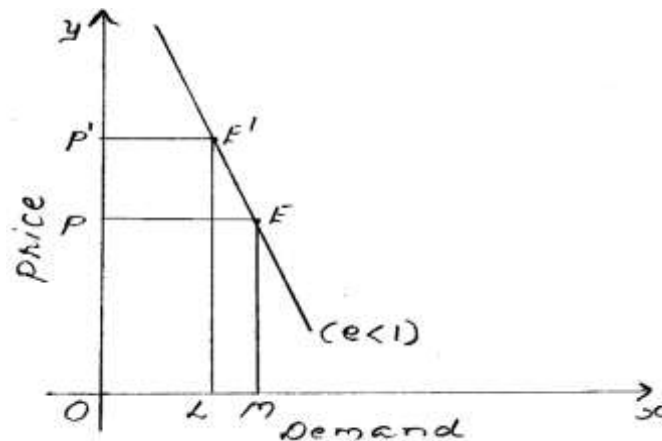
Demand for a commodity is said to be elastic when proportionate change in quantity demanded is greater than proportionate change in price. In such cases value of the elasticity is greater than one and shape of the demand curve is flatter as shown in the following diagram.



$$\begin{aligned}
 e(p) &= \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} > 1 \\
 &= \frac{LM}{OM} \div \frac{PP'}{OP} \\
 &= \frac{LM}{OM} \times \frac{OP}{PP'} > 1
 \end{aligned}$$

### 3. Relatively inelastic demand ( $e < 1$ )

Demand for a commodity is said to be relatively inelastic when proportionate change in demand is smaller than proportionate change in price of the commodity. In such cases, value of the elasticity is less than one ( $e < 1$ ) and the demand curve is steeper. The following diagram exhibits the said demand curve.

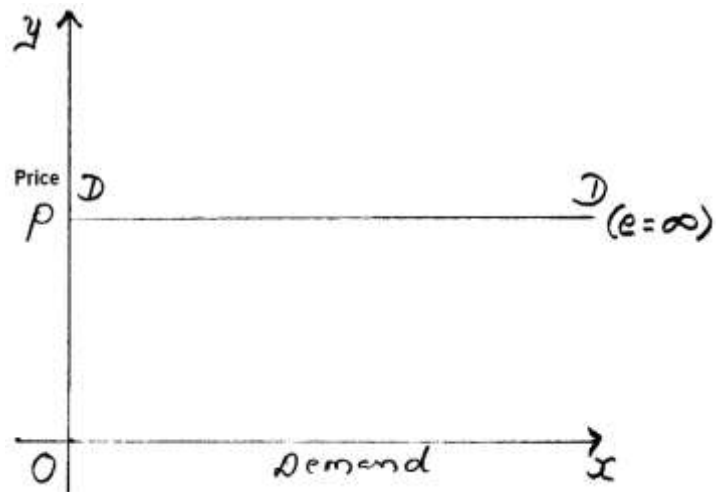


$$\begin{aligned}
 e(p) &= \frac{\Delta Q}{Q} \div \frac{\Delta P}{P} < 1 \\
 &= \frac{LM}{OM} \div \frac{PP'}{OP} \\
 &= \frac{LM}{OM} \times \frac{OP}{PP'} < 1
 \end{aligned}$$

### 4. Perfectly elastic demand ( $e = \infty$ )

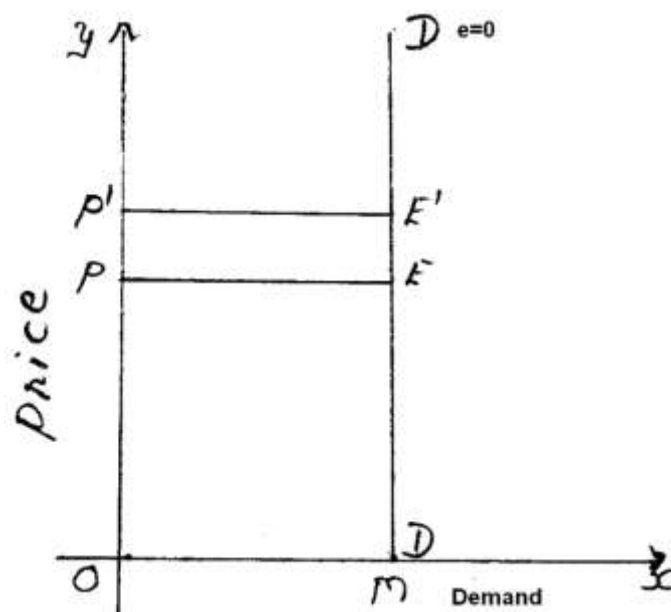
Demand for a commodity is said to be perfectly elastic when a small change (rise or fall) in price brings about either complete contraction or infinite expansion in demand. In such cases value of the elasticity is infinity ( $e = \infty$ ) and demand curve is horizontal to 'x' axis. The following figure depicts the same.





**5. Perfectly inelastic demand ( $e=0$ )**

Demand for any commodity is said to be perfectly inelastic when there is no change in demand at a high or low price. The value of the elasticity is zero in such cases and demand curve is vertical to 'x' axis. The following figure depicts the perfectly inelastic demand.



### 3.17 Determinants of Elasticity

#### 1. Nature of commodity

In case of necessities of life demand is inelastic while luxuries relatively elastic.

#### 2. Number of uses

In case of large number of uses, demand is relatively elastic and in case a few uses, it is relatively inelastic.

#### 3. Number of substitutes

If the substitutes are more demand is relatively elastic while less number of substitutes, demand is relatively inelastic.

#### 4. Durability of goods

Durable goods have relatively elastic demand while perishable goods have relatively inelastic demand.

#### 5. Low priced commodities

Low priced commodities like salt, newspapers, matchboxes etc. have relatively inelastic demand.

#### 6. Proportion of income spent

Commodities needing less expenditure generally have relatively inelastic demand.

### 3.18 Importance of Elasticity

The concept of elasticity is very much useful in day-to-day life. Firstly, it deeply analyses price-demand relationship. Secondly, it helps producers in fixing prices of their product. Thirdly it is helpful to government to declare certain industries as public utility services. Fourthly it also helps the government to frame economic policies. Fifthly it helps finance minister in matter of taxation. The concept elasticity explains why there exists poverty in the midst of plenty. It is also helpful in international trade to determine terms of trade between the two countries.

### 3.19 Income Elasticity of Demand

$$e(i) = \frac{\text{Proportionate change in quantity demanded}}{\text{Proportionate change in income}}$$

It is defined as “the degree of responsiveness or sensitiveness of demand to a change in income.” In other words, it shows a degree of responsiveness of demand to a change in income.

$$e(i) = \frac{\Delta Q}{Q} \div \frac{\Delta I}{I}$$

### 3.20 Cross Elasticity

It measures elasticity of demand of related goods. It means that when price of say ‘x’ good changes, the demand for related good say ‘y’ changes. Thus, the cross elasticity of demand measures the response of the quantity demanded of a particular commodity to the change in price of some other related commodity. Generally it takes place in complementary goods and substitutes

$$\text{Cross Elasticity} = \frac{\text{Proportionate change in quantity demanded of say 'x' good}}{\text{Proportionate change in price of related good say 'y' good}}$$

The cross elasticity in case of substitutes is always positive but it is negative in case of complementary goods.

**3.21 Exercise :**

1. What is Law of demand? Explain with the help of schedule and diagram.(10 Marks)
2. What is a demand schedule? (5 Marks)
3. Write a note on demand curve.(5 Marks)
4. What are the exceptions of Law of demand? (5 Marks)
5. Explain the derivation of demand curve with the help of diagram.(5 Marks)
6. Discuss demand function.(10 Marks)
7. State law of supply and explain it with the help of a suitable diagram and schedule.(10 Marks)
8. Examine the factors affecting supply.(10 Marks)
9. What do you understand by equilibrium price?(10 Marks)
10. Discuss the effect of change in supply and demand on the equilibrium price. (10 Marks)
11. What is elasticity of demand? When does it become perfectly elastic, unitary elastic and inelastic?

## UNIT – IV

### PRODUCTION

#### 4.1 Introduction

Production virtually means value-addition to natural resources. Men and nature are the basic elements in the production process. The valuers have to understand that commodities become saleable in the market after they are produced and every product acquires new value in this process. The output of production takes the form of goods as well as services.

In the next unit we shall see how to capture the value added through production. The product is meant primarily for exchange in return for money. The process of exchange is called transaction and return in terms of money is called price. The valuer has to make an estimate of price as it ought to be. In this way price is differentiated from value. However, value-addition is the goal of production and price is the stage in the process.

Now, in economics the following agents are usually considered as the factors for production:-

- Land
- Labour
- Capital
- Organization

We have already stated that men and nature are the primary agents. But in course of time the production process become more complex. Modern production said to be capitalistic in the sense that capital plays a predominant role. This takes us to consider what capital is.

### **3.1.1 Capital :**

Capital is produced means of production. In the olden days, at the dawn of human civilization, man used to produce by working upon natural resources with simple tools and implements. The farmer used to produce harvest of crops with plough, cobbler used to produce shoes and other lather products with aid of simple tools, the potter used turn-out utensils with the help of earth wheels, the weaver used to weave cloths with the help of an unsophisticated spinning wheel and loom.

But, with the advancement of civilization, growth of population and multiplication of demand, production has to be augmented many-folds by division of labour and intervening capital as the dominant media of production. The process of production also became round-about. Thus, irrigation became a prior need for investment, so that ultimate scale of production may be augmented, the spindles and looms are come to be replaced by power looms, weaving machines, etc. The cobbler simple tools became replaced by machine for mass production. The potter's simple earthen wheel paved the way for appropriate machineries. These intermediate machineries and means of production are again the resultant of initial production, the purpose of which is not directly to yield consumable items but to fill-in needs for produced means called capital, which can propel the quantum of ultimate production of consumable items in a big way. In course of time, this intermediate product called capital has gradually assumed the centre stage of production, so as to be recognized as a distinctly separate factor.

### **3.1.2 Organization :**

An organization is the typical task of coordinating and harnessing the functions of other factors of production. The person or a group of persons who take the leading role of such organization constitute a distinct class called entrepreneur. They are not simple labour as to be merged in he concept of men interacting with natural resources to make production at the primary stage. Just as capital is an offshoot of natural resources as a distinct agent of production so is an enterprise or an organization, an offshoot of man or labour.

### 3.1.3 The Future Scenario :

In course of time, the four factor of production, i.e., Land, Labour, Capital and Organization, are yielding place to more items through split. The factor of capital is going to be split into tangible capital and intangible capital. The latter consists of intellectual properties, developed through research and development, which again relegates the process of production to a more remote region away from directly turning-out consumable commodities. These intellectual properties are distinctly given shape as intangible rights in the form of patterns, copyrights, design, trademark, know-how, trade secret, etc.

Entrepreneurship is gradually being divided into proprietorship and management, the latter being developed as distinct cadre aiding the process of production and gradually emerging as an indispensable agent of production.

Labour has to be split-up as skilled and unskilled, as because the role of one is distinctly different from the other.

Finally, we may for the future generation of valuers, classify the factors of production in the following manner:-

Land	-	all natural resources
Labour	-	skilled and unskilled
Capital	-	tangible as well as intangible
Entrepreneurship	-	including management

## 4.2 ECONOMIC ANALYSIS OF COSTS

### 4.2.1 Total Cost : Fixed and Variable

Consider a firm that produces a quantity of output (denoted by  $q$ ) using inputs of capital, labour, and materials. The firm buys these inputs in the factor markets. A profit-minded firm will keep an eagle eye on its cost to maintain profitability. The firm's accountants have the task of calculating the total dollar costs incurred at each level of  $q$ .

**Table 1** shows the total cost ( $TC$ ) for each different level of output  $q$ . Looking at columns (1) and (4), we see that  $TC$  goes up as  $q$  goes up. This makes sense because it takes more labour and other inputs to produce more labour and other inputs to produce more of a good; extra factors involve an extra money cost. It costs \$110 in all to produce 2 units, \$130 to produce 3 units, and so forth. In our discussion, we assume that the firm always produces output at the lowest possible cost.

(1) Quantity $q$	(2) Fixed cost FC (\$)	(3) Variable cost VC (\$)	(4) Total cost TC (\$)
0	55	0	55
1	55	30	85
2	55	55	110
3	55	75	130
4	55	195	160
5	55	155	210
6	55	225	280

**Table 1 : Fixed, Variable, and Total Costs**

The major elements of a firm's costs are its fixed costs (which do not vary at all when output changes) and variable costs (which increase as output increase). Total costs are equal to fixed plus variable costs:  $TC = FC + VC$ .

### Fixed Cost

Columns (2) and (3) of **Table 1** break total cost into two components: total fixed cost (FC) and total variable cost (VC).

What are a firm's **fixed costs**? Sometimes called "overhead" or "sunk costs", they consist of items such as rent for factory or office space, contractual payments for equipment, interest payments on debts, salaries of tenured faculty, and so forth. These must be paid even if the firm produces no output, and they will not change if output changes. For example, a law firm might have an office lease which runs 10 years and remains an obligation even if the firm shrinks to half its previous size. Because  $FC$  is the amount that must be paid regardless of the level of output, it remains constant at \$55 in column (2).



## Variable Cost

Column (3) of **Table 1** shows variable cost (*VC*). **Variable costs** are those which vary as output changes. Examples include materials required to produce output (such as steel to produce automobiles), production workers to staff the assembly lines, power to operate factories, and so on. In a supermarket, checkout clerks are a variable cost, since managers can easily adjust the clerks' hours worked to match the number of shoppers coming through the store.

By definition, *VC* begins at zero when  $q$  is zero. It is part of *TC* that grows with output; indeed, the jump in *TC* between any two outputs is the same as the jump in *VC*. Why? Because *FC* stays constant at \$55 throughout and cancels out in the comparison of costs between different output levels.

Let us summarize these cost concepts:

*Total cost* represents the lowest total dollar expense needed to produce each level of output  $q$ -*TC* rises as  $q$  rises.

*Fixed cost* represents the total dollar expense that is paid out even when no output is produced: fixed cost is unaffected by any variation in the quantity of output.

*Variable cost* represents expenses that vary with the level of output – such as raw materials, wages, and fuel – and includes all costs that are not fixed.

Always, by definition

$$TC = FC + VC$$

### 4.2.2 Definition of Marginal Cost

Marginal cost is one of the key concepts of economics. **Marginal cost** (*MC*) denotes the extra or additional cost of producing one extra unit of outputs. Say a firm is producing 1000 compact discs for a total cost of \$10,000. If the total cost of producing 1001 discs is \$10,006, the marginal cost of production is \$6 for the 1001<sup>st</sup> disc.

Sometimes, the marginal cost of producing an extra unit of output can be quite low. For an airline flying planes with empty seats, the added cost of another passenger is simply the cost of the peanuts and snack; no additional capital (planes) or labour (pilots and flight attendants) is necessary. In other cases, the marginal cost of another unit of output can be quite high. Consider an electric utility. Under normal circumstances, it can generate enough power using only its lowest-cost, most efficient plants. But on a hot summer day, when everyone's air conditioners are running and electric demand is high, the utility may be forced to turn on its old, high-cost, inefficient generators. This added electric power comes at a high marginal cost to the utility.

(1) Output q	(2) Total cost TC (\$)	(3) Marginal cost MC (\$)
0	55	30
1	85	25
2	110	20
3	130	---
4	160	---
5	210	50

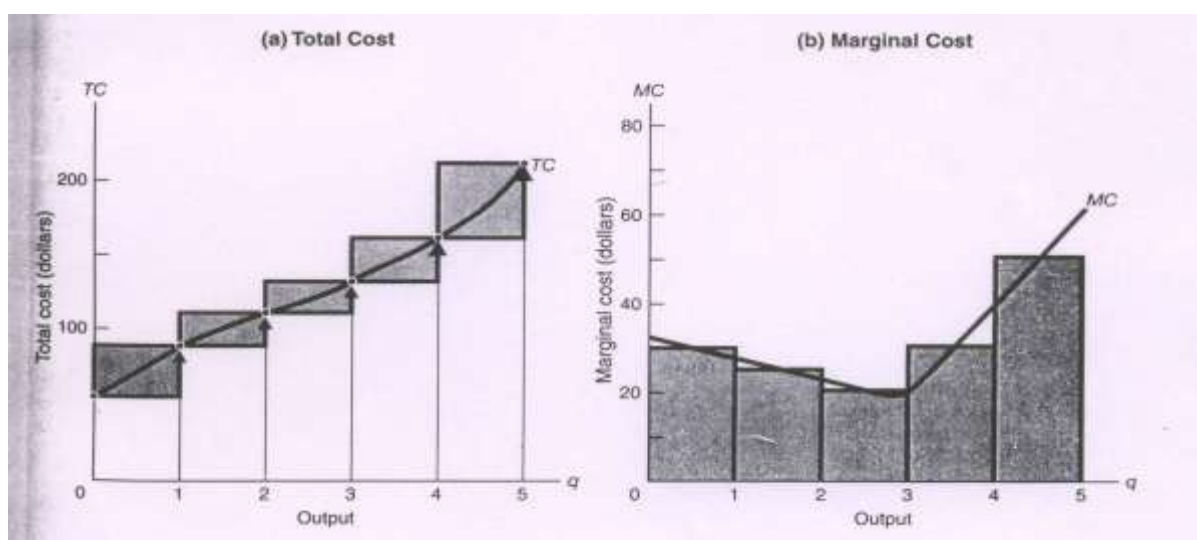
**Table 2 : Calculation of Marginal Cost**

Once we know total cost, it is easy to calculate marginal cost. To calculate the *MC* of the fifth unit, we subtract the total cost of the four units from the total cost of the five units, i.e.,  $MC = \$210 - \$160 = \$50$ . Fill in the blank for the marginal cost of the fourth unit

**Table 2** uses the data from **Table 1** to illustrate how we calculate marginal costs. The rust-colored *MC* numbers in column (3) of **Table 2** come from subtracting the *TC* in column (2) from the *TC* of the subsequent quantity. Thus, the *MC* of the first unit is \$30 (= \$85 - \$55). The marginal cost of the second unit is \$25 (= \$110 - \$85). And so on.

**Figure 1 : The Relationship between Total Cost and Marginal Cost**

This figure graphs the data from **Table 2**. Marginal cost in **(b)** is found by calculating



the extra cost added in **(a)** for each unit increase in output. Thus to find the *MC* of producing the fifth unit, we subtract \$160 from \$210 to get *MC* of \$50. A smooth black curve has been drawn through the points of *TC* in **(a)**, and the smooth black *MC* curve in **(b)** links the discrete steps of *MC*

Instead of getting *MC* from the *TC* column, we could get the *MC* figures by subtracting each *VC* number of column (3) of **Table 1** from the *VC* in the row below it. Why? Because variable cost always grows exactly like total cost, the only different being that *VC* must – by definition – start out from 0 rather than from the constant *FC* level. (Check that  $30 - 0 = 85 - 55$ , and  $55 - 30 = 110 - 85$ , and so on.)

The marginal cost of production is the additional cost incurred in production one extra unit of output.

### Marginal Cost in Diagrams

**Figure 1** illustrates total cost and marginal cost. It shows that *TC* is related to *MC* in the same way that total product is related to marginal product or that total utility is related to marginal utility.

What kind of shape would we expect actual. MC curves to have? Empirical studies have found that for most production activities in the short run (i.e., when the capital stock is fixed), marginal cost curves are U-shaped like the one shown in **Figure 1 (b)**. This U-shaped curve falls in the initial phase, reaches a minimum point, and finally begins to rise.

#### **4.2.3 Average Cost**

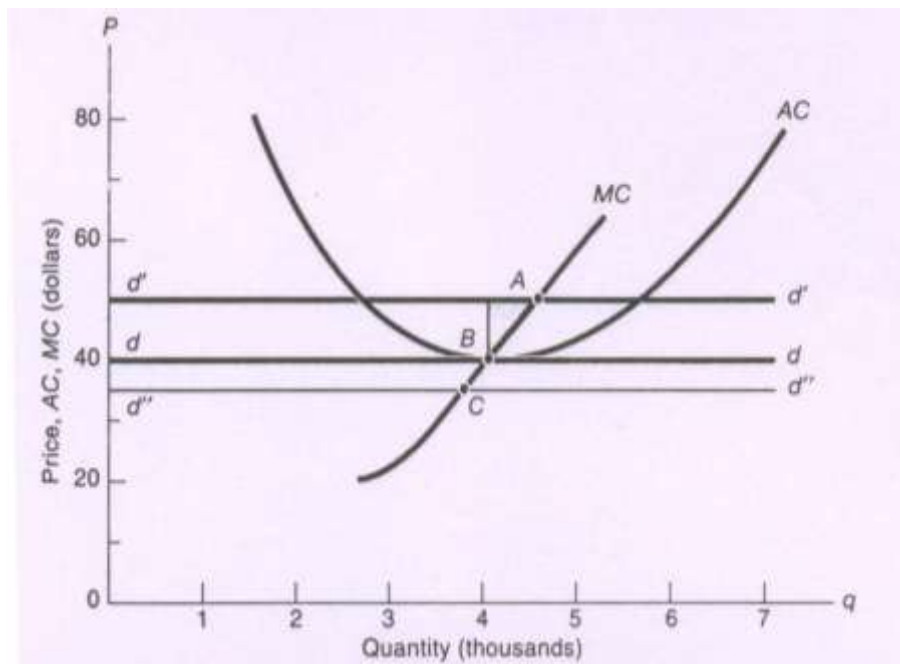
We complete out catalogue of the cost concepts important in economics and business with a discussion of different kinds of average or unit cost. **Table 3** expands the data of **Table 1** and **2** to include three new measures average cost, average fixed cost, and average variable cost.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Quantity	Fixed cost	Variable cost	Total cost	Marginal cost per unit	Average cost per unit	Average fixed cost per unit	Average variable cost per unit
	$FC$	$VC$	$TC=FC+VC$	$MC$	$AC = \frac{TC}{q}$	$AFC = \frac{FC}{q}$	
	$AVC = \frac{VC}{q}$						
q	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
0	55 Undefined	0	55	33	Infinity	Infinity	
1	55	30	85	27	85	55	30
2	55	55	110	22	55	27½	27½
3	55	75	130	21	43⅓	18⅓	25
4*	55	105	160	40*	40*	13¾	26¼
5	55	155	210	60	42	11	---
6	55	225	280	80	46⅔	91/6	37½
7	55	-----	370	100	526/7	76/7	45
8	55	-----	480	120	60	6⅔	53⅔

Table 3 : All Cost Concepts Derive from Total Cost Schedule

**Figure 2 : Firm's Supply Curve is Its Rising Marginal Cost Curve**

For a profit-maximizing competitive firm, the upward-sloping marginal cost (MC) curve is the firm's supply curve. For market price at  $d'd'$ , the firm will supply output at intersection point at A. Explain why intersection points at B and C represent equilibria for prices at  $d$  and  $d''$  respectively



### Rule for a firm's supply under perfect competition

A firm will maximize profits when it produces at that level where marginal cost equals price:

$$\text{Marginal cost} = \text{price or } MC = P$$

**Figure 2** illustrates a firm's supply decision diagrammatically. When the market price of output is \$40, the firm consults its cost data and finds that the production level corresponding to a marginal cost of \$40 is 4000 units. Hence, at a market price of \$40, the firm will wish to produce and sell 4000 units. We can find that profit-maximizing amount in **Figure 2** at the intersection of the price line at \$40 and the *MC* curve at point *B*.

In general, then, the firm's marginal cost curve can be used to find its optimal production schedule the profit-maximizing output will come where the price intersects the marginal cost curve.

We choose the example so that at the profit-maximizing output the firm has zero profits, with total revenues equal to total costs. (Recall that these are economic profits and include all opportunity costs, including the owner's labour and capital). Point *B* is the **zero-profit point**, the production level at which the firm makes zero profits; at the zero-profit point-price equals average cost, so revenues just cover costs.

What if the firm chooses the wrong output? If the market price were \$50, the firm should choose output at intersection point *A* in **Figure 2**. We can calculate the loss of profit if the firm mistakenly produces at *B* when price is at \$50 by the shaded gray triangle in **Figure 2**. This depicts the surplus of price over *MC* for production between *B* and *A*. Draw in a similar shaded triangle above *A* to show the loss from producing too much.

The general rule then is:

*A profit-maximizing firm will set its output at that level where marginal cost equals price. Diagrammatically, this means that a firm's marginal cost curve is also its supply curve.*

#### 4.5 Exercise

1. What are the different factors of production and how are they remunerated?
2. Distinguish between fixed cost and variable cost. How marginal cost is determined?
3. Explain the relationship between marginal product and average product by referring to a diagram.

## UNIT – V

### PRICING OF PRODUCT

#### 5.1 What is a Market?

##### 5.1.1 Not Chaos, but Economic Order

We usually take for granted the smooth running of the economy. When you go to the supermarket, the items you want – bread, cereal, and bananas – are usually on the shelf. You pay your bill, pop the food in you mouth, and have a juicy meal. What could be simpler?

If you pause for a moment and look more closely, you may begin to appreciate the complexity of the economic system that provides your daily bread. The food may have passed through five or ten links before getting to you, traveling for days or months from every state and every corner of the globe as it moved along the chain of farmers, food processors, packagers, truckers, wholesalers, and retailers. It seems almost a miracle that food is produced in suitable amounts, gets transported to the right place, and arrives in a palatable form at the dinner table.

But the true miracle is that this entire system works without coercion or centralized direction by anybody. Literally millions of businesses and consumers engage in voluntary trade, and their actions and purposes are invisibly coordinated by a system of prices and markets. Nobody decides how many chickens will be produced, where the trucks will drive, and when the supermarkets will open. Still, in the end, the food is in the store when you want it.

Markets perform similar miracles around us all the time, as can easily be seen if only we observe our economy carefully. Thousands of commodities are produced by millions of people, willingly, without central direction or master plan. Indeed, with a few important exceptions (like the military, police, and schools) most of our economic life proceeds without government intervention, and that's the true wonder of the social world.



## 5.2 The Market Mechanism

A market economy is an elaborate mechanism for co-ordinating people, activities, and business through a system of prices and markets. It is a communication device for pooling the knowledge and actions of billions of diverse individuals. Without central intelligence or computation, it solves problems of production and distribution involving billions of unknown variables and relations, problems that are far beyond the reach of even today's fastest supercomputer. Nobody designed the market, yet functions remarkably well. *Is a market economy no single individual or organization is responsible for production, consumption, distribution, and pricing.*

How do markets determine prices, wages, and outputs? Originally, a market was an actual place where buyers and sellers could engage in face-to-face bargaining. The *marketplace* – filled with slabs of butter pyramids of cheese, layers of wet fish, and heaps of vegetables – used to be a familiar sight in many villages and towns, where farmers brought their goods to sell. In the United States today there are still important markets where many traders gather together to do business. For example, wheat and corn are traded at the Chicago Board of Trade, oil and platinum are traded at the New York Mercantile Exchange, and gems are traded at the Diamond District in New York City.

More generally, a market should be thought of as a mechanism by which buyers and sellers can determine prices and exchange goods and services. There are markets for almost everything, from art to pollution. A market may be centralized, like the stock market. It may be decentralized, as in the case of houses or labour. Or it may exist only electronically, as in the case of many financial assets and services which are traded by computer. The crucial characteristic of a market is that it brings buyers and sellers together to set prices and quantities.

A market is a mechanism by which buyers and sellers interact to determine the price and quantity of a good or service.

In a market system, everything has a price, which is the value of the good in terms of money (the role of money will be discussed in Section B of this chapter), Prices represent the terms on which people and firms voluntarily exchange different commodities. When I agree to buy a used Ford from a dealer for \$4040, this agreement indicates that the Ford is worth more than \$4050 to me and that the \$4050 is worth more than the Ford to the dealer. The used – car market has determined the price of a used Ford and, through voluntary trading, has allocated this good to the person for whom it has the highest value.

In addition, Prices serve as *signals* to producers and consumers. If consumers want more of any good, the price will rise, sending a signal to producers that more supply is needed. For example, every summer, as families set out on their vacations, the demand for gasoline rises, and so does the price. The higher price encourages oil companies to increase gasoline production and, at the same time, discourages travelers from lengthening their trips.

On the other hand, if a commodity such as cars becomes overstocked, dealers and automobile companies will lower their prices in order to reduce their inventory. At the lower price, more consumers will want cars, and producers will want to make fewer cars. As a result, a balance, or equilibrium, between buyers and sellers will be restored.

What is true of the markets for consumer goods is also true of markets for factors of production, such as land or labour. If computer programmers rather than textile workers are needed, job opportunities will be more favourable in the computing field. The price of computer programmers (their hourly wage) will tend to rise, and that of textile workers will tend to fall, as they did during the 1980s. The shift in relative wages will attract workers into the growing occupation.

The nursing crisis of the 1980s shows the labour market at work. During that decade the growth in the healthcare sector led to an enormous expansion of nursing jobs with far too few trained nurses to fill them. Hospitals offered all sorts of fringe benefits to attract nurses, including subsidized apartments, low-cost on-site child care, and signing bounces as high as \$10,000. One hospital even ran a lottery for nurses, with the prize being a gift certificate at a nearby department store. But what really attracted people into the nursing profession was raising wages. Between 1983 and 1992, the pay for registered nurses rose almost 70 percent, so they were making about as much money as the average accountant or architect. The rising pay drew so many people into nursing that by 1992 the nursing shortage had disappeared in most parts of the country.

Prices coordinate the decisions of producers and consumers in a market. Higher prices tend to reduce consumer purchases and encourage production. Lower prices encourage consumption and discourage production. Prices are the balance wheel of the market mechanism.

### 5.3 Market Equilibrium

At every moment, some people are buying while others are selling; firms are inventing new products while governments are passing laws to regulate old ones; foreign companies are opening plants in America while American firms are selling their products abroad. Yet in the midst of all this turmoil, markets are constantly solving the *what, how, and for whom*. As they balance all the forces operating on the economy, markets are finding market **equilibrium of supply and demand**.

*A market equilibrium represents a balance among all the different buyers and sellers.* Depending upon the price, households and firms all want to buy or sell different quantities. The market finds the equilibrium price that simultaneously meets the desires of buyers and sellers. Too high a price would mean a glut of goods with too much output; too low a price would produce long lines in stores and a deficiency of goods. Those prices for which buyers desire to buy exactly the quantity that sellers desire to sell yield equilibrium of supply and demand.

### 5.4 How Markets Solve the Three Economic Problems

We have just described how prices help balance consumption and production (or demand and supply) in an individual market. What happens when we put all the different markets together – gasoline, cars, land, labour, capital, and everything else? These markets work simultaneously to determine a *general equilibrium* of prices and production.

By matching sellers and buyers (supply and demand) in each market, a market economy simultaneously solves the three problems of *what, how, and for whom*. Here is an outline of market equilibrium:

1. What goods and services will be produced is determined by the dollar votes of consumers – not every 2 or 4 years at the polls, but in their daily purchase decisions. The money that they pay into businesses' cash registers ultimately provides the payrolls, rents, and dividends that consumers, as employees, receive as income.

Firms, in turn, are motivated by the desire to maximize profits. Profits are net revenues, or the difference between total sales and total costs. Firms abandon areas where they are losing profits; by the same token, firms are lured by high profits into production of goods in high demand. A familiar example is Hollywood. If one film makes huge profits – say, a film about a cute dinosaur and an evil scientist – other studios will rush to produce imitations.

2. How things are produced is determined by the competition among different producers. The best way for producers to meet price competition and maximize profits is to keep costs at a minimum by adopting the most efficient methods of production. Sometimes change is incremental and consists of little more than tinkering with the machinery or adjusting the input mix to gain accost advantage, which can be very important in a competitive market. At other times there are drastic shifts in technology, as with steam engines displacing horses because steam was cheaper per unit of useful work, or airplanes replacing rail-roads as the most efficient mode for long-distance travel. Right now we are in the midst of just such a transition to a radically different technology, with computers replacing typewriters, paper, and many white-collar workers.
3. For whom things are produced – who is consuming, and how much – depends, in large part, on the supply and demand in the markets for factors of production. Factor markets (i.e., markets for factors of production) determine wage rates, land rents, interest rates, and profits. Such prices are called *factor prices*. The same person may receive wages from a job, dividends from stocks, interest from a certificate of deposit, and rent from a piece of property. By adding up all the revenues from factors, we can calculate the person's market income. The distribution of income among the population is thus determined by the amounts of factors (person-hours, acres, etc.) owned and the prices of the factors (wage rates, land rents, etc.).

Be warned, however, that incomes reflect much more than the rewards for sweaty labour or abstemious saving. High incomes come also from large inheritances, good luck, favourable location, and skills highly priced in the marketplace. Those with low incomes are often pictured as lazy, but the truth is that low incomes are generally the result of poor education, discrimination, or living where jobs are few and wages are low. When we see someone on the unemployment line, we might say, "There, but for the grace of supply and demand, go."

## 5.5 The demand and Supply Framework

The working of the market mechanism can be most simple illustrated by the apparatus of demand-supply curves which is employed by economists for a variety of purposes. In order to introduce the reader to this powerful tool we take a very simple example.

Suppose we want to understand how the price of milk is determined by the market mechanism. On one side of the market are ‘consumers’ who in this case includes households as well as makers of sweets and other milk products. On the other side are producers who may be dairy farmers, and public and privet dairies. Consumers’ demand for milk is determined by, among other things, price of milk, consumers’ incomes, number of consumers, their tastes, prices of product like eggs and meat which are alternative sources of proteins etc. Now, imagine a hypothetical experiment in which we confront a group of consumers and enquire what quantity of milk they would like to purchase per day at a price of, say, Rs. 5 per liter. We repeat the question with varying prices of milk. All other determinants of demand for milk – consumer income, price of substitute etc., - are assumed to remain fixed. We will obtain a schedule of milk price and the quantities the consumers would like to purchase at each price. This relationship

between the price of milk and the quantity demanded other thing remaining fixed is called the demand curve for milk. Note carefully that we are talking of quantity and not quantity purchased. The former is an expression of consumers’ intentions or desires, when faced with a set of hypothetical prices. The actual quantity purchased is the result of the consumers translating their intentions into action when faced with an actual price asked for milk by the suppliers. The demand curve is depicted in figure below.



Quantities demanded per day are plotted on the horizontal axis (measured in liter) while prices in rupees per liter are plotted on the vertical axis.

As shown in the figure, the curve is downward sloping i.e. as price of milk declines, other things remaining constant the quantity demanded increases and vice versa. Why should this be so? While a rigorous argument is outside our scope, we can sketch a plausible explanation.

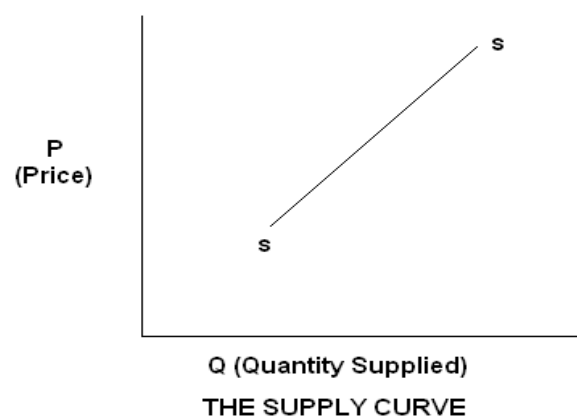
First consider a consumer faced with alternative prices. If the price is very high - say Rs.25 per liter - he might decide to go entirely without milk or decide to purchase the minimum essential quantity (suppose there is a baby in the family). As the price is reduced, the consumer would think of satisfying less urgent needs — milk for adding to tea, coffee, making butter etc. As the price decreases, less and less urgent needs would come into play. Each additional unit bought is satisfying a lesser (from the consumer's point of view) want; the price the consumer would be willing to pay for a unit of milk would be governed by the consumer's valuation of the satisfaction to be derived from consuming that unit which in turn would be a function of the quantity already consumed. Apart from this, but for similar reasons, more and more consumers would demand milk as price decreases - a family which cannot afford to buy any milk when the price is Rs.25 may want to buy some if the price goes down to say Rs.8.

A change in the price of a good has actually two effects. Consider a hypothetical consumer who consumes only three goods — rice, milk and meat. His monthly budget is Rs.500 and the prices are Rs.6 per kg of rice, Rs.5 per liter of milk and Rs.40 per kg of meat. His current consumption pattern is 30 litre of milk, 24 kg of rice and 5 kg of meat per month. Now suppose the price of milk decreases to Rs.4 per litre. The consumer can now purchase the same basket of goods (though he may not wish to) and have Rs. 30 left over with which he can purchase additional quantities of some or all of the three goods. The same effect could have been achieved by keeping the prices at the original level but giving the consumer an additional income of Rs.30. Thus a price reduction has an effect which is equivalent to an increase in income. Presumably, some of the extra income will be spent on milk thus increasing the quantity demanded. There is an additional effect.

Relative to meat, milk has become cheaper than before; this might induce the consumer to substitute some milk for meat since milk can, at least partly, satisfy similar needs. Thus, there is a substitution effect- away from the relatively more expensive goods towards the relatively cheaper good. On both counts the demand for milk increases as its price decreases.

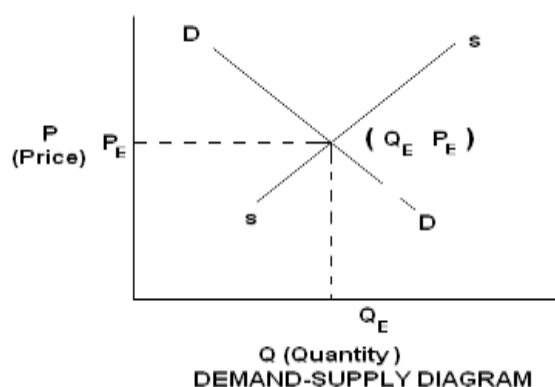
Now, consider the supply side of the market. Production of milk requires a number of inputs. For some of these, their quantities cannot be varied in the short run e.g., stock of milch cattle, grazing land, dairy machinery etc. For others, quantities can be varied e.g., cattle feed, labour, etc.

Consider a typical milk producer. He has a set of fixed inputs which are combined with varying quantities of variable inputs to produce milk. At a given price how much milk would he like to supply? It depends upon the behavior of cost of production and the objectives of the producer. If his goal is to maximise his profits - defined as sales revenue minus cost of production he will push production upto the point where the cost of production of the last unit just equals the price, and subsequent units will cost more. Thus his quantity decision will depend upon the behaviour of incremental or marginal cost. A well known law in economics, called the law of diminishing marginal products says that when the increasing quantities of variable inputs are applied to given quantities of fixed inputs, the incremental output from successive doses of variable inputs eventually declines. This implies that the incremental cost of production starts increasing beyond a point and hence the producer will be willing to supply larger quantity only if the price is higher. Figure below shows the supply curve which is the relation between the price and quantities which the producers would like to supply at each price.



Now, combine the two sides of the market. In figure given below we have shown a demand curve and a supply curve. The point at which they intersect, shown as  $(P_E, Q_E)$  is the price – quantity combination at which the producers’ and consumers’ intentions are simultaneously realized. At any price above  $P_E$ , the producers would like to supply more than the consumers would like to purchase. The result would be unsold stocks (which in the case of milk may have to be simply thrown away). Obviously, this situation cannot last; the producers will reduce the price and bring a smaller quantity to the market. At a price below  $P_E$  there would be a shortage of milk with a number of consumers unable to buy the quantities they would like to buy at such a price.

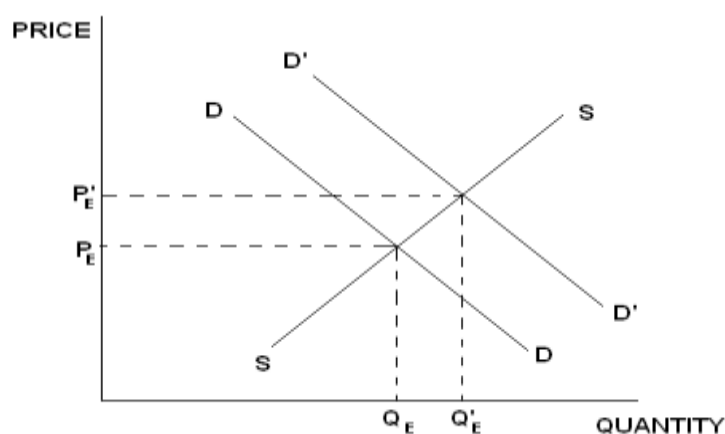
The result would be a clamour for larger quantity with willingness to pay a higher price. The market would be in ‘equilibrium’ at  $(P_E, Q_E)$  in the sense that neither the producers nor the consumers would have an incentive to depart from it unless other factors governing demand and supply change.



There are number of questions regarding the notion of equilibrium. First, there is the question of what is the actual process by means of which a market finds the equilibrium. Since individual participants do not know the plans of others, what mechanism brings about the equality of quantity demanded and quantity supplied? Second, there is the problem of stability of equilibrium. Suppose the milk market is in equilibrium at the price-quantity combination  $(P_E, Q_E)$ . Now there is a temporary disturbance e.g. power failure in a large cold storage facility used to preserve milk. There is a temporary shortage, price shoots up and long queues are seen at milk booths. After the disturbance is eliminated, will the market return to its original equilibrium or move away from it? Related to this is the question of market dynamics.



Suppose as a result of increase in consumer income, more milk than before is demanded at every price. In terms of our demand-supply framework, we show this as a shift of the demand curve upward and to the right. The new equilibrium is the price-quantity combination  $(P'_E, Q'_E)$ . What is the path of the market as it moves from the old to the new equilibrium i.e. how do price and quantity adjust to the change in demand? Can we say anything neither about markets which are nor in equilibrium?



These are some of the questions which have been and are being investigated by economists. There are no fully satisfactory answers.

The demand supply framework is a convenient representation of the working of the market mechanism. The notion of equilibrium forms a point of reference. In real life markets may not be permitted to function in the manner described above because of price controls, rationing and lack of information about prices and insufficient mobility of goods and factors of production. Nevertheless, the demand-supply framework has been found to be a useful analytical device.

Effect of changes in other factors can be depicted in the demand-supply diagram. Suppose consumers' incomes increase. At every price, consumers will now demand a larger quantity than before in figure this is shown as a rightward-upward shift of the entire demand curve. The result is a higher price and larger quantity in the new equilibrium. On the other hand suppose a drought causes shortage of fodder with a resultant increase in its price; the result would be an increase in the cost of production of milk.

At every price producers would be willing to supply a smaller quantity than before. In figure this is shown as a leftward-upward shift of the entire supply curve resulting in a higher price and a smaller quantity in the new equilibrium. You must be always careful to distinguish between movement along a demand or a supply curve, and shifts of curves.

## 5.6 Pure Competition

Pure competition is said to exist when the following two conditions are fulfilled:

(1) **Large Number of Buyers and Sellers**

The first condition is that there should be operating in the market a large number of buyers and sellers. If that is so no single producer or purchaser will be able to influence the market price. The output of any single firm is only a small portion of the total output and the demand of any single purchaser is only a small portion of the total demand. Hence, the market price has to be taken as given and unalterable by every purchaser and seller. Thus no individual purchaser can influence the market price by varying his own demand and no single firm is in a position to affect the market price by varying its own output.

(2) **Homogeneous Product**

The second condition is that the articles produced by all firms should be standardized or identical. In case all farms produce kalia wheat, it is immaterial for the purchaser as to who has produced it. He can buy it as well from the one as from the other. This condition ensures that the same price rules in the market for the same commodity. In case the output is not standardized (i.e., it is differentiated) each individual firm will be in a position to influence the market price.

*Whether the products are identical or not, has to be looked at from the purchaser's angle.* Even if the products are identical, the purchaser may have a prejudice against the output of a particular firm and may consider it different. That is, if the consumers regard the commodities as different, they should be considered different for purposes of classification in spite of the fact that they are actually identical. The consumers generally believe that the products are different. They generally believe that the commodities that they purchase from a particular shop are superior, even though they may actually be of the same quality.

When the quality is the same, the commodities are perfect substitutes of one another and their cross-elasticity is infinity. In these circumstances, if a firm raises its price, it will lose all customers. It can sell as much as it likes at the prevailing price. Why should it then think of lowering its price? Hence it cannot raise its price and it need not lower it. That is why the prevailing market price is accepted and acted upon by all dealers.

Thus, if the above two conditions, viz., homogeneous products and large number of buyers and sellers, are found in a market, it is said to be under pure competition.

Examples of pure competitions are to be found in the case of farm products, e.g., wheat, cotton, rice. There is a large number of producers, each producing an insignificant proportion of the total market supply. Their product is similar and none of them is in a position to influence the market price by his own individual action. In other fields we seldom come across pure competition.

## **5.7 Perfect Competition**

Perfect competition is wider than pure competition. In addition to the two conditions of pure competition mentioned above, several other conditions must be fulfilled to make it perfect competition.

These conditions are:

### **(1) Free Entry or Exit**

There should be no restriction on the firm's entry into, or exit from, that industry. This will happen when all the firms are making just normal profit. If the profit is more, new firms will enter and extra profit will be competed away; and if, on the other hand, profit is less, some firms will quit, raising the profits for the remaining firms. But if there are restrictions on the entry of new firms the existing firms may enjoy super-normal profit. Only when there are no restrictions on entry or exit, the firms will be in equilibrium.

(2) **Perfect Knowledge**

Another assumption of perfect competition is that the purchasers and sellers should be fully aware of the prices that are being offered and accepted. In case there is ignorance among the dealers, the same price cannot rule in the market for the same commodity. When the producers and the customers have full knowledge of the prevailing price, nobody will offer more and none will accept less and the same price will rule throughout the market. The producers can sell at that price as much as they like and the buyers also can buy as much as they like.

(3) **Absence of Transport Costs**

If the same price is to rule, it is necessary that no cost of transport has to be incurred. If the cost of transport is there, prices must differ in different sectors of the market.

(4) **Perfect Mobility of the Factors of Production**

This mobility is essential in order to enable the firms to adjust their supply to demand. If the demand exceeds supply, additional factors will move into the industry and in the opposite case, move out. Mobility of the factors of production is essential to enable the firms and the industry to achieve an equilibrium position.

## 5.8 Pure and Perfect Competition Distinguished

As would have become evident from the above discussion, the main difference between pure competition and perfect competition is that in pure competition there is no element of monopoly enabling a producer to charge more. If the two conditions of pure competition are fulfilled, there can be no question of monopolistic control. In perfect competition, apart from absence of monopoly, other conditions are also essential, e.g., free entry and exit, absence of transport cost, perfect knowledge, etc.

## 5.9 Imperfect Competition

It refers to conditions which are quite opposite of those that prevail under perfect competition. For instance, the number of dealers is not large, at any rate not as large as under perfect competition, the products are not homogeneous; they are on the other hand differentiated by means of different labels attached to them such as different brands of toilet requisites. Either in ignorance or on account of transports costs or lack of liability of the factors of production, same price does not rule in the market throughout. Rather different prices are charged by different producers of products which are really similar but are made to appear different through advertisements, high pressure salesmanship and labeling and branding. The result is that each producer comes to have a hold on a client from whom he can charge higher prices. In this case the demand curve or sales curve or what is also called average revenue curve, is not a horizontal straight line. It is, on the other hand, a downward sloping curve, i.e., the seller can sell more by reducing price. Under perfect competition, he need not reduce the price, for he can sell any amount at the prevailing price. He can also charge higher prices because his customers are attached to him.

He can thus have a price policy of his own whereas a seller under perfect competition has no price policy; he has merely to accept the market price. The demand for his product is not perfectly elastic; it is responsive to change in price.

This form of market is a blend of monopoly and competition and has been called "*monopolistic competition*" by Chamberlain, an American economist. In the real world, we have neither monopoly (i.e., absence of competition) nor competition but imperfect competition, i.e., partly monopoly and partly competition. The products are not complete substitutes for one another but they are close substitutes. But monopolistic competition is only one form of imperfect competition where there is a large number of sellers but products are differentiated. Other forms of imperfect competition are oligopoly and ordinary monopoly.

### 5.10 Monopolistic Competition

The last category of imperfect competition is monopolistic competition; this occurs when a large number of sellers produce differentiated products. This market structure resembles perfect competition in that there are many sellers, none of whom have a large share of the market. It differs from perfect competition in that the products sold by different firms are not identical. *Differentiated products* are ones whose important characteristics vary; for example, for automobiles, important characteristics include size, performance, fuel economy, and safety. Because companies sell slightly different products, they can sell at slightly different prices.

The classic case of monopolistic competition is the retail gasoline market. You may go to the local Exxon station, even though it charges slightly more, because it is on your way to work. But if the price at Exxon raises more than a few pennies above the competition, you might switch to the Mobil station a short distance away.

Indeed, this example illustrates that one important source of product differentiation comes from location. It takes time to go to the bank or the grocery store, and the amount of time needed to reach different stores will affect our shopping choices. In economic language, the total opportunity cost of goods (including the cost of time) will depend upon how far we live from a store. Because the opportunity cost of local shops is lower, people generally tend to shop in nearby locations. This consideration also explains why large shopping complexes are so popular they allow people to buy a wide variety of goods while economizing on shopping time. The product differentiation that comes from different locations is an important reason why these tend to be monopolistically competitive markets.

Product quality is an increasingly important part of product differentiation today. Goods differ in their characteristics as well as their prices. Most IBM compatible personal computers these days can all run the same software, and there are many manufacturers. Yet the personal computer industry is a monopolistically competitive industry, because computers differ in speed, size, memory, repair services, and ancillaries like CD-ROMs, internal modems, and sound systems. Indeed, a whole batch of monopolistically competitive computer magazines is devoted to explaining the differences between the computers produced by the monopolistically competitive computer manufacturers!

The main features of monopolistic competition are:-

- (i) In monopolistic competition, the number of dealers is quite large but not as large as under perfect competition.
- (ii) The products are not homogeneous; they are, on the other hand, differentiated by means of different labels attached to them, such as different brands of toilet requisites.
- (iii) Either in ignorance or on account of transport costs or lack of mobility of the factors of production, the same price does not rule in the market throughout. Rather different prices are charged by different producers for products which are really similar but are made to appear different through advertisements, high pressure salesmanship and labeling and branding. The result is that each produce comes to have a hold on a clientele from whom the producer can charge higher prices.
- (iv) Under monopolistic competition, the demand curve or sales curve, or what is also called average revenue curve, is not a horizontal straight line. It is, on the other hand, a downward sloping curve, i.e., the seller can sell more by reducing price. Under perfect competition, he need not reduce the price, for he can sell any amount at the prevailing price. Under monopolistic competition, the seller can also charge higher prices because his customers are attached to him. He can thus have a price policy of his own, whereas a seller under perfect competition has no price policy; he has merely to accept the market price as given.
- (v) Under imperfect competition, the demand for the product is not perfectly elastic; it is responsive to changes in price.

This form of market is a blend of monopoly and competition and has been called monopolistic competition by Chamberlain, an American economist. In the real world, we have neither monopoly (i.e., absence of competition) nor competition but imperfect competition, i.e., partly monopoly and partly competition. The products are not perfect substitutes for one another but they are close substitutes.

## **5.11 Price – Output Determination under Monopoly Market:**

### **5.11.1 What is Monopoly?**

The term monopoly is split up into mono and poly. 'Mono' means one and 'Poly' means seller. Thus monopoly means a single seller of the product having complete control on the supply of the product secondly, there should be no close substitute to monopoly product or the cross elasticity of demand between monopoly product and other's product must be either zero or very small. Zero cross and small elasticity implies total absence of substitutes and small elasticity implies distant substitute. Thirdly, there must be strong barriers to the entry of new firms in the market. Under monopoly condition, no rival firm is allowed to enter the market. Thus a single firm will face the market demand for the product. Therefore, the single firm constitutes the entire industry. Hence, there is no difference between firm and industry under monopoly form of market.

### **5.11.2 Nature of Demand Curve under Monopoly:**

There is a marked difference between the demand curve faced by the firm under perfect competition and the demand curve faced by a monopoly firm. A firm under competitive conditions faces perfectly elastic demand curve where as a monopoly firm faces relatively elastic demand curve. In case of monopoly market, a single firm constitutes the whole industry. Therefore the market demand for the product is faced by a single monopoly firm. Since individual demand schedules for the product slope down ward the monopoly firm faces a down ward sloping demand curve. This means that if the firm wants to increase sales of its products, it must lower the price. Monopoly firm can make two decisions viz (i) how much to produce i.e. fixing the size of output or naming the price for the product. But it can not make both the decisions at a time. It can make either of the decisions at a time.



It means that the firm may either fix the size of output to be produced and leaves it to consumers to determine the price for the product or it may name the price for the product and leaves to the consumers to buy whatever quantity they want to buy at that price.

However, the monopoly firm is a price maker and not merely a quantity adjuster like a firm under perfect competition. So the problem faced by a monopoly firm is one of picking up right price – quantity combination which is optimum for the firm.

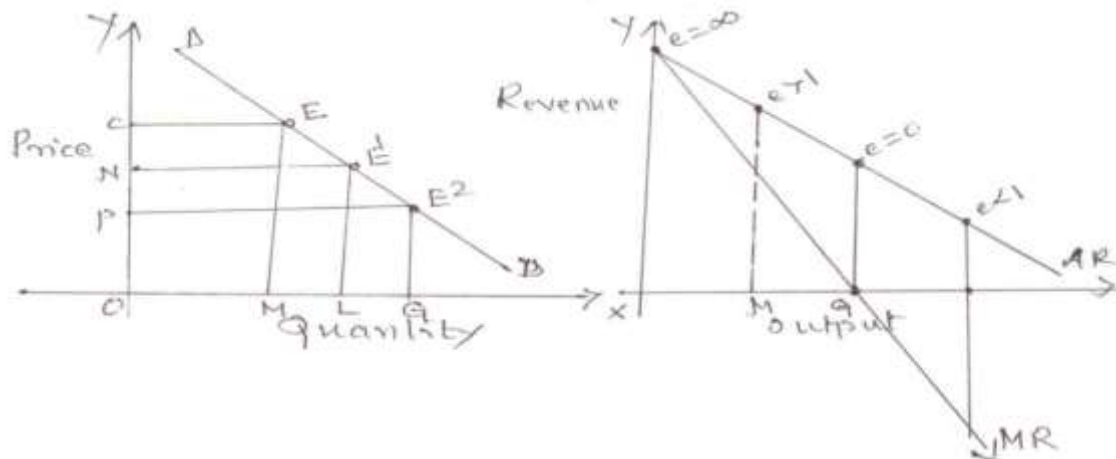
Demand curve of a monopoly firm is its average revenue curve. Since individual demand schedules slope downward, the average revenue curve of the monopoly firm also slopes downward through out its length. The marginal revenue curve lies below the average revenue curve. It is so because every additional unit of the product is sold at a lower and lower price. That is why marginal revenue is less than average revenue. The shape and the relationship between AR and MR are shown and explained in the following diagram. The MR curve lies below the AR curve because every additional unit is sold at lower price than the previous one. Though MR is less than AR, they are related to each other through price elasticity of demand. The price elasticity on AR curve will tell whether MR is positive or negative at a particular size of output. As long as price elasticity is positive i.e. between infinity and unity MR is positive and between unity and zero elasticity, MR is negative. At unity elasticity MR is zero as shown in the diagram below.

The relationship between AR and MR is explained by the following formula.

$$MR = AR \left( \frac{e - 1}{e} \right)$$

Where (a) MR → Marginal Revenue (b) AR → Average Revenue (c) e = elasticity of demand. The value of  $\frac{e - 1}{e}$  is less than one therefore MR is always less than AR or Price. So price or AR under monopoly market is always higher than MR. The extent to which the MR curve lies below the AR curve depends upon the value of the fraction  $\frac{e - 1}{e}$  However at infinity on AR curve both are equal, at unity MR is zero, at elasticity greater than one it is positive and elasticity less than one it is negative. Thus it can be observed that the higher the elasticity on AR curve, the closer will be the MR curve to the AR curve and lower the elasticity the farther off will be the MR curve from the AR curve. Beyond unity, MR becomes negative.

### 5.12 Price – Output Equilibrium Under Monopoly :

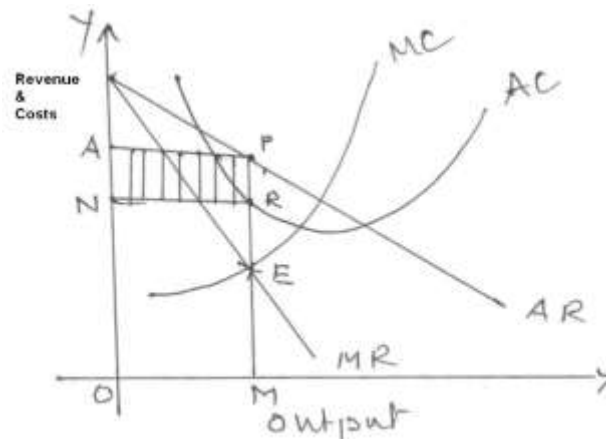


Monopoly firm like any other firm keeps before itself two objectives viz (i) Maximisation of profit or minimisation of losses. It is rather surprising that monopoly firm incurs losses. Yes, it does when demand for its product is inadequate in the short run.

As we have seen earlier that the monopoly firm makes either of the decisions at a time that is fixing the size of output or naming the price for its product.

Generally, price for the product is named. Once price is fixed, then it is up to consumers to buy whatever quantity they want to buy at that price.

The monopoly firm will continue production up to that point at which Marginal cost (MC) becomes equal to marginal revenue (MR). In other words, the essential condition for monopoly equilibrium is the equality between  $MC = MR$ . However this is essential condition but not a sufficient condition. The sufficient condition is that the elasticity of demand on the AR curve must be greater than one at the point of equilibrium. Thus the monopoly firm will never fix its size of output at that level where the elasticity is less than one because there after MR becomes negative. Therefore total receipts of the monopoly firm always falls if it increases its sales. Thus the problem faced by the monopoly firm is to pick up that price quantity combination which is the best for the firm i.e. which enables the firm to earn maximum possible profits. The following diagram depicts the monopoly equilibrium. Revenue and costs are measured along 'OY' axis and output along 'OX' axis. The diagram indicates MC and MR are equal at OM size of output and 'OA' is the price named by the monopolist.



ON is the average cost of production. Thus AN is the profit per unit (  $OA - ON = AN$  ). The firm is in equilibrium at 'E' point where  $MR = MC$  and elasticity of demand at 'P' point on AR curve is also greater than one. The firm makes excess

$$\begin{aligned}
 \text{Profit} &= TR - TC \\
 &= \text{Price} \times \text{output} - \text{Average cost} \times \text{output} \\
 &= AO \times OM - ON \times OM \\
 &= AOMP - NOMR \\
 &= ANRP \text{ (shaded Area)}
 \end{aligned}$$

One point is to be noted in the case of monopoly equilibrium is that the monopoly price is not equal to marginal cost. It is always higher than marginal cost but it stands in certain relation with MC through elasticity. This relationship is explained with the help of the formula given by Prof (MS) Joan Robinson, English Economist.

$$MR = AR \left( \frac{e-1}{e} \right)$$

$$\therefore AR = MR \left( \frac{e}{e-1} \right)$$

But in equilibrium  $MR = MC$

$$\therefore AR = MC \left( \frac{e}{e-1} \right)$$

$$AR \text{ or Price} = MC \left( \frac{1}{e - 1} \right)$$

Since the Value of the fraction  $\frac{1}{e - 1}$  is greater than one for a given value of

elasticity, it follows that under monopoly, price is always greater than MC

$AR > MC$ . However, the extent to which price differs from MC depends upon the value of the elasticity on AR curve at the point corresponding to the equilibrium. The smaller the elasticity, the greater is the value of expression  $\frac{1}{e - 1}$  and hence the

greater the extent to which price would differ from MC. Thus the monopoly price is the function of marginal cost and the elasticity of demand.

However MC curve which represents the supply curve of the product under perfectly competitive conditions does not function as such under monopoly. Since MC can never be negative, equality between MC and MR can not be achieved where elasticity is less than one because then MR becomes negative. Thus the monopoly equilibrium will always lie at a point where elasticity is greater than one.

### 5.13 Price Discrimination or Discriminating Monopoly :

Price discrimination refers to the practice of a seller of selling the same product at different prices to different buyers or groups of buyers. In other words, the monopolist sells the same product to different customers at different prices. This he does it to maximize profit. According to Prof. Stigler, price discrimination refers to "The sales of technically similar products at prices which are not proportional to marginal cost". This implies that the monopolist improves the quality of the product and sells it at a much higher price than the cost he incurs on improving the product.

There are three types of price discrimination namely personal price discrimination, local price discrimination and price discrimination according to use of the product.

- (1) **Personal Price Discrimination** : It refers to charging of different prices or fees for the same services or the product to different persons. This is possible in all personal services.
- (2) **Local Price Discrimination** : It refers to charging of different prices to customers living in different localities or places under this type of price discrimination, the monopolist divides his total market in to various sub-markets based on elasticity of demand or on the basis of economic conditions of the people.

(3) **Price Discrimination According to use of the Product** : It refers to charging of different prices for the same product or service in its different uses. For example electricity charges, or railway fares.

#### **5.13.1 Conditions For Price Discrimination :**

- (i) Price discrimination takes place only when it is not possible to transfer units of the product from one market to another. In other words sub-market must be separated from each other either by a long distance or by tariff walls otherwise buyers in the dear market may come down to the cheap market and buy the product or buyer in the cheap market may resell the product in dear market. Thus, there should be no seepage between the two sub-markets.
- (ii) The second condition for price discrimination is that the buyers in the dear market should not convert themselves into the buyers of cheap market for the purpose of buying the product. It means that the rich should not pretend themselves to be the poor. If they do so then in that case price discrimination will break down.

#### **5.13.2 Price Discrimination is possible in the following cases :**

- (1) It is possible in all personal services because there is no resale possible.
- (2) It is possible when sub-markets are separated by long distance or by tariff walls.
- (3) Legal sanction permits the price discrimination. The government allows the monopolist to charge different prices to different customers for the same product.
- (4) People's prejudices and preferences for certain products enable the monopolist to charge different prices to different groups of people for the same product.
- (5) Price discrimination is possible on account of ignorance and laziness of the people.
- (6) When several groups of buyers need the same service for clearly differentiated commodities or use, Price discrimination takes place.

### 5.13.3 When Is Price-Discrimination Possible & Profitable?

Price discrimination is possible, yet it may not be profitable. Price discrimination is possible only when there is different elasticity of demand in different sub-markets. If the demand curves in all the sub-markets are iso-elastic, then price discrimination may not be profitable even though it is possible. It is so because marginal revenue in all the sub markets at a price will be the same.

This is better explained by the formula

$$MR = AR \left( \frac{e-1}{e} \right)$$

We suppose, that there are two sub – markets namely ‘A’ and ‘B’. Price elasticity in both the markets is the same i.e. 2. So, at price Rs. 10 per unit MR in both the markets A and B would be the same. Therefore, it will not pay the monopolist to transfer any amount of the product from one market to another. He will get same revenue in both the markets. If he sells one extra unit in either of the markets.

$$MR_a = AR \left( \frac{e-1}{e} \right)$$

$$MR_a = 10 \left( \frac{2-1}{2} \right)$$

$$MR_a = 10 \times \frac{1}{2}$$

$$MR_a = 5$$

$$MR_b = AR \left( \frac{e-1}{e} \right)$$

$$MR_b = 10 \left( \frac{2-1}{2} \right)$$

$$MR_b = 10 \times \frac{1}{2}$$

$$MR_b = 5$$

e = 2, Price Rs. 10/- Per Unit

MR in both the market is Rs. 5/- . It is thus clear from the above example that it will not be profitable for the monopolist to discriminate prices between the sub-markets A and B. When elasticity is the same in both markets.

But it is possible and profitable only when elasticity of demand in different sub-markets is different. In such cases, it will be profitable for the monopolist to charge different prices if elasticity of demand in sub-markets at single monopoly price is not the same. Monopolist will make maximum profit by discriminating prices in the sub-markets having different price elasticity of demand. This is better understood by the formula.

$$MR = AR \left( \frac{e-1}{e} \right)$$

When elasticity is different in sub-markets, MR in different sub-markets is different. Let us use the same example but elasticity as  $e = 2$  in 'A' market and  $e = 4$  in 'B' market. Therefore MR in 'A' market and MR in 'B' market are as follows

$$MR_a = AR \left( \frac{e-1}{e} \right)$$

$$MR_b = AR \left( \frac{e-1}{e} \right)$$

$$MR_a = 10 \left( \frac{2-1}{2} \right)$$

$$MR_b = AR \left( \frac{4-1}{4} \right)$$

$$MR_a = 10 \times \frac{1}{2}$$

$$MR_b = 10 \times \frac{3}{4}$$

$$MR_a = \text{Rs. } 5/-$$

$$MR_b = 15/2$$

$$MR_b = \text{Rs. } 7.5$$

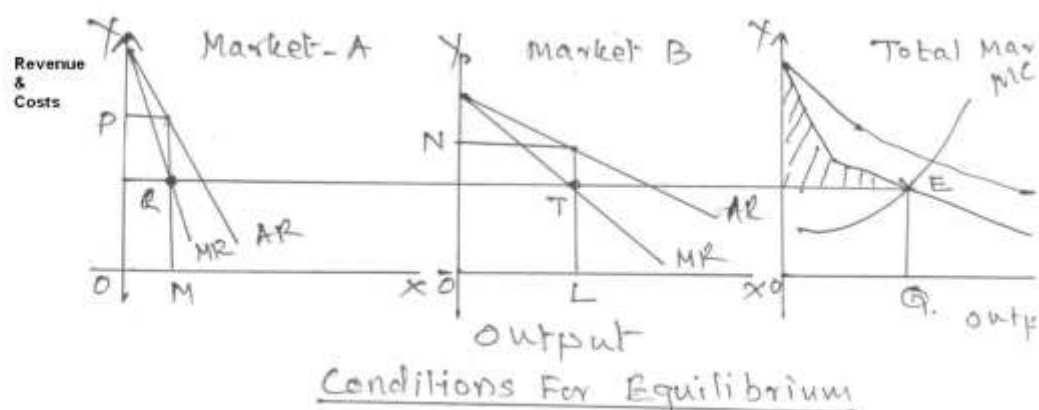
The above example makes clear that MR is higher in 'B' market than the MR in 'A' market. Thus it is profitable to transfer some quantity of the product from 'A' market to 'B' market. If he transfers one unit from A to B market, he will gain  $7.5 - 5$  Rs. 2.5 per unit. Thus, he will go on transferring unit of the product from A to B market until MRs. In both the markets become equal. Now, he will charge different prices for the same product in A and B markets. A higher price in 'A' market and a lower price in 'B' market . Generally a high price is charged in low elasticity market and a low price in a high elasticity market.

### 5.13.4 Monopoly Equilibrium Under Conditions of Price Discrimination :

To study equilibrium of discriminating monopoly we have to assume that the monopolist has divided his market in two submarkets. On the basis of elasticity of demand in each market. Having divided the markets, he has to make two decisions to attain equilibrium. These decisions are (a) How much out put is to be produced? and (b) How to share the total output between various sub-markets. In other words, how much quantity of the product is to be sold in each sub –market and at what prices. To illustrate the equilibrium under price discrimination, let us suppose that there are only two sub-markets namely 'A' and 'B'. Market 'A' is having low elasticity and market 'B' is having high price elasticity for the monopoly product.

The equality between marginal cost and aggregate marginal revenue will tell the monopolist how much to produce. It means that the monopolist would continue production up to a point at which  $MC = AMR$  or  $CMR$ .  $AMR$  or  $CMR = MR_a + MR_b + MR_c + \dots + MR_{nth}$  market. So,  $AMR$  refers to aggregate marginal revenue

Which is obtained by adding marginal revenues in all the sub-markets [ $AMR = MR_a + MR_b + MR_c + \dots + MR_{nth}$ ]. The second condition necessary for equilibrium is that  $MC = MR_a = MR_b = MR_{nth}$  market. The equality between  $AMR = MC$  will guide the monopolist as to how much to produce? And equality between  $MC$  and  $MR$  revenue in all the sub-market would tell him as to how much to sell in each sub-market. The  $AMR$  curve show the total output that would be sold in the sub-market taken together corresponding to each value of the marginal revenue. He will then distribute that total output in such a way that marginal revenue in the two sub-markets are equal. Marginal revenues in sub-markets must be equal if profits are to be maximized. The following diagram depicts the equilibrium of monopolist under discriminating conditions.





### 5.13.5 Conditions For Equilibrium

(i)  $AMR = MC$  (ii)  $MC = MR_a = MR_b = MR_{nth}$ . The above figure shows that the monopolist attains equilibrium at 'E' point where  $MC = AMR$  at OQ size of output. So the total output is OQ. Of the total output, OM quantity is sold in 'A' market and OL quantity in B market  $OQ = OM + OL$ . This sharing of OQ output is obtained by equating MC with  $MR_a$  and  $MR_b$ . In market 'A' he charges OP price and market 'B' he charges ON price per unit. Op price is higher than On price because price elasticity in 'A' market is lower than that of B market. The shaded area in total market depicts the profit. Thus it can be said that given the demand for the product and the cost conditions, the discriminating monopolist will produce OQ size of output and will sell Om part of the total output in 'A' market and OL part in 'B' market and thus will maximize profits.

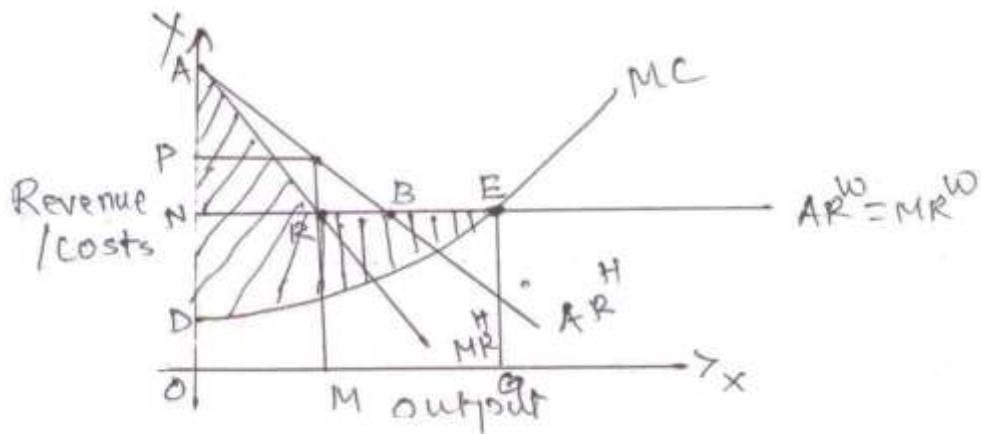
### 5.13.6 DUMPING – A Special case of Price – discrimination :

Dumping is nothing but price discrimination but it is a special type of price discrimination. It takes place when monopolist sells his product in two markets; one in which he faces perfect competitions and monopoly in the other; so demand curve for his product in perfect market will be perfectly elastic while in monopoly market relatively elastic or downward sloping demand curve. This happens when a producer is monopolist in home market and one of the sellers in the world market. In international market he is one of the sellers and therefore he faces keen competitions there. It is for this reason; he sells his product in international market at prevailing price. The international price is much lower than the price charged in domestic market.

Dumping may also refer to the practice of the monopolist to sell his product in the world market at a price less than the cost of production. He does this to enter and capture the world market. Secondly he may resort to dumping to clear off his excess output as domestic market is not large enough to sell his entire output. Thirdly, he may resort to dumping to earn foreign exchange for modernisation and lastly to maximise profits. The conditions for equilibrium of dumping monopoly are the same as ordinary discrimination.

$$1) \quad MC = AMR \quad 2) \quad MC = MR^H = MR^W$$

The second condition complies that MRs in world market as well as home market must be equal to marginal cost of production. The following diagram show equilibrium of the monopoly under conditions of dumping.



Revenue and costs are measured along 'OX' axis and output along OX axis.  $AR^H = MR^H$  represents average and marginal revenue in home market while  $AR^W = MR^W$  in world market.  $AR^W = MR^W$  line is perfectly elastic because in the world market monopolist faces perfect competition. In the home market he faces relatively elastic demand curve. That's why  $AR^H$  and  $MR^H$  slope downwards. The monopolist attains equilibrium at that size of output at which  $MC = AMR$  or aggregate marginal revenue. This equality is attained at 'E' point at  $OQ$  size of output. Now question of sharing of output between home market and world market arises. The monopolist solves this problem when he equates  $MC$  with  $MR^W$  and also  $MR^H$ . Market i.e.  $AR^W = MR^W$ . This condition is fulfilled at 'R' point in the diagram. At 'R' point  $MC = MR^H$  that is  $RM = EQ = MR^W$ . Thus  $OM$  size of output he will sell in the home market and  $MQ$  size of output in the world market. Thus the total output in the market outside. Thus, the total output  $OQ$  is divided between home market ( $OM$ ) and the world market ( $MQ$ ) i.e.  $O = OM + MQ$ .

The AMR curve, in this case is the composite curve i.e.  $ARBE$  which is the lateral summation of  $MR^H$  and  $MR^W$ . Total profit earned is equal to the area  $APNDE$  (shaded Area). He will charge  $OP$  price in the home market and  $ON$  price in the world market.

## 5.14 MONOPOLISTIC COMPETITION

In reality, there exists neither perfect competition nor pure monopoly. Both are extreme forms of market. The reality lies between the competition and monopoly. It was Prof. E. H. Chamberlin who developed this kind of market. It is a blending of competition and monopoly. This form of market includes some features of monopoly and some features of competitions. The term monopolistic implies 'Mono' means one and 'Polistic' means competitions. Thus, it is the competition among the producers who produce similar products and not the same product. So each firm faces a keen competition from its rivals.

Therefore each firm so far as supply of its product is concerned is monopolist because no one else can supply that product. So, it becomes a single seller of that product. But it faces competitions from other firms who produce close substitute. In other words, cross elasticity between the products of the firms under monopolistic market is very high. Therefore, it is called as the blending of monopoly and competitions.

Product differentiation is the characteristic feature of this market. This means that the products of different firms are heterogeneous but are closely related to each other. Product differentiation doesn't mean that the products of different firms are totally different but they are slightly different. That's why they are called similar and not the same. If the degree of product differentiation is greater, the presence of monopoly element is greater and if the degree of product differentiation is smaller, the greater is the competitive element. Since this form of market exhibits features of monopoly and competitions, we call it as monopolistic competitions.

### 5.14.1 Characteristics of Monopolistic competition :

**1) Large numbers of buyers:** Like perfect competition there are large number of buyers. But how large is the number can not be ascertained. Each firm has its own group of buyers. They are attached to particular brand of product. Therefore, they follow their own pricing policy. Prices of different products therefore differ. Because tastes and preferences of the people differ, each firm finds demands for its products. However the large numbers of buyer are divided among many sellers supplying the similar products.

- 2) Large numbers of sellers:** Existence of large number of sellers is the second condition of this form of market. Each seller supplies similar products. If the number of firms is larger, the product differentiation may be smaller., Again, if the number of firms are smaller differentiation is generally greater. Thus, this form of market offers an opportunity to everyone who wants to enter the market but on one condition that the product is differentiated from the existing ones. So, there is no limit to the number of firms like perfect competitions. In this way, the market also resembles perfect competition.
- 3) Product Differentiation:** This is the distinguished feature of this market. Each firm produces non identical product and not the same product. The degree of product differentiation depends upon the numbers of firms. The larger the number of firms, the smaller is the difference and vice-versa. However each firm’s product is close substitute to other firms. Therefore, product differentiation is the soul of this market. The product differentiation is based on certain characteristic of the product itself like exclusive patented features, trade marks, trade names, designs, colour, weight, packaging price etc. also conditions surrounding sales of the product like making available free home delivery etc. Besides, location of the seller, the way of doing business seller’s reputation for fair dealing courtesy etc also determine product differentiation.
- 4) Free Entry and Exit of Firms:** There are no barriers on entry and exit of firms under this market. But new firms will have to supply differentiated product from the existing ones. Thus any numbers of firms are welcomed provided they produce similar products. This brings about automatic adjustment in the supply of the product. The larger the number of firms, the greater is the competition and vice – versa.
- 5) Selling Costs:** This is another marked feature of this form of market. There is no need of advertising either under perfect competitions or under monopoly. But under, this form of market, without selling costs, no firm can survive. Each firm will have to advertise its product to inform the consumers about the new product for creating demand. A skillful and imaginative advertisement is necessary to convince the consumers to buy the product. Thus, the selling cost refers to the cost incurred on advertisement. It may be informative or competitive.

- 6) Informative:** The purpose of this type of advertisement is to inform the consumers about the new product. It can be done through newspapers, magazines, sign boards, radio, T.V. cinema houses etc so that the people know about the new product. The purpose of this type of advertisement is not to boost demand but to inform the people about the new product to make their rational choice. It also enlightens them about the market situation and helps them to make rational choice.
- 7) Competitive Advertisement:** The objective of this type of advertisement is either to create demand or boost the demand for the product. Generally, all means moral immoral are made use of to create demand for the product and rattle down the rivals. Public media like newspapers, radios, TV, cinema houses, models, window dressing, sign-boards, magazines etc are used to convince the consumers to choose a particular product from among many. Even popular figure like film star, sportsman are employed to advertise the product. This category of advertisement tries to establish that the advertised product is the best or superior to all and appeals the consumers to buy that product some times, even free gifts are offered on purchase of the product.

However, this type of advertisement misleads the consumer. It becomes difficult for consumer to make correct and rational choice from among host of advertised products. Many times, they make wrong choice based on false and exaggerated advertisement. Therefore on moral and economic grounds such advertisement is not desirable. The selling cost influences the shape and the position of the demand curve because it influences the elasticity of demand. When demand curve shifts to the right, it means that the selling cost has proved successful in improving demand for the product.

#### 5.14.4 CONCEPT OF GROUP

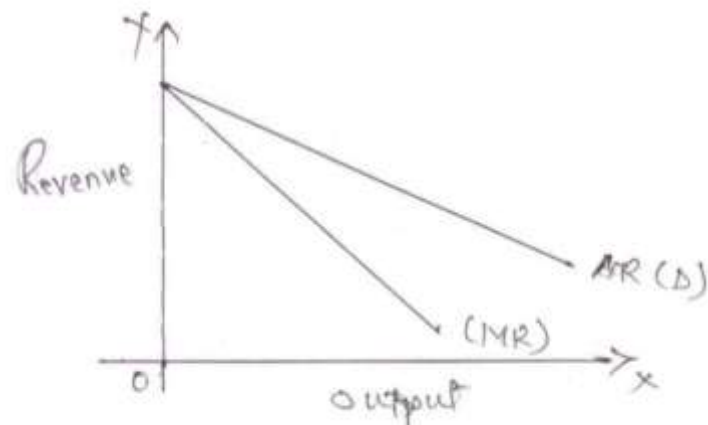
Since all the firms under monopolistic competition produce non – identical products, therefore they are said to be in a group. The concept of industry is peculiar with perfect completion only because all firms under perfect competition produce identical products. But under monopolistic competition each firm produce close substitute to other is product. It is for this reason within the group firms has greater affinity and their products become close substitutes. They offer stiff competition to each other. The larger the number, the keener is the competitions and vice versa.

### 5.14.3 NATURE OF DEMAND CURVE

The shape of the demand curve under this form of market is determined by the tastes and preference of the consumer, pricing policy of rivals, output, selling costs and product decision of rivals firms. The problems of monopolistic competitions are therefore more complicated than those under perfect competition. The demand curve faced by a firm under monopolistic competition is its average revenue (AR) curve. It is neither perfectly elastic nor perfectly inelastic. It lies between the two elasticities. It is more elastic than it is under monopoly and less elastic than the demand curve under perfect competition.

This makes clear that the demand faced by the firm under this form of market is flatter and elasticity of demand is greater than one. The degree of elasticity depends upon the extent of product differentiation and the number of firms operating.

If the degree of product differentiating is greater, then in that case monopoly element will be larger and so the demand curve will be relatively inelastic. But if the degree of product differentiation is smaller then in that case competitive element will be greater and therefore demand curve will be more elastic. Secondly number of firms in the group also determines the position and shape of the demand curve. If the number is larger, the smaller is the product differentiation and hence greater is the competitive element and hence the demand curve will be relatively elastic. If the degree of product differentiation is smaller then in that case competitive element will be greater and therefore demand curve will be more elastic. Secondly, the numbers of firms in the group also determine the position and shape of the demand curve. If the number is larger, the smaller is the product differentiation and hence greater is the competitive element and therefore the demand curve will be more elastic. If the number is smaller, the greater is the product differentiation and therefore greater is the monopoly element so demand curve will be relatively inelastic. The following diagram depicts the shape and position of demand curve. Since individual demand schedule slopes downward, AR curve of the firm also slopes downward. The marginal revenue curve lies below the AR curve. MR like monopoly is always less than price because additional sale of output involves cut in price.



#### 5.14.4 Production & Selling Costs

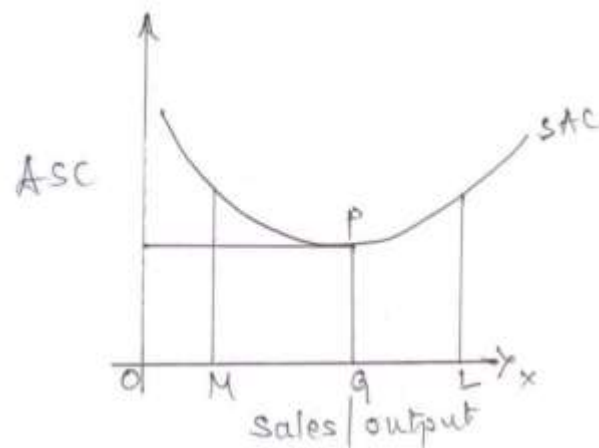
Selling costs occupy an important place in marketing the product. In fact, in certain cases selling cost exceeds the production cost because marketing of the product becomes difficult. To market the product means to create the demand for the product. Thus to convince the consumers to buy the product an intensive and skillful advertisement campaign needs to be undertaken. Many a times a good product does not get sales for want of proper and effective advertisement.

Therefore, we should know the difference between the two.

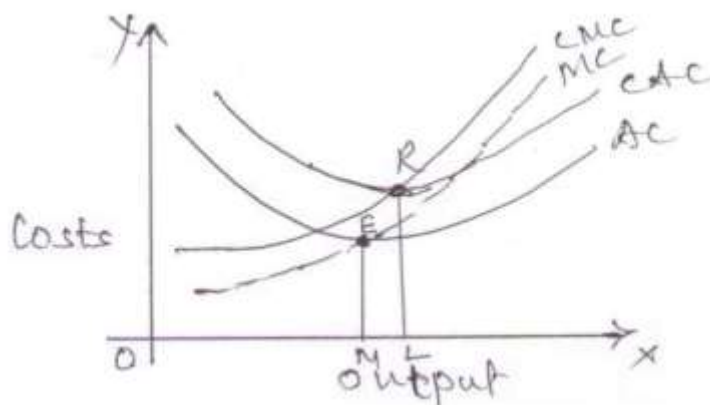
- 1) Production cost is incurred to produce and supply good and services whereas selling costs are incurred to raise sales of the product.
- 2) Production cost is generally incurred to satisfy the existing wants whereas selling costs are incurred to create future demand.
- 3) Selling costs change the shape and position of demand curve. It makes it more elastic but production cost does not do the same.
- 4) Production costs create utility but selling costs do not create any utility
- 5) Production costs increase supply of goods and services while selling costs create or increase demand for the product.
- 6) Production cost increases national income in real terms whereas selling costs bring about merely transfer of resources without adding anything to the national income.

**5.14.5 NATURE AND SHAPE OF THE AVERAGE SELLING COST:**

Average Selling Costs (ASC) refers to the selling cost incurred per unit of sale. It is also U shaped. Thus in the beginning it is high but as the sales of the product increases, the average selling cost starts falling. It falls due to operation of the law of increasing sales. Therefore ASC declines. But this will not happen indefinitely. After having reached the minimum point, it begins to rise due to the operation of the law of decreasing sales. In other words, the operation of the law of non – proportional sales is the cause of ASC being U shaped. The following diagram depicts the shape of ASC.



Total cost of production includes TFC, TVC and total selling costs. Therefore AC of production is equal to  $AFC + AVC + ASC$ . In the following diagram combined AC and MC are shown.





#### 5.14. Exercise

1. What is meant by market in equilibrium? How does the demand curve and the supply curve enable us to arrive at it? Explain with the diagrams.
2. What are the essentials of pure and perfect competition? When does it turn imperfect?
3. Explain the main features of monopolistic competition. How product differentiation helps to distinguish a monopolistic competition?
4. Explain the mechanism of price determination under monopoly with reference to a diagram where the area of excess profit is shown.
5. Explain the market situation which enables price discrimination possible & profitable.
6. Write short notes on :-
  - (a) Dumping
  - (b) Selling cost
  - (c) Product differentiation
  - (d) Discriminating monopoly

## **UNIT – VI**

### **PRICING OF FACTORS (DISTRIBUTION)**

#### **6.1 THE GENERAL THEORY OF DISTRIBUTION**

Production is the result of joint endeavor of four factors of production namely land, labour, capital and entrepreneur. Since their services are economic goods, they are to be paid for. Thus, the national income is distributed among these factors of production. The theory, which refers to the distribution of national income among the factors of production, is called as the general theory of distribution. It deals with the pricing of the productive resources. It determines the relative share of land, labour, capital and entrepreneur in the national income. Thus land is paid in terms of rent, labour in wages, capital in interest and entrepreneur in profits from the national income.

National Income = Rent + wages + interest + profit. Distribution of national income is studied in two ways namely personal distribution and the functional distribution. Personal distribution refers to the study of individual incomes. It analyses how much is earned by individuals in the country. However, it is very difficult to explain earning of individual incomes because they earn from different sources. Earning of individual incomes depends upon social and political structure of the country, system of ownership, of property and the laws of inheritance. It is for these reasons study of personal distribution becomes a complex one.

Functional distribution on the other hand deals with the study of factor incomes. It analyses the relative share of each factor in total national income in terms of rent, wages, interest and profit. In other words functional distribution of national income studies pricing of factors in terms of function they perform in producing goods and services or national income. Thus, the functional distribution is named as the theory of factor pricing.

## 6.2 MARGINAL PRODUCTIVITY THEORY

The marginal productivity theory of distribution is only an extension of general theory of distribution. It explains determination of incomes of factors of production. Theory is associated with names of J. B. Clarke, Wicksteed and others. The theory states that income of the factor of production is determined by its marginal product. Marginal product refers to the addition made to the total product by employing one more extra unit of the same factor of production, quantity of other factors remaining constant.

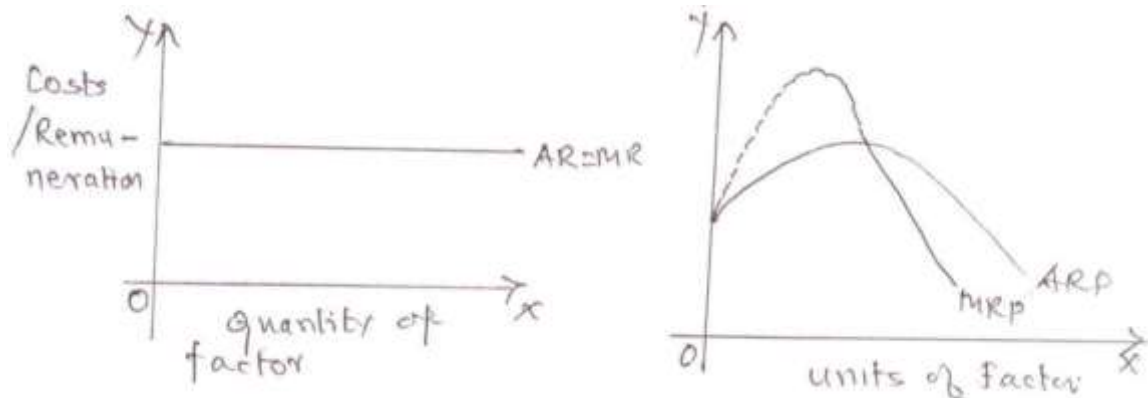
J. B. Clark, held the view that in a static economy, every factor of production including entrepreneur receives reward equal to its marginal product. The marginal product can be measured in marginal physical product or marginal revenue product. Marginal Physical Product (MPP) refer to the addition made to the total product in physical form by employing one more unit of the same factor keeping quantity of other factors the same. While marginal revenue product (MRP) is money value of MPP i.e.  $MPP \times \text{price}$  of the product. Since factors of production are paid in their revenue productivity, the theory is studied in terms of revenue productivity.

## 6.3 THE STATEMENT OF THE THEORY

The marginal productivity theory relates the reward of a factor of production to the revenue productivity of that factor. Thus price of any factor of production depends upon its revenue productivity. An employer will continue employing units of a factor up to the point at which rewards paid to the marginal unit of that factor is equal to the contribution made to the total production by that unit in terms of money. No rational producer would go beyond this point of equality because the cost (Reward) exceeds the contribution (income). At the margin, the reward of the factor is equal to its productivity or marginal productivity. Thus, the marginal productivity theory states that

- 1) rewards of a factor would depend upon the contribution of that factor to the total production.
- 2) the reward of a unit of factor of production would be determined by and would be equal to the marginal productivity of that factor unit.
- 3) Under certain conditions, the reward of the factor unit would be equal to both, the average productivity of factor under consideration.

Here two points are to be noted. First the reward which a factor of production receives is income for that factor but it is the cost to the employer under perfect competition, rewards which pays is the same for all units of factor. Therefore cost curve of the factor is horizontal straight line indicating that average cost and marginal cost are the same to the employer. Secondly that the factors of production are paid in money and not in



what they produce. Therefore, employer is interested in revenue productivity. Physical productivity is converted into revenue productivity through price mechanism or prices. Average revenue productivity (ARP) refers to the total revenue divided by number of units of the factor employed to produce the given output. Marginal Revenue Productivity (MRP) refers to the net contribution made to the total revenue productivity by employing one more unit of the same factor. Both revenue productivity depend upon the law of variable returns that is they increase, reach maximum and then decline.

The marginal productivity theory of distribution states that under perfect competition in the long run, the reward paid to the factor units will be equal to both average revenue productivity as well as marginal revenue productivity. The following figure show the ARP and MRP curves and the average and marginal remuneration (Cost) curves under competitive conditions

#### 6.4 EQUILIBRIUM OF THE FIRMS IN FACTOR MARKET

To understand the equilibrium of a firm with regards to employment of factors of production, one assumption is made i.e. quantity of other factors of production is kept fixed quantity of one variable factor say labour is increased. In other words, more and more units of labour are employed until contribution made by the last unit employed becomes equal to the reward that unit of labour receives from the employer.

The following diagram illustrates the firm is equilibrium. Revenue productivity and costs are measured along vertical axis while labour along horizontal axis.

## 6.5 CONDITIONS FOR FIRM'S EQUILIBRIUM

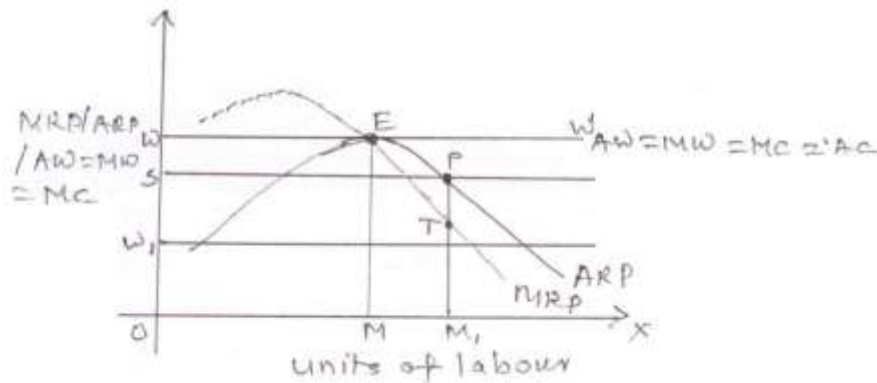
The firm would be in equilibrium with regards to employment of factors of production if the following conditions are fulfilled.

Marginal Revenue productivity (MRP) = Marginal Cost (MC or MW). This is essential condition but not the sufficient condition for a firm to be in equilibrium. Therefore, the second sufficient condition for firm's equilibrium is that the marginal revenue productivity curve must cut marginal cost curve or marginal wage line from above. If these two conditions are fulfilled, the firm would be in equilibrium earning maximum profit.

WW is the supply curve faced by the firm parallel to the OX axis. It depicts the supply curve of labour to the individual firm. Since there is perfect competition in the labour market, the firm can hire as many units of labour as it desires at the ruling wage rate of rupees i.e. OW per worker. Under competitive conditions, the firm would have to accept the ruling price. The firms demand for labour is so insignificant in comparison with total demand of the industry that any change in the firm's demand for labour will not affect the price anyway. The marginal revenue productivity of labour to the firm is the firms demand curve for labour. Demand for labour is a derived demand because labour is hired only for what it produces. So in the following figure the MRP curve indicates derived demand curve for labour of the firm under consideration.

Conditions for equilibrium

- 1)  $MRP = MC = AC = AW = MW$
- 2) MRP curve must cut ARP curve at its highest point from above to maximize the profit.



Where

- 1) MRP = Marginal Revenue Productivity
- 2) ARP = Average Revenue Productivity
- 3) AW = Average Wage
- 4) MW = Marginal Wage
- 5) MC = Marginal Cost
- 6) AC = Average Cost

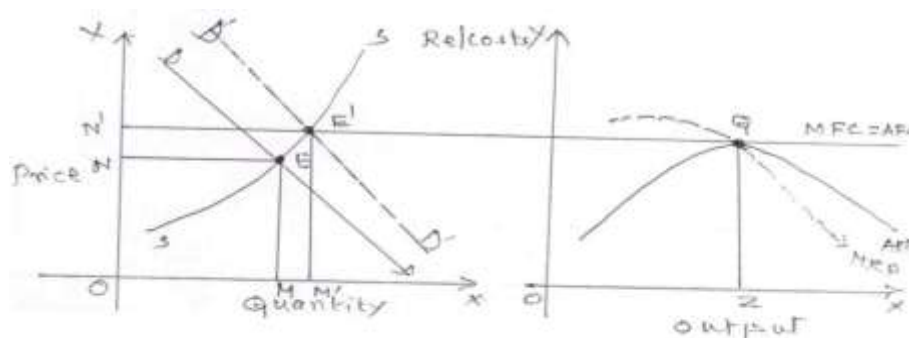
In the above diagram  $WW'$  curve represents both the average and marginal wage. The average amount of money paid to a worker is  $OW$ . Since, the firm is operating under competitive conditions, what is paid to one worker would be paid to all the workers employed. Therefore  $WW$  wage line is horizontal to 'x' axis. The firm will be in equilibrium and maximizes its profit when the MRP of the factor ( $ME$ ) unit is equal to the marginal cost of the factor which is equal to marginal and average wage.

This takes place when  $OM$  amount of labour is employed. If less than  $OM$  amount of labour is employed, the firm would suffer unnecessary losses. If it wants to raise its receipts, it must increase the employment of labour which would go on adding to the receipts of the firm more than the marginal cost. The MRP exceeds the  $MW = AW = MC$ . In the same way if more than  $OM$  amount of labour is employed, the marginal cost of labour, that is marginal wage would exceed its MRP; the firm would be paying more to its marginal employees than their contribution. This results into losses.

At  $OM$  employment of labour, the firm would be in equilibrium and its profit would be maximized. It is so because the last unit of labour employed would contribute equal amount to the firm's receipts. In other words, the firm would be in equilibrium when it equates marginal revenue productivity of labour with its marginal cost ( $MRP = MC = MW$ ). But this equality must be realized at falling MRP.

And that is why economists are more keen to show that the MRP must ultimately decline otherwise equilibrium would be impossible. Assuming rationality on the part of entrepreneur, a firm will be in equilibrium when MRP of a factor to the firm equals its marginal cost. Fulfillment of this condition enables the firm to maximize profit. This condition realizes at OM amount of labour Not only MRP is equal to marginal cost but it is also equal to average wage and average revenue productivity of labour. This also implies that the industry is in full equilibrium earning normal profit. Though price of any factor of production including labour is determined by the demand for and supply of it, it is always equal to its MRP. The next diagram depicts the industry equilibrium.

Price is measured along 'OY' axis and quantity along 'OX' axis. With increase in demand for the factor shown in the diagram above, price of the factor shoots up to 'ON'. As soon as price goes up at 'ON', the firm will be in equilibrium at 'Q' using OZ amount of that factor earning normal profits. At OZ amount of that factor, the price of it is equal to its MRP as well as ARP of the factor. At equilibrium point 'Q' the firm earns just normal profits. Thus in the long run under perfect competition in the factor market, price will always equal to MRP and ARP of the factor.

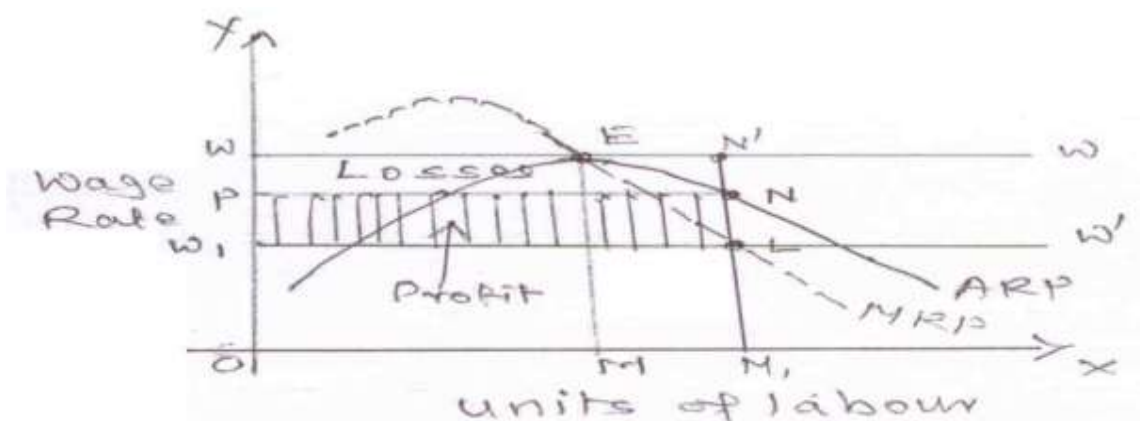


In other words, long run equilibrium between demand for and supply of the factor is established at the level where the price of the factor is equal to both MRP as well as ARP of the factor which means only normal profit is made.

## 6.6 EQUILIBRIUM OF AN INDUSTRY

Industry equilibrium will be attained only when each and every firm constituting that industry is in equilibrium earning normal profits. This means that each firm would be equating MRP with marginal wage or marginal cost. If it happens, the whole industry would be in equilibrium earning normal profits. Diagrammatic representation of the industry equilibrium is the same as that of equilibrium of a firm. It is also explained in terms of costs and receipts. For industry equilibrium, it is assumed that the entrepreneurs are homogenous and each firm would be in equilibrium when ARP curve is tangential to the wageline.

In short run, some firms will be earning super normal profits while some will be earning normal profits and some will be minimizing losses by just covering variable cost. But in long run, this will not happen. Firms incurring losses will quit the industry and if excess profit is made new firms will enter the industry and compete out the excess profit. This entry and exit of firms in and out of industry will continue until equilibrium is established. So, the industry equilibrium will realized when  $MRP = ARP = MW = AW = MC$ . The following diagram depicts the same.





The industry equilibrium takes place at employment of OM amount of labour and the OW wage is paid to every unit of labour. So 'E' is the equilibrium point where  $MRP = ARP = MW = AW = MC$  are equal. MRP and ARP curves are tangent to wage line WW. Industry is earning normal profit. If less than OM amount of labour is employed, industry will unnecessarily reduce its profits and if more than OM amount of labour is employed say OM', the industry will incur losses because its labour cost would be more than the receipts. Wage rate would exceed receipt. If the wage line shifts down ward that is W'W', equilibrium position would change. Now it would be at 'L' point at 'OM' employment of labour. At 'L' point  $MRP = MW = AW$  and MC of the firm. But ARP is M'N which is higher than MRP (L'M) which means that the industry would be making excess profit. This will invite new firms in the industry which will compete out the excess profit bringing the industry to the level of normal profit. The entry of new firms will lower the price of its products and this will bring down the MRP and ARP. Likewise an increase in demand for labour may raise wages. The ARP curve will fall and wage line will rise until they are tangent to each other.

#### 6.6.1 Principle of an industry Equilibrium:

$$\frac{\text{MRP of Land}}{\text{Rent}} = \frac{\text{MRP of Labour}}{\text{Wages}} = \frac{\text{MRP of Capital}}{\text{Interest}}$$

$$= \frac{\text{MRP of Entrepreneur}}{\text{Profit}}$$

If this condition is fulfilled, the industry will be in equilibrium earning normal profit. This is the same principle as the consumer's equilibrium with regards to more than one good i.e. the law of substitution. To conclude an entrepreneur employs units of any factor of production until its MRP becomes equal to the marginal cost.

**ASSUMPTIONS :**

The above stated theory holds good only when certain conditions are fulfilled. These conditions are the foundation stones of the theory.

- 1) There exists perfect competition in both the markets, factor as well as commodity market.
- 2) All units of labour are homogeneous in all respects.
- 3) Problem of overtime is ignored.
- 4) Theory would hold good only in long run.
- 5) It considers only stationary conditions.
- 6) There is equal bargaining power on the part of buyer seller.
- 7) The theory assumes that there is perfect mobility of factor of production.
- 8) It is based on belief that entrepreneurs can predict and measure MRP of labour in advance.
- 9) The theory holds that entrepreneurs always try to maximize profit.
- 10) No government intervention anywhere in the process of determining rewards of factor of production.

### **Criticism / Limitations :**

Through the theory is pioneer in explaining as to what determines prices of factors of productions, it is not free from drawbacks.

- 1) Perfect competition is not reality. Reality is imperfect markets.
- 2) Units of labour are not homogeneous; On the contrary, the world is full of heterogeneity.
- 3) The theory is static where as problems it attempts to solve is dynamic. Therefore it is illogical to solve problems of dynamic world with tools of static theory.
- 4) The theory is applicable in long run only. But Lord Keynes says that we are all dead in long run. What concerns us most is the short run.
- 5) The theory doesn't solve the problems of individual income.
- 6) There is no equal bargaining on the part of buyers and sellers. Actually labour is exploited by the employers.
- 7) The government interference is in every walks of life. A number of labour laws shows that there is a great deal of government interference in determing reward for labour.
- 8) The theory is not useful in determing reward of such factors which are used in fixed proportions.
- 9) According to this theory, trade unions are superfluous and collective bargaining is a futile activity.
- 10) Marginal productivity ignores the positive inter relation between rewards of factors of production and their productivity especially between the wages and efficiency of labour.
- 11) The theory is based on the principle of maximization of profit which is not true.
- 12) The various factors are jointly demanded for the production of a commodity.
- 13) The theory fails to explain the remuneration of entrepreneur that is profit. Marginal productivity of a factor can be known if it can be varied by keeping the other factors fixed. However, the entrepreneur in a firm is only one and therefore variation in it is not possible.

### 6.6.2 IMPORTANCE OF THE THEORY :

- (1) The theory enables us to determine the levels of employment of factors of production. Price of factor depends upon its demand.
- (2) The theory is useful in bring about the efficient and optimum allocation among their alternative uses. The movement of factors is essential for best and efficient use of scarce natural resources.
- (3) The theory also guides us to determine the incomes of factor owners and thereby determines the relative share of factors of production in the national income.

### 6.7 RENT

**Introduction :** Land is a primary and original factor of production. Its total supply to the entire society is perfectly inelastic. It is a free gift of nature. However for an individual or an industry it is relatively elastic. The reward paid for use of land is called rent. The economic rent refers to payment for the use of land. It excludes any return on capital investment. Economic rent is also called as surplus because it does not result from any exertion on the part of land owner. Adam Smith held, " The landlords like all other men love to reap where they never sow". It was Ricardo an English Economist who explained why rent is paid.

### **6.7.1 Ricardian Concept of Rent :**

Ricardo held, "Rent is a return for the use of the original and indestructible powers of the soil; and high rents are not a sign of the bounty of nature. On the contrary, they are an indication of the niggardliness of nature." He defined rent as, "that portion of the produce of earth which is paid to the landlord for the use of original and indestructible powers of the soil." The above definition makes it clear that rent is payment for the use of land only and it is different from contractual rent. It does not include return on the capital investment. However, Physiocrats laid great stress on the bounty of nature as the reason of the rent of land. Ricardo argued that though the land was useful, it was also scarce. While the productivity of nature may be a sign of its usefulness and of the bounty of nature, the fact is that the total supply of land is fixed is a sign of nature's niggardliness. The contention of Ricardo that rent is a return for the use of the original and indestructible powers of the soil does not throw any light on the powers of the land that are said to be original. By the term Original Powers, Ricardo perhaps meant that it must be distinguished between money spent on improvement of land and the economic rent.

Though, the land itself can not be destroyed, its fertility can be destroyed . It depends upon the climatic conditions, use of irrigation, improved farming methods and so many other factors. Therefore, it would be entirely unreasonable to regard the powers of the land as indestructible. The Ricardian theory of rent is based on two basic principles viz. The Law of Diminishing Returns which operate in agriculture and the Mal thus principle of population. These two principles are the foundation stones of Ricardian theory of rent.

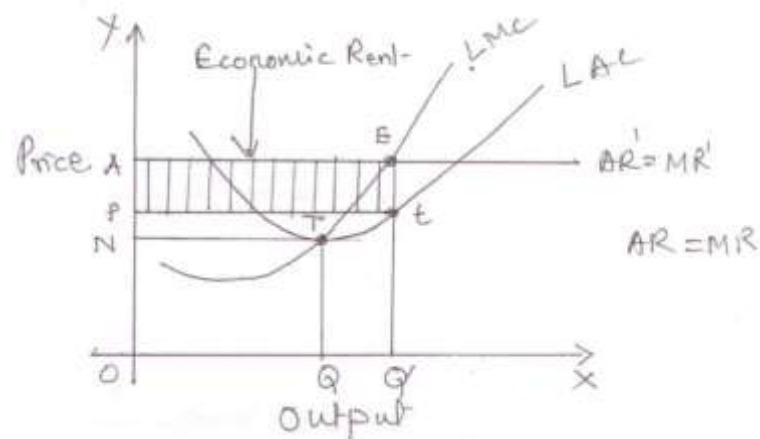
### **Assumptions of the Theory :**

- (1) The elasticity of supply of land is zero which means supply of land to the society is fixed.
- (2) The land is used to produce food grains only. No other use of land is considered.
- (3) Land differs in fertility. This means that there are different grades of land differing in fertility.
- (4) There exists perfect competition in factor market. This only means that there are a number of land owners who are willing to rent out their pieces of land at ruling rate of rent.
- (5) The theory operates only in long run.
- (6) The concept of marginal piece of land plays a dominant role in the classical theory of rent.

In the light of above assumptions, it is stated that if the land is of same quality, scarcity of land in relation to its demand gives rise to rent. Ricardo calls it as the scarcity rent. And if land differs in quality, then in that case superior quality pieces of land earn rent. Ricardo calls it as differential rent.

### **6.7.2 Scarcity Rent Theory :**

To explain the scarcity rent theory, it is assumed that a new piece of land is discovered which was not occupied by man. As the people start occupying this new land, it starts earning rent because demand for land exceeds supply of land for producing food grains. As long as vacant pieces of land are available for producing food grains, its production cost would be equal to average cost of production. So, cost of production and price of the food grains would be the same. So there would be no surplus. But once, the entire land is brought under cultivation, further demand for food-grains would raise the price of food-grains above the average cost of production. This happens because population goes on increasing. Since there is perfect competition in factor as well as product markets, the cultivator's equilibrium will be established at the lowest point on long run average cost curve. But as the population grows, demand for food grains also increase but supply can not be increased on account of fixity of supply of land. This raises, the price and therefore, there appears a difference between price or average revenue and average cost of production. It is this difference between revenue and cost Ricardo calls it as the scarcity rent. The following diagram illustrates the scarcity rent phenomenon. Price is measured along OY axis and output along OX axis.



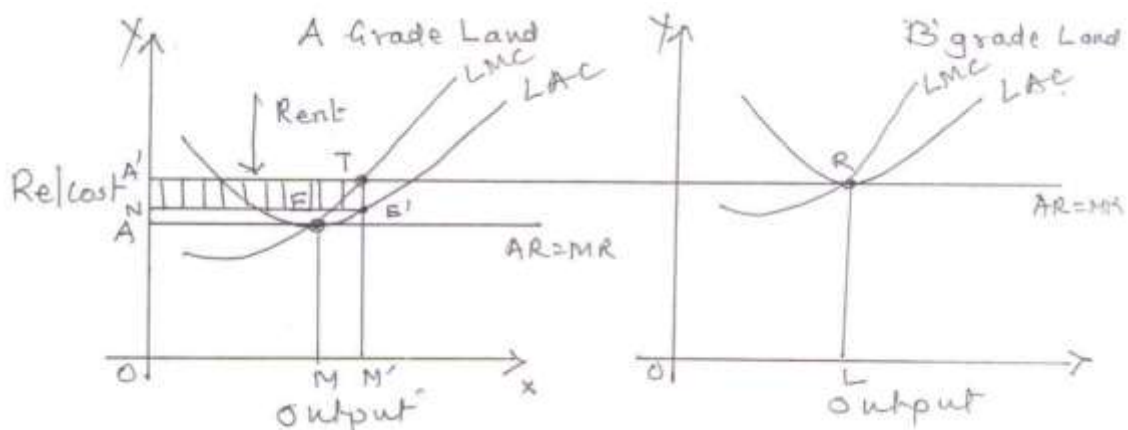
The cultivator is in equilibrium at OQ size of output. At this level of output price of corn i.e. ON. Is equal to average cost of production i.e. TQ. Thus, at this size of output price and long run average cost are equal and hence there is no surplus. But as output is raised to OQ', price shoots up to OA or EQ' but the average cost of production remains at OP or TQ' level. Thus, there appears a surplus to the extent of APLE rectangle which Ricardo calls as economic rent. It must be noted that there exists perfect competition among landlords so it is not possible to earn any rent as long as surplus land exists. As demand for food grains increases, the vacant pieces of land are brought under cultivation to produce more food grains to meet increased demand for food grains. But once entire land is put to use, there is no scope to improve the supply of food grains . So, demand for food grains exceeds supply of food grains which shoots up the price of the food grains. Now, price can not fall back to original level that is ON because there is no idle land to be put to use. Now, cultivator's equilibrium realizes at 'E' point at OQ' size of output because LMC is equal to new price OA' but LAC is tQ. So, 'Et' or AP surplus arises which is scarcity rent according to Ricardo. Thus, contention of Ricardo rent arises, due to niggardliness of nature is true. The classical thinking holds that rent is a surplus over and above cost of production. They never held rent as a part of cost of production. Thus scarcity rent arises due to the fixity of supply of land.

### 6.7.3 RENT UNDER INTENSIVE CULTIVATION :

The Ricardian concept of surplus rent applies to intensive cultivation also. Intensive cultivation refers to usage of same piece of land again and again for the production of same food grains. In such cultivation fertility of land goes on declining and so additional doses of labour and capital applied to produce food grains from the same piece of land yields less and less quantity of food grains. The cost of last dose of labour and capital must be at least equal to the yield which we get in return from the land to make application of the dose of labour and capital worth while. So the last dose is called marginal dose because it simply covers its cost. It doesn't give rise to any surplus. Whereas earlier doses produce more than the cost incurred on them. So, it is this Surplus over and above cost of doses of labour and capital is called rent. Thus Ricardian theory of rent is true in case of intensive cultivation of land also.

### 6.7.4 THE DIFFERENTIAL RENT THEORY :

This concept of rent is based on assumption that of land differs in quality or productivity. So superior pieces of land earns rent when inferior quality pieces of land area brought under cultivation. It is held that on new island people begin cultivating the best piece of land for production of food grains. But as the population goes on increasing, inferior pieces of land are brought under cultivation to produce more and more food grains to meet increase demand for food grains. As the inferior pieces of land are brought under cultivation cost of production increases and therefore price of food grains. So, there appears a surplus over and above the cost of production in case of superior pieces of land; and it is this surplus which Ricardo calls a differential rent.





The following diagram illustrates the phenomenon.

The cost of production on 'B' grade land is higher than that of on A grade land. Therefore 'A' grade land earns rent i.e. a difference between price of food grains and cost of production. Total rent earned by 'A' grade land is equal to shaded area A'NET'. In case of 'B' grade land, there is no rent because price and cost of production are equal. Hence it doesn't earn any rent.

#### **6.7.5 RENT UNDER EXTENSIVE CULTIVATION :**

Extensive cultivation is defined as the cultivation of different pieces of land of different quality for the production of same food grains. As inferior quality pieces of land are brought under cultivation, cost of production rises and so price of food grains. So, there appears a difference between price of food grains and cost of production of superior quality pieces of land and it is this difference which is called as differential rent. The cost on last piece of land must be equal to price to make cultivation of that piece of land worthwhile. According to classical economists rent does not form a part of the cost of production. It is an earnings over and above the cost of production of marginal land which is no rent land. That is why it is said that rent is not price determining but price determined. David Ricardo contends, "Corn is not high because rent is paid but a rent is paid because corn is high." This means that it is the price of food grains that determines rent. Thus it can be summed up as follows:

(1) Rent is a differential surplus because it is a Surplus over and above cost of production which arises due to differences in fertility of soil. In other words if all pieces of land were of equal quality no rent would arise.

(2) Rent is price determined and not price determining.

(3) Rent is peculiar to land alone. It means that other factors of production do not earn rent.

#### **6.7.6 APPRAISAL OF THE RICARDIAN THEORY :-**

- (1) In modern thinking, it is the interaction between demand for and supply of land will determine price of land. Rise in population, raise demand for food grains and so for land. But land is fixed in supply. That is why price of food grains increases which creates surplus over and above the cost of production. But Ricardian theory does not explain what determines wages of labour, interest on capital, transport cost etc.
- (2) Ricardo holds that the land has no transfer earnings or it has no alternative use. But in modern times, it is held that every factor of production has alternative use.
- (3) Supply of land for the whole economy is perfectly inelastic but for a firm or a particular industry supply of land is not fixed. Supply of it can be varied depending demand for its product. Thus, demand for land also depends upon its marginal productivity.
- (4) The contention of Ricardo that land is indestructible is also not true. In the age of atomic energy, fertility of land could be destroyed converting it totally barren. That is why his contention that rent is reward paid for the use of original and indestructible powers of soil does not hold good.
- (5) Two foundation pillars of the Ricardian theory are the Malthusian Principle of population and the law of diminishing returns. But operation of both the principles can be postponed with the help of modern technique of cultivation, irrigation, use of fertilizers and pesticides. Growth of population can also be controlled. Ricardo failed to take cognizance of it.
- (6) Land has transfer earnings. It can be put to alternative uses. Therefore transfer earnings of land enters into the cost of production and hence determines the price of the product.
- (7) The Ricardian theory is not applicable in short run. But according to J.M. Keynes we are all dead in the long run in which theory holds good what concerns us most is the short run and not the long run.
- (8) Perfect competition doesn't exist in the real world. Our world is full of imperfections.
- (9) Ricardo had predicted economic stagnation on the basis of his rent theory. But modern economists do not agree with his stagnation theory.
- (10) Lastly, David Ricardo did not use forces of demand for and supply of to explain the emergence of rent. He uses them indirectly. The Ricardian model of scarcity rent can be better and easily explained with the forces of demand and supply.

This brings us to the conclusion that demand and supply theory would have been enough to explain the phenomenon of rent.

In fine, it can be said that from the view point of individual firm or industry or cultivator, rent enters into the cost of production and therefore determines price. Ricardo was wrong in contending that the rent does not enter into the price. Rent does enter into cost of production.

#### **6.7.7 MODERN THEORY OF RENT :-**

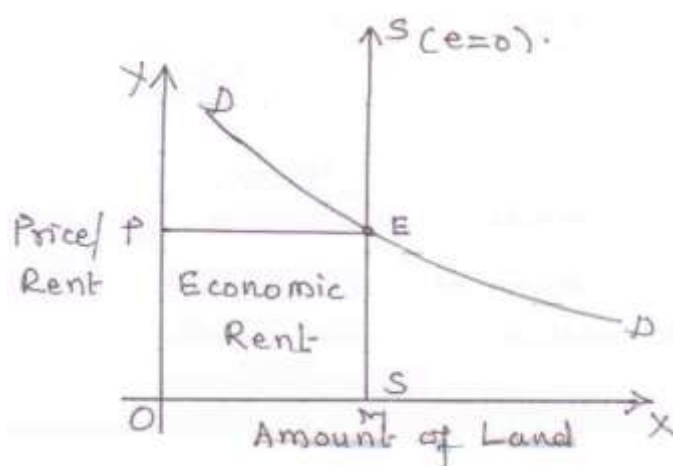
Surplus payment made to any factor of production over and above its transfer earnings is called rent in modern theory of economics. This means that labour, capital and even entrepreneur earn rent which is called as rent of ability. According to Pareto, "Economic rent means the excess payment to a factor of production over and above the minimum amount necessary to keep a factor in its present occupation." Benham held, "Economic rents are the sum paid to the factors which need not be paid in order to retain the factors in the industry." It means that income received by a unit of factor of production in its present employment or industry in excess of its transfer earnings is therefore called rent.

Transfer earnings of any factor of production can be defined as the minimum payment that must be made to a unit of factor of production in order to retain it in its existing employment and that it must be equal to the earnings of what that unit of factor of production would earn in the next best alternative use or employment. For individual farmer the whole rent will be a cost that is cost of preventing the land from transferring to other uses. Thus, in modern theory, economic rent is not merely confined to land alone. It refers to the surplus payments made to units of factors of production in excess of what is necessary to keep them in the present employment or use. Economic rent emerges when supply of a factor is less than perfectly elastic. According to Joan Robinson whenever supply of factors units is not perfectly elastic, a part of the earnings of that factors will consist of surplus or economic rent since the full price they get is not necessary to make all the units available.

If supply is not perfectly elastic, some units of that factor would be available at lower price than what it would receive at equilibrium price. The difference between the actual price and the one necessary to make it available is economic rent. Since land has no supply cost, entire earnings of it is economic rent.

### A) PERFECTLY INELASTIC SUPPLY ( $e = 0$ ) :-

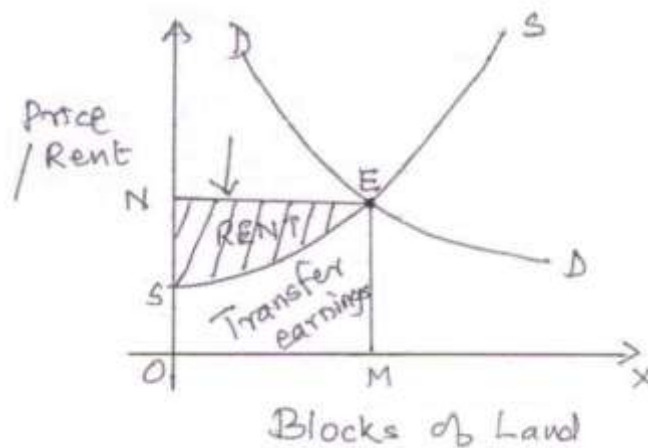
The whole earnings of land is considered as surplus earnings since land is free gift of nature. The following diagram explains the phenomenon of economic rent. 'SS curve represents perfectly inelastic supply curve of land and 'DD' is the demand curve. Intersection of demand and supply curves, determines the price of land i.e OP or EM. Since transfer earnings are zero, the entire earnings or price will be economic rent per unit of land. The total earnings or economic rent is OM XOP = POME. ( $e = 0$ ).



Economic rent is defined as payment for any factor whose supply is perfectly inelastic. This is depicted in the along side diagram. If the quantity of land is in plenty in relation to its demand, there would be no reward for its use, and therefore no economic rent will arise. In Ricardian theory land is considered to have specific use only i.e. it is used only for production of a particular food grains but in real world, land is used for different commodities. According to modern economists, supply of land is fixed to the society but not to a particular industry or firm. There are various uses of land competing with each other. If in its next best alternative use, it earns more than what it earns in present use, it would get transferred to that use.

### (B) RELATIVELY ELASTIC SUPPLY ( $e > 1$ ) :-

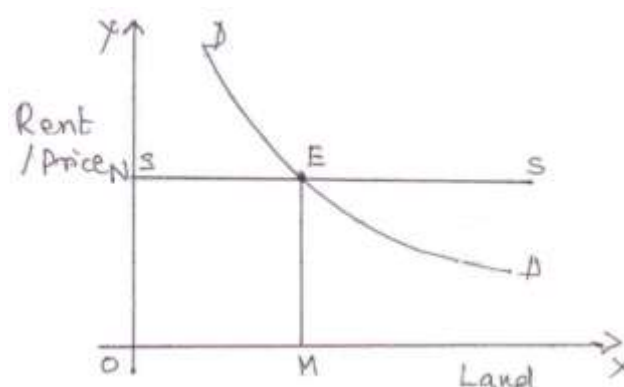
If supply of land or any other factor is relatively elastic, then in that case, there arises a difference between actual earnings and its transfer earnings; and it is this difference which is called rent in modern theory. The following diagram illustrates the phenomenon. The diagram shows that equilibrium between demand for and supply of land takes place at 'E' point where demand and supply intersect each other. So equilibrium price is ON.



Transfer earnings of last block of land and price are equal that is  $ON = EM$ . Hence last block of land earns no rent. But earlier blocks earn rent because there is difference between actual earnings and transfer earnings. At  $ON$  equilibrium price, total actual earnings of 'OM land is  $NOME$  ( $ONXOM$ ) whereas transfer earnings is  $SOME$ . So the difference between actual earnings and transfer earnings is  $NOME - SOME = NSE$  (Shaded Area). This difference is economic rent.

**(C) PERFECTLY ELASTIC SUPPLY ( $e = \infty$ ):-**

When supply of land or any other factor is perfectly elastic, no economic rent arises or earned. To illustrate the point, we suppose all blocks of land are homogeneous in all respects. So, each block of land will have equal transfer earnings which means supply curve will be straight line and horizontal to the 'X' axis 'DD' is the demand curve. It cuts supply curve at 'E' point. It means that at 'E' point demand for land and supply of land become equal. 'ON' will be the equilibrium price. Since supply of land is perfectly elastic, price  $ON$  and transfer earnings  $EM$  will be equal hence there is no rent paid to any piece of land. This is depicted in the following diagram.



Here no rent is paid because transfer earnings and actual earnings are the same. Hence, there is no difference between the two. That is why no rent is paid. Hence we can conclude if supply of land or any other factor is perfectly elastic no rent is paid.

#### **6.7.8 CONCEPT OF QUASI – RENT :**

It was Dr. Marshall who introduced this concept in economic theory. It is Just expansion of Ricardian concept of rent to the short run earnings of the capital equipments or factors of production whose supply is perfectly inelastic ( $e=0$ ) in short run. It is therefore quasi-rent is essentially a short run phenomenon. Earnings of specialized capital equipments depends upon the demand conditions and thus similar to rent of land. However, supply of fixed capital assets is not perfectly inelastic in long run like land. Therefore, Dr. Marshall instead of calling this earnings as economic rent called it as quasi-rent. Quasi rent refers to an excess earnings of any factor of production over and above its marginal productivity. It is temporary surplus earned by such capital assets in the short run.

Quasi-rent arises because specialized equipments like machinery has no alternative use. So its supply is limited in short run. Its transfer earnings will be zero since it has no alternative use in short run. So entire earnings of such factors will be the surplus since its transfer earnings of such factors will be the surplus since its transfer earnings is zero. There may be some maintenance cost to keep it in running conditions. It can be defined as the short run earnings of a fixed factor or capital assets minus the short run cost of keeping it in running condition. Supply of capital assets is fixed in short run but not in long run. That is why this surplus vanishes in long run as supply of fixed factor gets increased to match increased demand for it. This makes the quasi-rent disappear. Quasi-rent is also defined as the excess of total revenue earned in the short run over and above the total variable costs of production.

#### **6.8 WAGES**

**Introduction :-** The term wage has a broad connotation it includes pay, salary, emoluments, fees, commissions, bonus etc. In other words, it includes all types of income earned by labour as a factor of production. The term wage may refer to piece-wage, time wage, money wage, real wage and piece wage. It may be paid per hour, per day, per week and per month or annum.

### 6.8.1 NOMINAL WAGES & REAL WAGES :

Nominal Wages means money wages. It refers to total amount of money paid to labour as its price for its service in the process of production. So nominal wages are measured in terms of money while real wages refer to the amount of purchasing power received by a labour through his money wages. It refers to the net advantages of labourer's remuneration. It means the amount of necessities, comforts and luxuries of life which a labour can enjoy in return for his services through his money wages.

It is the real wages which determine the standard of living of the people. Real wages depend upon the money wages and the general price level. Thus it is stated as

$$\text{Real wages} = \frac{\text{Money Wages}}{\text{Price level}}$$

### 6.8.2 DETERMINANTS OF REAL WAGES :

- (1) **Price Level** :- The Purchasing power of money determines the real wages. But purchasing power of money depends upon the general Price level in the economy. The purchasing power refers to amount of goods and services which a unit of money can buy. There is inverse relationship between general price level and purchasing power of money. When general price level rises, the purchasing power falls and vice-versa.
- (2) **Working Conditions** :- The working conditions also determines the real wages. It includes, number of hours of work put in and number of days worked per years; educational and recreational and other facilities made available to the labour. If a worker works in a poorly ventilated, hot and unhealthy surroundings, he would be dissatisfied and his estimation of real wages would definitely be low. This brings home that payment of high money wages alone would not raise real wages.
- (3) **Trade Expenses** :- Jobs requiring high trade expenses tend to reduce real wages. Doctors, lawyers, C.A. etc need high trade expenses and therefore estimation of their real wages would be very low.
- (4) **Incidental Benefits** :- There are some jobs in which money wages are low but other benefits like free lodging and boarding, subsidized canteen facilities, free transport and free medical treatment etc raise the real wages.
- (5) **Possibility of Extra-Earnings** :- In certain areas, workers may have a plenty of scope to under take other lucrative work along with their regular work. This fetches them additional income. This tends to increase their real wages.

- (6) **Period and Cost of Training :-** While estimating real wages, the period required for completion of training and cost incurred on that training is also taken into account. The longer the period and higher the cost, the lower would be the real wages.
- (7) **Nature of Job :-** If a Job is precarious or insecured , estimation of real wages in such jobs would be much low. Estimation of real wages in all risky employment is very low.
- (8) **Possibility of Promotion :-** An allowance should be made for prospects of success while estimating real wages. A labourer may be prepared to work on low wages if he knows that there is a bright prospects of possible promotion in future. Besides, social prestige attached to jobs, regularity of payment, permanency of work and uncertainty etc are to be considered while calculating real wages.

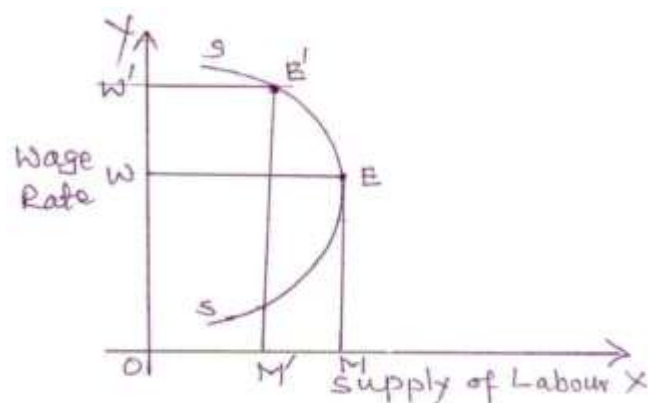
### 6.8.3 SUPPLY OF LABOUR :

Supply of labour depends upon size and composition of population, skills of workers and their willingness to work. One must understand one thing and that is supply of labour can not be adjusted to demand overnight. However advocates of the subsistence theory of wages believed that the size of population depends upon wage rate. But it is known fact that apart from wage-rate, size of population depends upon social, cultural, religious and economic factors. But ability to work and willingness to work are the most important factor in determining the supply of labour. However willingness to work is influenced considerably by the wage-rate. Rise in wage rate has a great effect on supply of labour. Changes in wage-rate has composite effect on supply of labour that is some may offer more hours of work while others may contract and women might withdraw and therefore it is said that rise in wage rate has negative effect on supply of labour because of substitution effect. Workers may substitute more leisure for work efforts.

That is why supply curve of the labour force slopes backward. It is generally held that the total supply curve of labour rises up to a certain wage level and then it slopes backward. The following diagram depicts the backward sloping supply curve of labour. As the wage rate rises to OW, the total quantity of labour offered increases to OM amount but beyond OW wage rate say OW', the total quantity of labour supplied instead of increasing contracts from OM to OM'.



But supply of labour to a particular firm or industry is elastic. If the wage rate is increased, workers from other industries are attracted and supply will match the increased demand, supply of labour also depends upon transfer earnings of workers.



Long run supply curve of labour is more elastic than short run supply curve. It is so because to acquire skill of particular trade or occupation required some time to switch over to other employments. That is why supply of labour is more elastic in long run than in the short run.

#### 6.8.4 WAGE DETERMINATION UNDER COMPETITIVE CONDITIONS :

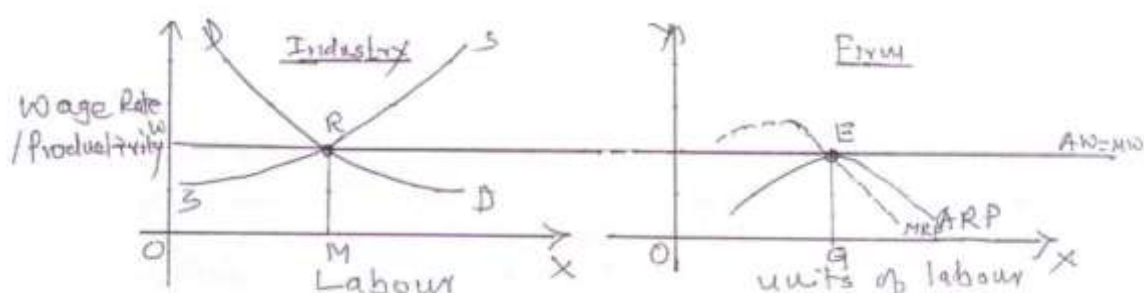
Assuming that there are competitive conditions in both the markets that is labour as well as commodity markets, we shall take up for discussion wage determination under competitive conditions, under competitive conditions, wage rate would be determined by the interaction between demand for labour and supply of labour. In other words, wage rate is determined by the equilibrium between the demand for and supply of labour. Demand for labour is governed by marginal revenue product (MRP). The equilibrium wage rate would be equal to marginal revenue product of labour which is also equal to average revenue product (ARP). Since there are Competitive conditions in factors as well as product markets.

This brings home that under competitive conditions a firm would employ that much amount of labour at which wage-rate would be equal to MRP of the last unit of labour employed under competitive conditions wage rate would be equal to average revenue product which is also equal to marginal revenue product. A rational entrepreneur therefore goes on employing additional unit of labour up to that level at which wage rate becomes equal to MRP of the last unit of labour employed.

In short run, firms can make profit or incur losses but in long run free entry and exit of the firms will force every firm in the industry to pay wage rate equal to marginal product of labour which is also equal to average revenue product. At this, the industry will be earning normal profits. Equilibrium position would be attained only when MRP curve cuts average wage and marginal wage line from above and at this point of cutting average revenue product curve will be tangent to the wage line ( $AW=MW$ ). MRP curve will intersect ARP curve at its highest point from above. At the point of equilibrium  $MRP = MW = ARP = AW$ . When this equality is attained each and every firm in the industry will be in equilibrium earning normal profits. The following diagram illustrates the position.

### 6.8.5 BILATERAL MONOPOLY & WAGE DETERMINATION :

It is a market situation under which a single buyer faces a single seller of the same commodity. When a single seller of labour and single buyer of it carry on transaction in buying and selling of labour at an agreed wage-rate; it is called a bilateral monopoly. There are two limits which could be reached by collective bargaining. They are the upper and lower limit. The upper limit is set by the trade union of workers and a lower limit is set by an employer or the employer's association. However, the actual wage rate is determined between these two limits. Relative bargaining strength of trade union and employer's association would determine whether the wage-rate is nearer to upper or lower limit. It becomes difficult to predict at what rate the wage-rate is fixed between these two limits. Therefore wage determination under bilateral monopoly remains indeterminate. But definitely it would be fixed between the upper and lower limit. The upper limit can not be higher than MRP of labour and lower limit set by employers must be acceptable to the union. Thus the range of wage-rate would be upper and lower limits in which actual wage rate is determined. If entrepreneurs try to set wage-rate below the acceptable wage-rate to the union, it will ask its members to go on strike and if wage-rate demanded by union is higher than MRP entrepreneurs stop employing labour as it meant losses to them.



But the concept of lower limit is not clear. It is ambiguous but there would be a certain minimum wage below which workers will refuse to work. Thus the wage-rate would be fixed some where between these two limits namely the upper and lower limits as a result of bargaining powers between the two parties. The distance between the upper limit and the lower limit indicates the bargaining range within which the wage rate would be actually set. One can not know exactly at what particular point the wage-rate would be fixed within the bargaining range. That is why wage determination under collective bargaining remains indeterminate.

### 6.8.6 EXPLOITATION OF LABOUR :

Under conditions of imperfections, labour is exploited. If imperfect conditions exist either in product or factor market labour is exploited. If imperfect market exists in product market, it is called monopolistic exploitation and in case of imperfections in labour market, it is called monopolistic exploitation.

Prof (MRS) Joan Robinson defined exploitation of labour as the payment to the labour less than its value of marginal product. The value of marginal product is equal to price multiply by MRP of labour i.e.  $AR \times MRP$ . In the works of Mrs. Robinson, "what is actually meant by exploitation is usually, that the labour valued at its selling price." This means that exploitation of labour does not take place under competitive conditions in both the markets. When there is imperfect competition in the product market, MR differs from the price of the product (AR). That is why under such conditions of Market, MRP of the factor differs from value of the marginal product.

(1) Value of Marginal Product = Marginal Product X Price i.e.

$$MPP \times AR \text{ or Price}$$

(2) Marginal Revenue Product = Marginal Product X Marginal Revenue

$$MPP \times MR$$

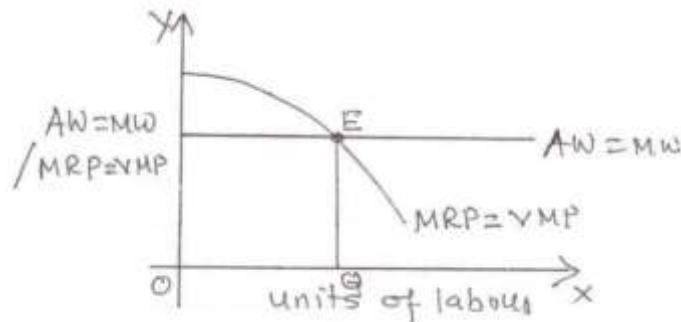
Since under imperfect market, average revenue or price is always greater than marginal revenue, the Value of marginal product (VMP) will be always greater than marginal revenue product (MRP).

Thus,

(a)  $MRP = MP \times MR$

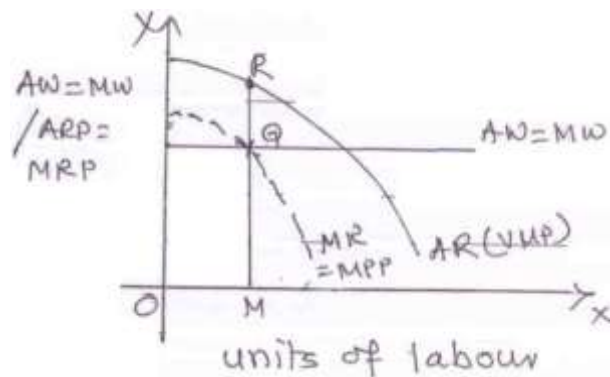
(b)  $VMP = MP \times AR$ . Since under imperfect market price (AR) of the product is greater than MR ( $AR > MR$ )

VMP > MRP.



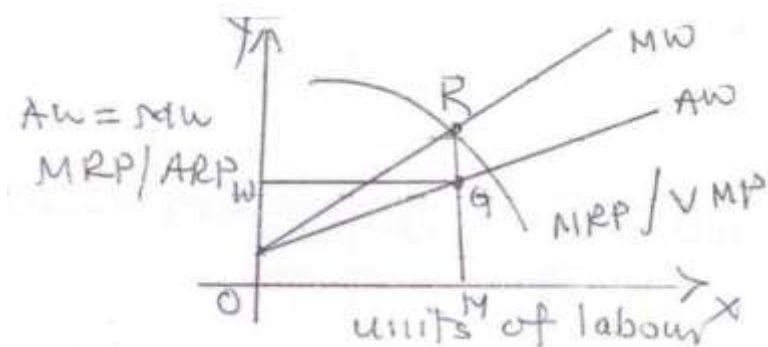
But under perfect competition both VMP and MRP are equal since there is no difference between AR and MR. Therefore, there would be no exploitation of labour under perfect competition. The following diagram depicts the same. Since wage rate is equal to MRP as well as VMP under perfect competition, there is no exploitation of labour under perfect competition. The firm under consideration employs OQ quantity of labour and pays each labourer wage equal to its MRP or VMP and so there is no scope for exploitation of labour.

Now let us consider the situation where there is monopoly in product market and competition in labour market under such situation labour would be exploited. The wage line would be perfectly elastic and horizontal to 'X' axis. But existence of monopoly in product market means sloping down ward AR as well as MR curves. There is a difference between the two. This means that every additional labourer adds more to the total revenue than what he is paid i.e. he is paid less than what is due to him. The following diagram depicts the phenomenon.



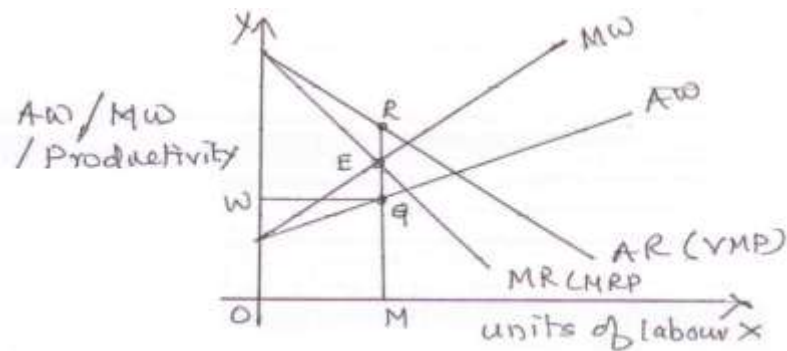
Because there is competition in the labour market wage line would be straight line horizontal to X axis. But there is a difference between AR and MR and therefore, there is a difference between VMP and MRP. So labour is exploited to the extent of RQ. It is also said that exploitation of labour occurs when there are imperfections in labour market even though there is perfect market in product market.

Imperfections in labour market means monopoly in labour market. In this case, supply curve of labour (AW) is not perfectly elastic but it slopes down ward. It is for this reason marginal wage curve would lie above the average wage. Under this situation also labour is exploited because there is a difference between the value of marginal product and the wage rate. Because, there is perfect competition in product market MRP and VMP will be the same. The diagram below explains the situation.



The firm will attain its equilibrium when it equates marginal wage with the marginal revenue product or the value of marginal product. OM, amount of labour is employed and 'OW' wage is paid. But it is less than the value of marginal product. The value of marginal product is greater than the wage. The wage-rate is less than the value of marginal product by RQ amount and this is nothing but exploitation of labour. This kind of exploitation of labour occurs because the supply curve of labour is not perfectly elastic and that is why marginal wage line lies above the average wage line.

If imperfections exist in factors as well as product market i.e. it may be monopsony in labour market and monopoly in product market. In such cases, labour would be doubly exploited. The following diagram depicts the same.



The above diagram shows that labour is exploited to the extent of RQ. It could be split up as RE monopolistic exploitation and EQ amount as monopolistic exploitation. This explains why labour is doubly exploited. According to Prof. Pigion and Prof. Joan Robinson perfect competition is an ideal situation. So, wage-rate determined under it would be just and fair. Any change in this wage-rate will result in the exploitation of labour.

However Prof. Chamberlin did not accept Prof. Pigou Robinson concept of exploitation of labour and has supplied his own concept of exploitation of labour. According to him all factors of production receive less than the value of their MPP under imperfect market under conditions of imperfect competition in the product market MRP is always less than price (AR).

If all factors are paid equal to the value of their marginal product then in that case total payment to all factors exceed total revenue of the firm. Therefore, it becomes impossible for a firm to pay all factors equal to their value of marginal product. He holds the view that labour would be exploited only when he is paid less than his marginal revenue product. Nevertheless exploitation of labour would be removed by creating conditions of perfect completion in product market. The government can take measures to remove imperfections from the product market. In case of monopolistic exploitation, it can be removed by raising the wage rate through the activities of trade unions and the government.

### 6.8.7 DIFFERENCES IN WAGES :

It is generally observed that all units of labour do not get same wage rate. Some get higher while others get lower. Why this happens? Why can't be there equal wage rate for all ? Answers to these questions we find in following factors.

- (1) **Demand Conditions** :- Demand for labour is derived demand. So if demand for the product labour produces is greater, then demand for that kind of labour would also be greater. This raises its wage-rate as in the short run it is the demand for labour which plays dominant role in determining the wage rate. That is why wage rate of such labour is very high.
- (2) **Non-monetary Factors** :- Certain jobs enjoy non-monetary benefits which tend to reduce wage rate. For example college teacher. He has to work only for 3 to 4 hours a day. Moreover he works comparatively in healthy and decent atmosphere. In sharp contrast to this a medical practitioner will have to work round the clock. He has to work in unhealthy conditions and all the time in midst of deadly diseases. Naturally remuneration received by a doctor is always more than a college teacher. It is so doctor does not get non-monetary benefits like that of college teacher.
- (3) **Imperfections In Labour Market** :- Imperfections like immobility of labour, cost of transporting, customs and traditions, social surroundings, climatic conditions, cost of settling down else where etc. help a unit of labour to move from low paid job to a high paid job.
- (4) **Non-Competing Groups** :- There are certain trades which do not compete with each other. Their scale of pay is determined by different principles. This is due to differences in skills in these trades or professions. Therefore higher payment in one trade does not lead to the movement of a unit of labour from low paid trade to a high paid trade. Besides, it is not possible for a person to change his trade in short run due to high skill. For instance, an engineer can not become a doctor or lawyer in short run.
- (5) **Risk and uncertainty** :- The higher the risk and uncertainty, the higher would be payment. In other words, risk and uncertainty involved determines the level of payment of labour.
- (6) **Specificity of labour** :- If a Person does the same kind of job again and again, his mobility is restricted. He becomes expert in that kind of job. He can not be then transferred to any other job. Hence, this brings about the differences in wage-rate.

- (7) **Customs And Traditions** :- Customs and traditions also play a role in fixing fees and remuneration in certain skilled professions like medicine and law. In these profession rates of remuneration are based on old established practice and traditions. So price of labour in these professions is not adjusted by competitive forces.
- (8) **Artificial Restrictions** :- Certain occupations and professions put some restrictions on the entry in these professions on the pretext of maintaining high standard of those professions. For example, Medical Council of India, Bar Councils etc.

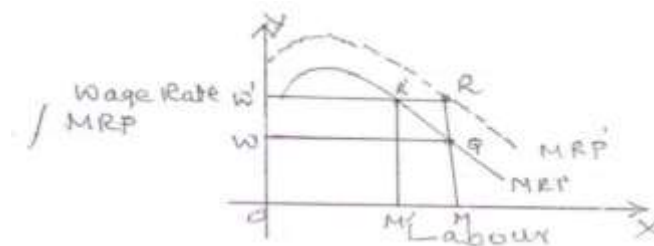
#### **6.8.8 COLLECTIVE BARGAINING :**

In the past, it was believed that trade unions or collective bargaining could not raise the wages of labour. They thought that trade unions were superfluous or ineffective in bettering workers lot. According to them, it was futile undertaking. That is why almost all the theories which attempted to explain what determines wage-rate neglected collective bargaining altogether. The subsistence wage theory, the Iron Law of Wages. The Residual claimant theory of wages and the marginal productivity theory. All these theories considered that in long run wage-rate would remain equal to the subsistence level. As per these theories, long run supply curve of labour (LRS) perfectly elastic at subsistence wage rate. It implies that any attempt by trade unions to raise wages will be useless. An increase in wage rate above subsistence wage-rate will lead to increase in population and working force. This will bring down the wage-rate to level of subsistence because supply of labour would exceed demand for labour. Secondly, supply curve of labour being perfectly elastic, a change in demand for labour would not alter the wage-rate. Even marginal productivity theory holds that there is no scope for collective bargaining. Nevertheless, modern thinking holds that collective bargaining plays a very important and positive role in bettering the conditions of working class.



### 6.8.9 COLLECTIVE BARGAINING & WAGE RATE

It is widely accepted that marginal productivity curve as the employer's demand curve for labour and wage-rate will be settled at the point where MRP will be equal to the marginal wage. It was argued further that any attempt by trade union to raise wage rate above MRP will lead to unemployment. This argument is rebutted by saying that when wage rate goes up, the marginal productivity schedule will shift upward. The higher wages make the labour force better off which increases their efficiency and it is this increased efficiency which raises their marginal productivity. So, an increase in wage-rate would not create unemployment. This is illustrated in the along side diagram.



At  $OW$  wage-rate  $OM$  amount of labour is employed. Now we suppose that wage rate raises to  $OW'$  due to collective bargaining by the trade unions. If the MRP schedule remains the same,  $MM'$  amount employment is created. But, increased wage increases the efficiency of labour, the MRP schedule would shift to  $NRP'$  which would not create unemployment. The diagram makes clear that the  $OW$  wage-rate same amount of labour is employed. This brings us to the conclusion that a powerful trade union would prove successful of raising wage-rate without creating any amount of unemployment.

However, one point is to be noted that in case of collective bargaining when the wage rate is raised, the supply of labour might fall because supply curve of labour is backward sloping. It means that as the wage-rate goes up, workers contract their labour. Therefore, the higher wage-rate might create unemployment which would be due to backward sloping supply curve and not due to collective bargaining. According to Prof. Rothchild, "the imposition of higher wage-rate may lead initially to some unemployment but then produce such a change in the determinants of the wage-employment situation that the unemployment disappears and the higher wage rate becomes an equilibrium wage rate"

## **6.8 INTEREST**

### **6.8.1 INTRODUCTION**

Capital is a man made factor of production. That is why it is considered to be secondary factor of production. The term capital is defined as “all those instruments of production which are deliberately made by man to undertake production of goods and services. It is also called as “Produced means of Production”. Capital is the only factor of production over which man has a complete control in production. Capital goods have a complete control in production. Capital goods have a long life and therefore the time of expenditure and expected receipts from them will have to be carefully predicted in making decision of creation of them. This makes the problem all the more difficult and complicated.

Interest is defined as reward paid to the capital for having used its services in production of goods and services. According to Alfred Marshall. “Interest is nothing but the price paid for the use of capital in the market.” J.M. Keynes defines, “Interest as the premium which has to be offered to induce people to hold their wealth in some other than hoarding.”

Distinction is always made between gross interest and net interest. The total income received by owner of capital is called gross interest. It includes payment of the loan and capital, payment to cover risks of loss, payment for the inconvenience of investment and the last payment for administrative work and worry involved in the process whereas net interest is a payment for the loan of capital when no rise no inconvenience and no administrative work is involved. It is a pure income to capital owner. Dr. Marshall holds, “Net interest is the reward for waiting while gross interest includes some insurance against risk and the cost of management.”

Natural rate of interest refers to that rate of interest at which demand for saving and the supply of savings are in equilibrium whereas market rate of interest corresponds to this equilibrium rate of interest. If market rate of interest tends to be higher than natural rate of interest, supply of savings will exceed the demand for savings at that rate of interest. This will bring down market rate of interest. Likewise if market rate of interest tends to be lower than the natural rate of interest, demand for saving would exceed supply of savings taking market rate of interest upto the level of natural rate of interest. This shows that there are remote chances of market rate of interest differing from natural rate interest. However, price stability could guarantee identify between natural rate and the market rate of interest.

The time preference theory of interest was presented by many economists. Those who supply capital abstain from current consumption. That's why interest is regarded as a compensation for this abstinence. Since lending involves waiting on the part of people, interest should be paid to induce to wait and delay their consumption until the time investment becomes fruitful. Normally people prefer present consumption to future consumption. Secondly, future is always uncertain and thirdly, good in present command a technical superiority over goods in future, according to senior", Interest is the price paid for the use of capital and this price depends upon the forces of demand for and supply of capital:

### **6.8.2 THE CLASSICAL THEORY OF INTEREST**

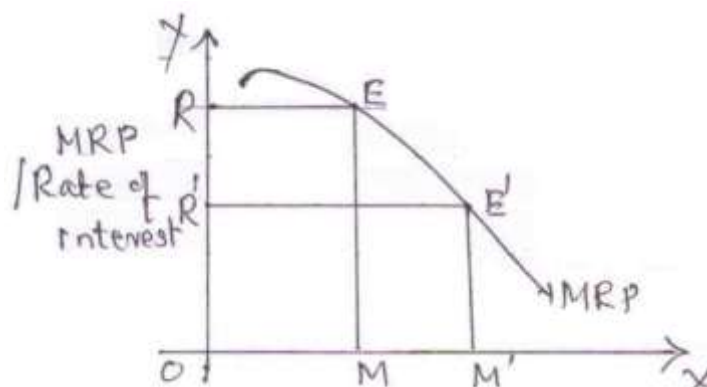
The classical economists held MRP of capital as the interest. Rate of interest is the rate of return over investment in physical capital. It is the role of waiting or time preference. In determination of interest is more important than anything else. But some economist held productivity of capital more important. Prof. Fisher and Prof. Bohm Bawerk held that the determination of rate of interest in terms of demand for and supply of investible funds. However, classical economists stressed the time preference and marginal productivity which are called the real factors of determination of rate of interest. That's why the classical theory is called as the real theory of rate of interest. Neo-classical economists developed a new theory called as the Loanable Funds or Neo-Classical theory of interest. According to them monetary as well as non-monetary factors determine the rate of interest. But J.M. Keynes holds phenomenon and rate of interest is determined by the forces of demand for money which he called as liquidity preference and the forces of supply of money. Interest is the price of parting with liquidity. All theories which attempt to explain the phenomenon of rate of interest either take demand side into consideration or supply side.

A theory of interest has to answer (1) why is interest paid? And (2) how is the rate of interest determined? Since capital is one of the factors of production, its price is also governed by its marginal productivity. But MRP of capital is very difficult to ascertain because capital has long life. It yields incomes for years. But future is uncertain. People prefer present to future. Because of number of uncertainties, entrepreneur will have to take into consideration, all those uncertainties of the future and estimate prospective yields from capital investment after deducting depreciation charges.

### **6.8.3 DEMAND FOR CAPITAL**

Demand for capital comes from entrepreneurs to be used for production of goods and services. Since capital is productive, it earns series of income. Therefore, interest is to be paid to those who supply capital. The price of capital is governed by its MRP. The higher the MRP, the higher would be the rate of interest offered by entrepreneurs and vice-versa. As long as MRP of capital exceeds the rate of interest, demand for capital would continue and would come to an end at that point at which both rate become equal. A rational entrepreneur will go on demanding capital assets with the borrowed funds as long as expected net returns from the capital asset would be equal to the price he pays for the borrowed funds. In other words, it would be the rate of interest paid to the people for surrendering their liquidity. Investment in capital assets would be worth while till the rate of interest equates with the prospective rate of return from the capital asset and at this point of equilibrium investment in capital assets will come to an end. If the entrepreneur continues to investment beyond equilibrium point, he would incur losses; the rate of interest being higher than the prospective rate of return. Since MRP schedule slopes downwards, it would be profitable for an entrepreneur to purchase more units of capital provided the rate of interest falls. Since rate of interest is expressed in terms of percentage, both marginal efficiency of capital and rate of interest schedules follow the same course. But they do not depend upon each other. They are independent and not interdependent classical economists held the view that investment demand is interest elastic.

MRP schedule of capital and rate of interest schedule slope downwards from left to right indicating thereby more will be invested if the rate of interest comes down and as more and more units of capital are demanded for investment, the return from each marginal unit of capital goes on falling. So more will be invested if the rate of interest falls and also MRP of capital declines as more and more units of capital are demanded for investment. The following diagram shows the MRP schedule of capital.



It falls from left to right. 'OR' is the market rate of interest. At this rate of interest OM amount of investment is undertaken. The curve MRP depicts the falling marginal net expectations as more and more investment is undertaken. Here one must note that rate of interest becomes equal to MRP of the capital. Now let us suppose that rate of interest falls from  $OR$  to  $OR^1$ . This will make further investment more profitable. Therefore  $MM^1$  additional fresh investment is undertaken to equalise MRP with new rate of interest. It is therefore concluded that investment demand slopes downward from left to right with a change in rate of interest.

#### 6.8.4 SUPPLY OF CAPITAL

Capital is productive and hence capital owner is required to pay some income to make it available for producing goods and services. To make people to surrender their savings or investible funds, they must be offered something and that is rate of interest. The suppliers of capital prefer present consumption to future consumption. When they lend their investible funds, they would have to postpone their present consumption of goods and services. This involves a sacrifice on the part of lenders. Interest is the reward for this sacrifice or waiting. The investible funds come from general public. They supply these funds out of their savings. Therefore, savings schedule slopes upward from left to right indicating the direct relationship between rate of interest and supply of funds. Thus according to the classicists savings is interest elastic or  $s = f(r)$ . It means that it is a function of rate of interest.

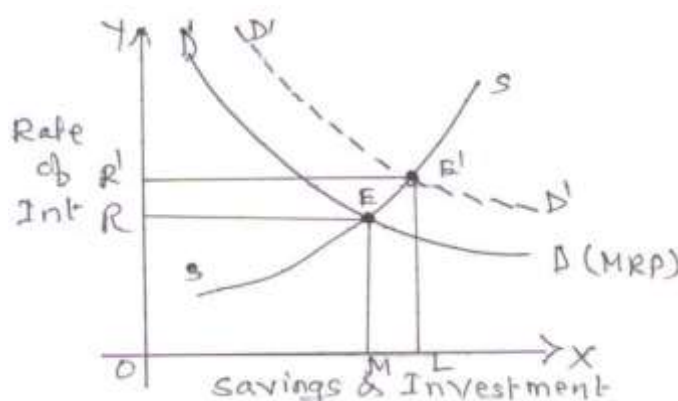
### 6.8.5 DETERMINATION OF EQUILIBRIUM RATE OF INTEREST

The classical economists held that interaction between demand for and supply of investible funds determines the equilibrium rate of interest. According to classical economists savings is interest elastic. If the demand for investible funds exceeds supply of investible funds, the rate of interest would shoot up and vice – versa.

The classical economists held to view that the rate of interest is equilibrium force between demand for and supply of investible funds. This equilibrium rate of interest demand for savings for investment. If saving exceeds demand for it, the rate of interest would fall. This would result into a fall in rate of interest and reduction in supply of savings. So, the rate of interest is the mechanism which brings two into equality. The classical economists always held.

$$(1) S = f(r) \quad (2) I = f(r)$$

where, 'S' stands for savings and 'I' stands for investment, 'r' for rate of interest & 'f' for function. So, Savings would be equal to investment always. Aggregate savings and investment are treated to be flows; and secondly, it is the rate of interest that brings about equality between the two. The following diagram depicts determination of rate of interest. The diagram shows DD demand curve is nothing but MRP schedule of capital.



'DD' demand schedule cuts supply schedule at 'E' point at 'OM' size (MRP) of investment. Thus OR is the equilibrium rate of interest. If any change either in demand for or supply of investible funds takes place, a new equilibrium rate of interest would be established. Thus according to classical economists rate of interest is determined by the interaction between demand for and supply of investible funds.

#### 6.8.6 ASSUMPTIONS OF THE THEORY

- 1) Existence of full employment of natural resources.
- 2) Government policy of laissez-faire.
- 3) Long Run operation.
- 4) Existence of perfect competition
- 5) Savings and investment are the function of rate Interest  $S = f(r)$ ,  $I = f(r)$
- 6) Accepting the marginal productivity theory as the base and rate of interest as a mechanism which brings savings and investment into equality. The classical theory is also called as real theory of rate of interest because it is based on real factors like capital and abstinence form consumption neglecting totally monetary factors.

#### 6.8.7 LIMITATIONS OF THE THEORY

- 1) **Full Employment:** The classical theory of rate of interest is based on full employment. i.e. all natural resources are fully employed. But there can be cyclical, frictional, voluntary or involuntary unemployment in the economy. So, assumption is unrealistic.
- 2) **Savings is not interest elastic:** The classicists held that savings is the function of rate of interest. But this is not correct. Saving is basically income elastic and then interest elastic. It means that savings depends upon the level of national income which classicists failed to recognise.
- 3) **Investment is not interest elastic:** Though the classical economists held investment also function of rate of Interest but it is not so. Investment is primarily function of marginal efficiency of capital or prospective rate of return over cost. Rate of interest on one side and marginal efficiency of capital on the other determines the volume of investment in the economy. But classical economists failed to consider this fact.
- 4) **Monetary Forces Neglected:** Another drawback of the theory is that they totally neglected monetary forces such as bank money, hoardings etc. these factors equally influence rate of interest. The classicist emphasized only real forces.
- 5) **Rate of Interest Is A Weak Mechanism:** The Classical economists held the view that the equality between savings and investments is brought through rate of interest. It is so because according to them both are interest elastic. But there are many other forces which are equally important in bringing about equality between the two.

Whatever may be the drawbacks of the classical theory, it can not be discarded because it is based on real factors such as productivity, time preference, waiting, sacrifice etc. Therefore, it is termed as real theory of rate of interest.

#### **6.9.8 THE LOANABLE FUNDS THEORY OF RATE OF INTEREST**

This theory of interest associated with the name of Neo-classical economists like Wicksell, Marshall Robertson etc. This theory holds that rate of interest is determined by the interaction between the demand for and supply of loanable funds. Not only real factors but monetary factors also like bank money hoardings, disinvestment etc. determine the equilibrium rate of interest. So, the loanable funds theory takes much more broader view of demand for as well as supply of loanable funds.

#### **6.9.9 SUPPLY OF LOANABLE FUNDS**

Funds for investment come from four different sources which are as follows :

- 1) **Savings (S)** : Savings of general public as well as of institutions forms the major source of supply of funds. It is interest elastic. The higher the rate of interest, the greater would be volume of savings and vice-versa. Savings is defined as an excess of income over consumption expenditure. It depends upon the level of income and the prevailing rate of interest. Besides, industrial houses accumulate savings out of undistributed profits and reserved funds. Since savings is interest elastic, saving function slopes upward from left to right.
- 2) **Dis-hoarding (DH)**: Hoardings means idle cash balances or money kept out of circulation. If the rate of interest goes up, people dishoard their hoardings and make funds available for investment. It is also interest elastic and therefore dishoarding curve also slopes upward.
- 3) **Bank Money (BM)**: The credit created by the banking system forms the another source of loanable funds. The expansion or contraction of credit creation increases or decreases the supply of funds for investment. The BM function also slopes upward.
- 4) **Dis-investment (DI)**: Investments which do not remain attractive are liquidated and funds are made available for fresh investment. Old investment is liquidated because rate of return over cost is less than the current rate of interest. That is why old investment is liquidated and funds are made available for new investment. So, the supply of funds comes from savings, dishoardings, bank money, and dis-investment.

Thus,  $SL = S + DH + BN + DI$



### 6.9.10 DEMAND FOR LOANABLE FUNDS

The demand for loanable funds come from investment, consumption and hoardings.

1) **Investment Demand (I):** Demand for funds mainly come from investors. The businessmen borrow funds for the purpose of investment. It depends upon the rate of interest. So long as the rate of profitability is higher than the current rate of interest, funds will be demanded for investment. The moment the rate of profitability comes down to the level of current rate of interest, further demand for funds would come to an end. The higher the rate of interest, the lower would be the demand for funds for investment and vice-versa.

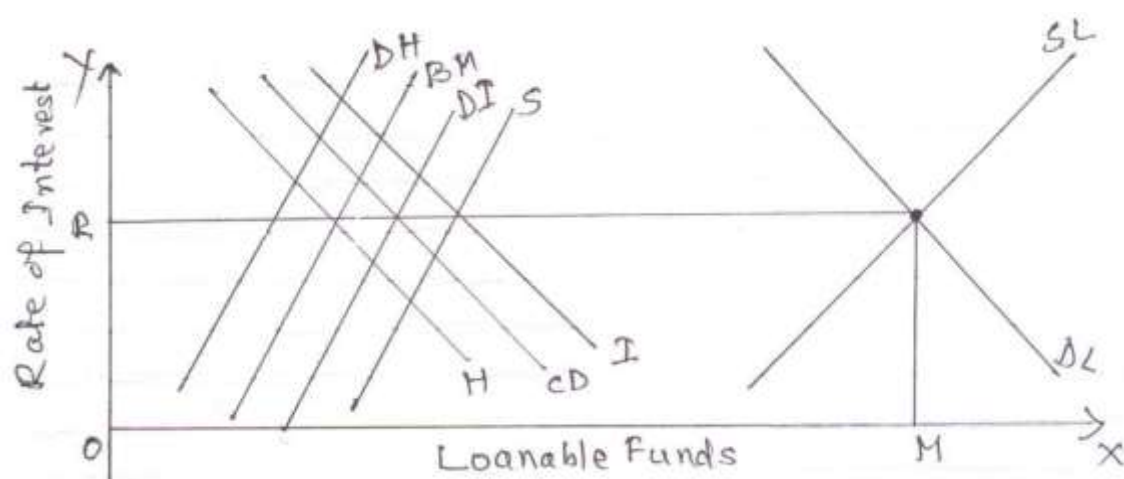
2) **Consumption Demand (CD):** For buying durable goods such as vehicles, houses, air-conditioners, refrigerators etc. people demand funds. They do so because their current income may not be sufficient to buy these goods. Demand for funds for this purpose is also interest elastic. That is why CD function slopes downwards from left to right.

3) **Hoardings (H):** When people decide to maintain high liquidity when rate of interest is very low, they demand funds simply for hoardings. In other words they keep funds idle without making any investment. But at high rate of interest they dishoard it. So the rate of interest and demand for funds are inversely related.

Thus total demand for funds (DL) = I + CD + H

### 6.9.11 DETERMINATION RATE OF INTEREST

The equilibrium rate of interest is determined by the equality between the total demand for and supply of funds. This equality is reached at the point of intersection between total supply of funds and total demand for funds. Thus SL and DL curves intersect at each other at 'E' point at which equilibrium rate of interest is determined as OR and funds demanded supplied are OM. This implies that any other rate of interest will bring disequilibrium between the SL and DL. The following diagram depicts the equilibrium rate of interest.



## LIMITATIONS

- 1) No clarity about the concept of hoardings.
- 2) The theory is indeterminate, in the sense that what determines what is not made clear.
- 3) National Income never remains constant. It always fluctuates which the theorists failed to recognize/
- 4) The assumption of full employment is not true.
- 5) Saving-Investment are not only interest elastic. They depend upon income and marginal efficiency of capital.
- 6) The theory is synthesis of the real theory and liquidity preference theory.
- 7) It is also states to be static whereas our world is dynamic. We can not solve the problems of dynamic world with static tools.

## 6.10 PROFITS

### 6.10.1 INTRODUCTION

Profit is regarded as the reward for entrepreneur. An entrepreneur means undertaker; one who undertakes the task of producing goods and services. He hires the services of factors of production. He also co-ordinates their services to complete the process of production. In the past, the owner of a business was considered entrepreneur. But in modern times business enterprises have not remained one man enterprise. Therefore, it has become more difficult to conceive the proper and clear cut meaning of the term entrepreneur.

There is a controversy over the meaning and functions of entrepreneur. Entrepreneurial work is regarded as special type of labour. His job is to hire, combine and co-ordinate the factors of production. In order to complete the process of production. All are expected to lead to maximum profit. One point to be noted that all other factors are hired but entrepreneur can not be hired. The entrepreneur is paid profit as his reward. However, it is considered as non-contractual income. It is the left over income. So, profit can be positive as well as negative. But in case of other factors, their rewards would always be positive. Net profits are calculated after having deducted imputed values of the land and capital owned by the entrepreneur himself. He must also deduct the value of his services rendered to the production. There is also a difference between profit and profits. Profits are those which an entrepreneur hopes to earn in near future while profit is one which already earned.

### **6.10.2 GROSS PROFIT & NET PROFIT**

Gross profit refers to the total income received by an entrepreneur after having deducted total explicit cost from total earning. Total explicit cost includes all the money expenditure incurred by a business man to produce a commodity or a service payment made to outside parties whereas Net profit or pure profit refers to the total revenue minus total cost inclusive of implicit cost. Gross profit includes, wages, rent and interest and this imputed value while net profit is a left over income after having made all contractual and non-contractual payments. It is quite possible, therefore that net profit may be either positive or negative. It would be positive when total revenue exceeds total costs including implicit costs. It would be negative when total cost exceed total revenue. If all the factors of production are paid equal to their MRPs, then that case, there would not be any net profit. Except perfect competition, there would be always left over income which goes to entrepreneur.

### **6.10.3 NORMAL PROFIT**

Normal profit can be defined as the minimum profits which entrepreneur must earn to make him remain or continue in the same business. In other words, it is the transfer earnings of the entrepreneur. If he fails to get the minimum expected profit in the existing business, he would transfer his services to some other lucrative business. Normal profit is treated as a part of total cost. It is regarded as the return for entrepreneur for managing and bearing uncertainty of the business. While abnormal profit or excess profit refers to any surplus over and above normal profit. It is residue surplus which can be referred as rent of ability. Earning of excess profit is not necessary for continuance of the business.

### **6.10.4 FUNCTIONS OF ENTREPRENEUR**

Profit is closely related with functions of entrepreneur. It is the entrepreneur who hires the services of other factors of production and pays them fixed contractual remuneration to them but entrepreneur himself is not employed by any one and is not paid a fixed salary. Entrepreneurship includes all those productive functions which are not rewarded in the form of rent, wages and interest. It is a residual income which he earns for performing special functions.

- 1) **ORIGINATING** : The entrepreneur introduces new products, new techniques or processes of production and explores the new opportunities of earning profits.
- 2) **RISK BEARING**: It is the entrepreneur who shoulders the entire risk of the business. He bears all risk because he is the originator and executor of the business.
- 3) **CO-ORDINATING**: It is he who hires and employs the services of other factors of production. He combines and co-ordinates the work of other factors of production so that production is made possible and goods and services are produced.

#### **6.10.5 PROFITS & UNCERTAINTY**

Before production is undertaken, an entrepreneur has to make various decisions on certain figures of cost and revenue. If his calculations regarding costs and revenue come true, he will certainly make profits. But these calculations go wrong, he will incur losses and these calculations vary from entrepreneur to entrepreneur. Therefore, these estimates regarding costs and revenue are subjective. But if these calculations are not known then in that case everything becomes uncertain. Therefore, whether he would earn profits or incur losses, all depends upon his expectations, calculations and guesses. And if these all come true, he will definitely make profits but unfortunately if these go wrong, he would incur losses. So, there is a great amount of uncertainty in these calculations with uncertainty. That is the reason why profits are associated with uncertainty. However, one thing must be noted that if the world is static, there would be no uncertainty and so scope for losses. But things may not shape as we want them to be. That's why there is uncertainty which gives rise to risk in business. Dr. H.L. Ahuja holds, "Profits arise due to disequilibrium caused by the changes in demand and supply conditions."

#### **6.10.6 RISK & UNCERTAINTY**

As other factors of production namely land, labour and capital have their MRP schedules, in the same manner entrepreneur also has his MRP schedule. It means that he is also productive like all factors of production. The risks which entrepreneur shoulders can be insurable and non-insurable. This distinction is of great importance. There are number of risks and uncertainties that the entrepreneur is confronted with besides the risk of losing his money invested in the business. These risks take place partly due to his misjudging the market movements and partly due to natural uncertainties. The risks like fire, theft, death, earthquakes can be insured against. So over such risks entrepreneur is not to worry. He has to shoulder those risks which can not be insured against.

These risks are connected with his business decisions about what to produce? Where to produce? When to produce? Which technique to follow? Etc. predictions regarding demand conditions are very difficult. These predictions may come true or may go wrong. Therefore, it is impossible for any insurance company to ensure such risks and uncertainties. If an entrepreneur uses his own capital, land and his own labour he is entitled to rent, wages and interest. Such payments are called as imputed values.

#### **6.10.7 PROFIT AS A DYNAMIC SURPLUS**

J.B. Clarke developed this theory of profit. He holds that profits are a dynamic surplus. In a static economy where there are no changes in conditions of demand and supply, remuneration paid to the factors of production on the basis of their MRP would exhaust the total revenue and hence no profit would occur to the entrepreneur. Profit results when total revenue is in the excess of total cost of production.

In a competitive market, in the long run price equals average cost ( $AR = AC$ ) and no profit. Profits arise due to disequilibrium caused by the changes in demand and supply conditions and therefore there would be no profit since both demand and supply forces balance each other. The size and composition of population, incomes, tastes and preferences, existence of substitutes, changes in government, economic and fiscal policies bring about change in demand conditions. Similarly, introduction of a new commodity or a new technique or a process of production or a new method of selling or a change in supply which cause disequilibrium leading to profit. But in a static economy demand and supply are taken to be constant hence cost and price do not change and so no profit.

But in reality, everything is subject to changes or uncertainty. Nothing can be anticipated before hand. A dynamic economy is one in which demand and supply conditions undergo change constantly. These changes lead to profit or losses. Thus, disequilibrium between demand and supply causes profit or losses. Like internal changes, there are external changes which affect entire manufacturing units in the economy. These changes are, war, inflation and depression, change in monetary and fiscal policies, change in the technique of production, change in spending habits of the people and lastly statutory changes. These changes either bring changes in demand or supply conditions resulting into disequilibrium leading to either profits or losses.

### **6.10.8 LIMITATION OF THE THEORY**

1) According to F.H. Knight, dynamic surplus theory does not make any difference between a foreseen changes and unforeseen changes. Certain changes can be predicted in advance. The moment this aspect we take into account, the entire clarkian thesis based upon the effects of changes falls flat on the ground. Thus, it is not change as such but uncertainty about this change that gives rise to profit. Uncertainty is the permanent feature of economic system.

2) The theory ignores completely the role of uncertainty in making profit. He also rejects the view that profits are nothing but the reward for shouldering risk of the business. Risk and uncertainty exist in entrepreneurial function. The one can not exist without other. Therefore, the theory is one sided.

3) Clark's concept of profit as a dynamic surplus is worked out in the context of static background and is too mechanical. Nothing is static in the world. Hence, the role of uncertainty creeps into it. Thus Clark overlooks the active role played by uncertainty and expectations in shaping the course of things. In the words of professors Stonier and Hange "In an economy where nothing changes, there can be no profits." There is no uncertainty about the future, so there are not risks and no profits."

### **6.10.9 INNOVATION THEORY OF PROFIT**

It was Joseph Schumpeter who developed the innovation theory of profit. Innovation is an important factor responsible for the occurrence of profit to the entrepreneur. According to Schumpeter the main function of the entrepreneur is to introduce innovations in the economy and profits are reward for performing this function. Schumpeter held that innovations are not only the cause of profits but also the root cause of economic fluctuation. He explained the phenomenon of trade cycles in terms of innovation and the behavior of entrepreneurs. The term innovation is not the same as invention. Innovation has wider meaning. Any new measure or technique or policy introduced by an entrepreneur to reduce the costs of production or to increase the demand for his product is an innovation. So, innovations can be put into two categories namely cost saving or demand boosting. In either case profit is made.

Cost saving innovations do change the production function. These innovations are introduction of a new machinery, new and cheaper technique or process of production, exploitation of a new source of raw materials and better method of organizing the business, etc. The second category innovations are the measures which increase the demand for the product and these measures alter the utility function. They include introduction of new product, a new design of product, a new and superior method of advertisement or discovery of new market etc. If the introduction of an innovation proves worthwhile or successful in reducing either cost or raising demand for the product, it would generate profit. One who introduces innovation first will reap the maximum profit. But later on others will imitate the pioneer entrepreneur and the profit margin will start declining due to keen competition from other entrepreneurs.

Introduction of innovation which gives rise to profits are temporary. Profits are earned till the effects of innovation remain. Once that innovation is completely exploited, the cost of production starts rising and profits come to zero. Economic activity comes to an end. But if any other entrepreneur introduces a new innovation at the time when the desirable effects of previous innovation are dying out, he would be monopolist for new innovation is confined to him. So, he makes profits. Others may try to imitate him but take some time and during this period the pioneer entrepreneur makes profits. When others succeed to imitate him, excess profits would be competed out by imitators until another innovation emerges. It must be noted that innovations appear in cluster i.e. one after the other and take economic system to its climax. It is so because in a competitive and progressive economy true and rational entrepreneurs are always after the new method of production or technique or any device that reduces the cost of production. Therefore as long as innovations exist, profits continue to emerge out of them.

#### **LIMITATIONS OF THE THEORY**

- 1) Role of uncertainty is not analysed. He gave all importance to innovation without considering the role of risk and uncertainty.
- 2) Joseph Schumpeter denies the much accepted contention that the entrepreneur is the risk bearer. He says "The entrepreneur is never risk bearer. The one who gives credit comes to grief if the undertakings fails." But this is not a correct view. Ultimately the entire responsibility of business lies on one who makes all the production decisions. These decisions may go wrong and hence one who makes wrong decisions will have to face losses. Even introduction of innovation may be wrong time but it may prove successful who knows? This means uncertainty and risk of making such decisions.

#### **6.10.10. PROFIT AS A REWARD FOR RISK BEARING**

This theory is developed by Hawley. According to him risk bearing is the main function of the entrepreneur and this results into profit. Before undertaking any business, the entrepreneur expects to earn a certain amount of profit because the business involves some element of risk. The higher the risk, the greater would be the gain. If the gain is not a proportion to the risk, no entrepreneur would undertake that business. Therefore to start any business, the entrepreneur is required to be rewarded sufficiently. Thus risk bearing is an essential function of entrepreneur and therefore is the basis of profits.

#### **LIMITATIONS OF THE THEORY**

- 1) Firstly profits arise because of the reduction of risk in the business by above and efficient entrepreneur and not by merely shouldering risk.
- 2) Secondly, it is not true to hold that every risk leads to profits. Some risks can be insured against whereas others can not. Risks of making production decisions can not be insured against. It is only these risks which are responsible for occurrence of profits.

In conclusion, we can add that the root cause of profits is innovation. Profits are the necessary incentives for entrepreneurs to undertake economic development of the country. Since innovations generate profits, profits are incentive to introduce innovations. So both are there as cause and consequences of each other. Both are required to take up economic system of the country to the level of full employment.



### Exercise

1. Explain the marginal productivity theory of distribution with special reference to marginal revenue productivity.
2. What are the conditions of equilibrium of an industry? What are the assumptions behind it and what are the limitations thereof.
3. Explain the Ricardian concept of “rent” and the assumptions on which it rests.
4. What is the modern theory of rent? How elasticity of supply of land affect it? Explain quasi-rent.
5. Distinguish between nominal wage and real wage. How wage is determined under competitive conditions.
6. Discuss the effect of collective bargaining on wage rate.
7. What is meant by ‘interest’? What determines the equilibrium rate of interest? Explain with diagram.
8. Explain the theory of profit as a reward for risk bearing. What are the limitations of the theory?

# MACROECONOMICS

## INRODUCTION

The weightage of utility arising out of consumption is recorded through money. Such utility arising out of consumption is referable to commodity which means goods as well as services. The immediate effect of demand and supply of a commodity is recordable as price and ultimate effect is the value. The aspect of pricing had been our subject matter of microeconomics. We are concerned with valuation which goes beyond pricing and analysis the forces as well as the factors that go to determine the ultimate effect, determining value.

In pricing, we are concerned with behaviour of demand schedule and supply schedule under different market conditions – perfect, imperfect and monopoly. In valuation, we have to take into account various other forces which are deeply laden in macroeconomics that means monetary polices, distribution of national income, price level and inflation, demographic patterns, changes in consumer behaviour, rate of saving and investment, parallel economy, etc., which lie within the domain of macroeconomics. That is how the study of macroeconomics assumes extreme importance in the context of valuation.

The goals of macroeconomic policy are:

1. A high and growing level of national output (i.e., of real GDP)
2. High employment with low unemployment
3. A stable or gently rising price level

## The Tools of Macroeconomic Policy

Governments have certain instruments that they can use to affect macroeconomic activity. A *policy instrument* is an economic variable under the control of government that can affect one or more of the macroeconomic goals. That is, by changing monetary, fiscal, and other policies, governments can avoid the worst excesses of the business cycle and can increase the growth rate of potential output.

**Fiscal Policy.** Begin with **fiscal policy**, which denotes the use of taxes and government expenditures. *Government expenditures* come in two distinct forms. First there are government purchases. These comprise spending on goods and services—purchases of tanks, construction of roads, salaries for judges, and so forth. In addition, there are government transfer payments, which boost the incomes of targeted groups such as the elderly *or* the unemployed. Government spending determines the relative size of the public and private sectors, that is, how much of our GDP is consumed collectively rather than privately. From a macroeconomic perspective, government expenditures also affect the overall level of spending in the economy and thereby influence the level of GDP.

The other part of fiscal policy, *taxation*, affects the overall economy in two ways. To begin with, taxes affect people's incomes. By leaving households with more *or* less disposable *or* spendable income, taxes tend to affect the amount people spend *on* goods and services as well as the amount of private saving. Private consumption and saving have important effects *on* output and investment in the short and long run.

In addition, taxes affect the prices of goods and factors of production and thereby affect incentives and behaviour. For example, the more heavily business profits are taxed; the more businesses are discouraged from investing in new capital goods. From 1962 until 1986, the United States employed all investment tax credit, which was a rebate to businesses that buy capital goods, as a way of stimulating investment and boosting economic growth. Many provisions of the tax code have an important effect *on* economic activity through their effect on the incentives to work and to save.

**Monetary Policy.** The second major instrument of macroeconomic policy is monetary policy, which government conducts through the management of the nation's money, credit, and banking system. You may have read how *our* central bank, the Federal Reserve System, operates to regulate the money supply. But what exactly is the money supply? Money consists of the means of exchange *or* method of payment. Today, people use currency and checking accounts to pay their bills. By engaging in central-bank operations, the Federal Reserve can regulate the amount of money available to the economy.

How does such a minor thing as the money supply have such a large impact *on* macroeconomic activity? By changing the money supply, the Federal Reserve can influence many financial and economic variables, such as interest rates, stock prices, housing prices, and foreign exchange rates.

Restricting the money supply leads to higher interest rates and reduced investment, which, in turn, causes a decline in GDP and lower inflation. If the central bank is faced with a business downturn, it can increase the money supply and lower interest rates to stimulate economic activity.

The exact nature of monetary policy-the way in which the central bank controls the money supply and the relationships among money, output, and inflation-is one of the most fascinating, important and controversial areas of macroeconomics.

## UNIT – VII

### NATIONAL INCOME

#### 7.1 CONCEPT OF NATIONAL INCOME

The total income of the nation is called "national income." The aggregate economic performance of the whole economy is measured by the national income data. In fact, national income data provide a summary statement of a country's aggregate economic activity.

In real terms, national income is the flow of goods and services produced in an economy in a particular period - a year.

Modern economy is a money economy. Thus, national income of the country is expressed in money terms. A National Sample Survey has, therefore, defined national income as: "money measures of the net aggregates of all commodities and services accruing to the inhabitants of a community during a specific period."

More elaborately, however, we may say that national Income is a money measure of value of net aggregate of goods and services becoming available annually to the nation as a result of the economic activities of the community at large, consisting of households or individuals, business firms, and social and political institutions.

An important point about national income is that it is always expressed with reference to a time interval. It is meaningless to speak of the income of an individual without mentioning the period over which it is earned, say per week, per month, or per year. Similarly, it is meaningless to talk of national income without mentioning the period over which it is generated. This is because national income is a flow and not a stock *i.e.*, income is generated every year, and at different rates and, therefore, it is necessary to mention the period during which that income is generated. National income is usually measured and shown with reference to a year or as annual flow; it is, thus, an amount of total production per unit of time.

Like many other terms in common use, the concept "national income" has various connotations. For instance, national income is variously described. Sometimes it is known as "national income" at other times, "national product", or "national dividend." As a matter of fact, all these terms mean one and the same thing.

In national income accounting, thus, the concept of national income has been interpreted in three ways, as: (1) National Product, (2) National Dividend, (3) National Expenditure.

***National Product***

It consists of all the goods and services produced by the community and exchanged for money during a year. It does not include goods and services, which are not paid for, such as hobbies, housewives' services, charitable work, etc.

***National Dividend***

It consists of all the incomes, in cash and kind, accruing to the factors of production in the course of generating the national product. It represents the total of income flow which will exactly equal the value of the national product turned out by the community during the year.

***National Expenditure***

This represents the total spending or outlay of the community on the goods and services (of all types, capital as well as consumption) produced during a given year. Since income is the source of expenditure, national expenditure constitutes the disposal of national income, which is evidently equal to it in value or in other words, National Expenditure equals National Income.

Indeed, one man's income is another man's expenditure. When a person buys milk, it is his expenditure, but this very expenditure is the milkman's income. When the milkman spends part of this income in buying sugar, it becomes income for the sugar merchant and so on. In a sense, therefore, the sum of expenditure of all agents of production is equal to the total income received by the factors of production during that year. National Income can, therefore, be also defined as a sum of the expenditure on producer goods; consumer goods and services of agents of all production.

In fact, there is a fundamental equality between the total income of the community and its total expenditure, as one's expenditure becomes another's income in the economy. Hence, there is a large circular flow established in which each expenditure, creates an income, which in its turn is spent and creates other incomes. Therefore, this total national income will be equal to the total national expenditure.

Briefly, thus, the identity of the three factors of the flow of national income may be expressed as follows:

$$\text{National Expenditure} = \text{National Product} = \text{National Income or Dividend}$$

When we analyse, the above three concepts, we find that national income is nothing but “the total flow of wealth produced, distributed and consumed.” National income is not a stock but it is a flow. It is not that the income is first earned and then gradually spent or distributed, or alternatively, it is not that the expenditure first takes place and then an income is earned. As a matter of fact, the process of income creation and income distribution goes on at one and the same time.

There are, thus, three alternative definitions of national income. The first definition is that it is the money value of goods and services produced by agents of production during the course of a year. We might call this "total production approach.”

The second definition is that it is the sum of incomes of agents of production, profits of public enterprises, income from government companies. This we might describe as "income approach."

The third definition is that national income is the sum of total expenditure of agents of production. We might call it "Total expenditure approach.”

Corresponding to these approaches, we observe that national income has been defined in three ways in the publications of the United Nations:

- (a) "Net National Product" as the aggregate of the net value added in all branches of economic activity during a specified period, together with the net income from abroad.
- (b) "Sum of the distributive shares" as the aggregate of income accrued to the factors of production in a specific period, these payments taking the shape of wages, profits, interest, rent etc.
- (c) "Net national expenditure" as the sum of expenditure on final, consumption of goods and services, plus domestic and foreign investment.

Incidentally, Keynes has suggested three approaches to national income, which are more suitable and practicable in the microanalysis of income and employment, as follows:

1. Income-expenditure approach: in which total expenditure on consumption and investment goods constitute total income.
2. Factor-income approach: in which national income is measured as the aggregate of incomes received by all the factors of production.  
Keynes wrote:  $Y = F + E_p$  where, Y stands for national income, F stands for payments received by land, labour and capital owners, and  $E_p$  refers to entrepreneurial profits.
3. Sales proceeds minus cost approach: in which Keynes considered that national income is based on aggregate sales minus cost.

In fact, Keynesian analysis has revolutionized thinking of the national income analysis. Prior to Keynes's General Theory, national income data were not collected officially from the economic analysis point of view. Keynes developed a theory which showed how consumption and investment expenditure can affect the national income flow. From the Keynesian analysis, modern concepts of national income has been evolved which are more dynamic in content.

Modern economists consider national income as a flow in three forms: income, output and expenditure. When goods are produced by the firms, factors of production comprising households are paid income, these income receipts are spent by the household sector on consumption and their savings are mobilised by the producers for investment spending. Likewise, a circular flow is constituted between income and expenditure. Obviously, income, output, and expenditure flows are always equal per unit of time. There is, thus, a triple identity:

$$\text{Output} = \text{Income} = \text{Expenditure}$$



## 7.2 Concepts Associated with National Income Total

### 7.2.1 Gross National Product (GNP)

In calculating national income, we add up all the goods and services produced in a country. Such a total represents the gross value of final products turned out by the whole economy in a year, which is technically called Gross National Product. The word "gross" indicates the inclusion of the provision for the consumption of capital assets, *i.e.*, depreciation or replacement allowances.

GNP, thus, may be defined as the aggregate market value of all final goods and services produced during a given year. The concept of final goods and services stands for finished goods and services, ready for consumption of households and firms, and exclude raw materials, semi-finished goods and such other intermediary products. More specifically, all sales to households, business investment expenditures, and all government expenditures are treated as final products: But, intermediary goods purchased by business firms are obviously regarded as final goods. For example, when a textile mill purchases a machine or showroom, it is regarded as final goods, but when it buys cotton, it is not regarded as final goods. This is to avoid double counting because when cotton is transformed into cloth, its value will be included in the price of cloth.

In an open economy (an economy subject to international trade), GNP may be obtained by adding up:

1. The value of all consumption goods, which are currently produced.
2. The value of all capital goods produced which is defined as Gross Investment. Gross investment, in the real sense, here implies the increase in inventories plus gross products of buildings and equipments. It, thus, includes the provision for the consumption of capital assets, *i.e.* depreciation, or replacement allowances.
3. The value of government services which are measured in terms of governmental expenditure on various goods and services for rendering certain services to the benefit of the entire community.
4. The value of net products, *viz.*, the difference between total exports and total imports of the nation. This value may be positive or negative.

5. The net amount earned abroad. This represents the difference between the income received by the nationals from abroad on their foreign investment, minus the income paid by them abroad on the foreigner's investment.  
 GNP at market price, thus, represents:

$$\text{GNP} = C + I + G + (X - M) + (R - P),$$

Where,

- C stands for consumption goods,  
 I stands for capital goods/or gross investment,  
 G stands for government services,  
 X stands for exports,  
 M stands for imports,  
 R stands for income receipts from abroad, and  
 P stands for income paid abroad.

In a closed isolated economy, however,  $\text{GNP} = C + I + G$ .

GNP is the basic social accounting measure of the total output. It represents the final products, ready for consumption, valued at current market prices.

### 7.2.2 Gross Domestic Product (GDP)

When we take the sum total of values of output of goods and services in the country, without adding net factor incomes received from abroad, the figure so obtained is called Gross Domestic Product (GDP).

$$\text{GDP} = C + I + G + (X - M).$$

This is measured at market prices.

A measurement of GNP has been illustrated in the **Table 1** below.

Item	Value of Current Market Price (Rs. Crores)
Consumption (C)	654
Investment (I)	334
Government Purchases (G)	123
Net Exports (X – M)	+ 15
Net Income from the rest of world (R – P)	+ 2
Total	1128

**Table 1 : Final Output (GNP)**

In measuring GNP, each finished product is multiplied by its price. Thus, the relative importance of particular good is expressed by its relative price. Further, with changes in prices the GNP also changes. During inflation, thus GNP appreciates simply on account of rising prices. To know the real GNP, therefore, we must deflate a given GNP total from the market price to the constant price.

GDP at factor cost is obtained as follows:

GDP at market price + (S – T),

Where,

S = Government subsidies, and

T = Indirect taxes.

GNP represents the measure of the economic output in an economic system. The final output included in the GNP is composed of the following uses:

1. Consumption,
2. Investment,
3. Government spendings, and
4. Net exports.

As Schultze points out, all output flows to one of these four uses.

The consumption expenditure component of national product constitutes the expenditure on durable goods, perishable goods, and services which are marketed during the year.

The investment component implies that part of the current product which is not consumed but used for adding further or replacing the real capital assets. It refers to gross investment. Gross investment minus depreciation (for replacement requirement) is equal to net investment.

Schultze lists the following main categories of investment in the GNP accounts:

1. Fixed investment, relating to the purchase of durable capital goods by firms.
2. Inventory investment, representing that part of output which is absorbed by firms as an increase in their stocks of finished goods, intermediary products and raw materials.
3. Residential building constructions for households. Here only new buildings are to be accounted for.

Full employment level of GNP is the potential GNP, Potential GNP is, thus, the value of final goods and services which a country can produce by operating at a point of its production possibility frontier by fully exploiting its available resources and industrial capacities. Actual GNP is rarely equal to potential GNP. Thus, potential GNP minus actual GNP is the measure of the size of unemployment or excess capacity in the economy.

### **7.2.3 Net National Product (NNP)**

It refers to the value of the net output of the economy during one year. NNP is obtained by deducting the value of depreciation or replacement allowance of the capital assets from the GNP. To put it symbolically :

$$\text{NNP} = \text{GNP} - D, \quad \text{Where,} \quad D = \text{Depreciation allowances}$$

This value is measured at current prices, while GNP is expressed at current market prices. Net National Product, in fact, is the value of total consumption plus the value of net investment of the community.

What is the difference between GNP and NNP? In our definition of Gross National Product, we have not made any allowance for depreciation, capital appreciation and obsolescence. Depreciation means wear and tear of machinery in the process of production. Machines used for production have to be replaced at some future time, as due to their constant use they become useless over time. In other words, fixed assets are not everlasting and must be constantly renewed to keep production running smoothly and steadily. Similarly, some machinery becomes out of date with the passage of time. This old type of machinery needs to be replaced by an up-to-date one, if competitive efficiency is to be maintained. Capital appreciation means an increase in the value of fixed assets like machinery, building, tools, etc. due to rise in their prices. It usually happens during the period of inflation. A rise in the value of fixed assets does not mean that there is any increase in national income, because the total quantity of fixed assets remains the same. Thus, when the amount of estimated depreciation and obsolescence, i.e., capital consumption, is subtracted from Gross National Product, we get Net National Product.

However, national income, in its technical sense, is obtained by deducting indirect taxes from the net product measured at current market prices. Such a figure is also called NNP at factor cost, as it represents payments made to the factors of production during the process of production.

#### **7.2.4 National Income at Market Price and National Income at Factor Costs**

In the national income analysis, usually a distinction is made between national income at market price and national income at factor costs. National income at market price means the money value of goods and services produced. It is the price of the aggregate output and services at current market prices. This price also includes some element of taxes and subsidies. A simple example will illustrate this point.

Let us suppose that the price of a bottle of beer is Rs.6/-. In this case, the national income at market price is Rs.6/-. But there is some element of tax in the above price. Let us suppose, the tax is Rs.2/-. Then, the national income at factor cost is Rs.4/- because the factor of production which has contributed to the production of one bottle of beer will get only Rs.4/- and the balance of Rs.2/- will go to the government as tax.

Let us now analyse the implications of the elements of subsidy. Let us suppose the fair price of a kilogram of sugar is Rs.4/-, but its actual cost of production is Rs.5/-. The difference of Re.1/- between the actual cost of production (Rs.5/-) and the fair price shop price (Rs.4/-) is borne by the State. In this case, the national income at market price is Rs.4/-, but it is Rs.5/- at factor cost because the factors of production would receive Rs.5/- for the production of one kilogram of sugar.

Gross domestic product at factor cost	=	Income earned by the factor of production + Depreciation
Net Domestic Product at factor cost	=	Income earned by the factor of production - Depreciation + Taxes - Subsidy

National Income at market price + National Income at factor cost + Taxes - Subsidies - Depreciation

We are now in a position to examine the interrelationship between the three definitions of national income given above. There is close relation between national income as a flow of goods, as a flow of expenditure, and as a flow of income. In fact, they are so interrelated that total production; total income and total expenditure are described as a circular flow of income activities. The firms hire the factors of production to produce goods and services. The factors of production create real income. The factors of production are paid out of this real income, in terms of money as a reward for their services. They, in turn, spend this income. Thus, income leads to expenditure, i.e., expenditure creates demand for goods.

This demand, in turn, leads to production. The flow is from production to income generation to expenditure, and from expenditure to production. National income is, therefore, the total flow of wealth produced, distributed and consumed by the economy as a whole during the course of a year. These three things – total production, total income and total expenditure – are really one and the same thing when reviewed from different angles. Each approach with suitable adjustment, will give exactly the same GNP or NNP.

### **7.2.5 Other related Concepts and Relationships**

#### **1. Personal Income**

Personal income is the total money income received by individuals in the community. Personal income is the aggregate earned and unearned income. Undistributed profits of the corporations reduce the personal income of individuals to that extent. Thus, personal income (PI = NI - undistributed profits, (U). Again personal income includes transfer payments made by government as well as the private business sector to individuals.

Thus, personal income (PI) = NNP + transfer payments (R)

$$\therefore \text{PI} = \text{NI} + \text{R} - \text{U}$$

#### **2. Disposable Personal Income**

Disposable personal income is the sum of the consumption and saving of individuals.

Thus, DI = C + S

Disposable personal income (DPI) rather than National Income is the determinant of consumption, because the consumption of a person depends on his take home pay.

Disposable income includes an unearned element (transfer payments) which is excluded in community's earned income estimates, i.e., national income. Disposable income is the total income, earned and unearned, of individuals minus direct taxes.

$$\text{Thus, DPI or simply DI} = \text{PI} - Td,$$

where  $Td$  = direct personal taxes such as income tax, wealth tax, etc.

DPI is also symbolized as  $Yd$  by money economists.

$$\text{PI} = Yd = C + S$$

Keynes, however, assumed that  $Td = 0$ .

$$\therefore Y = Yd \quad \therefore Y = C + S$$

### 3. Personal Savings

Personal savings refer to the difference between disposable personal income and personal consumption expenditure.

A bird's eyerview of the calculation of related concepts in national income data is presented in **Table 2**.

	Rs. Crores
GNP	500
Capital Consumption allowance	- 50
	-----
Net National Product (NNP)	450
Indirect Taxes	- 60
Subsidies	10
	-----
National Income (NI)	400
Corporate Profits	- 70

Dividends		15
Government Transfer payments and business transfer payments		25
	-----	
Personal Income		370
Personal direct taxes	-	70
	-----	
Disposable personal income (DPI)		300
Personal Consumption expenditure	-	275
	-----	
Personal savings		25

**Table 2 : Relation of GNP, NI, Personal Income Saving (Imaginary Data)**

### **7.3 Methods of Estimating National Income**

In national income estimates, by definition, we have to count all those goods and services produced in the country and exchanged against money during a year. Thus, whatever is produced is either used for consumption or for saving. Thus, national output can be computed at any of the three levels, viz., production, distribution and expenditure. Accordingly, we have three methods of estimating national income: (i) the census of products method, (ii) the census of income method, and (iii) the expenditure method.

#### **7.3.1 The Census of Products Method or Output Method**

This method measures the output of the country. It is also called the inventory method and involves the assessment, through census, of the gross value of production of goods and services produced in different economic sectors by all the productive enterprises in the economy. (For instance, the producing sectors in India are agriculture, forestry, fisheries, mining, industries, transport, commerce and other services.)

To the aggregated value of total output, real income earned from abroad is added (i.e. add the net difference between the value of exports and imports). And indirect taxes like excise and customs duties, plus depreciation allowances are to be reduced from the total obtained. Thus, to this net difference of the income earned from the rest of the world, a symbolic expression for this method may be given as follows:



$$Y = (P - D) + (S - T) + (X - M) + (R - p)$$

Where,

Y	=	Total income of the nation,
P	=	Domestic output of all production sectors,
D	=	Depreciation allowance,
S	=	Subsidies,
T	=	Indirect taxes,
X	=	Exports
M	=	Imports
R	=	Receipt from abroad, and
p	=	Payments made abroad

Mostly, this method is adopted in the calculation of national income. However, there are certain precautions against the danger of double counting, etc., which must be strictly avoided if a correct result is to be achieved.

The following precautions are necessary:

1. To avoid double counting, we must add only the final products. Raw materials and intermediate goods should not be included, as that would lead to double counting.
2. Goods for self-consumption by the producer should be excluded; they have not been marketed, so it is difficult to ascertain their true market value.
3. While evaluating the output, changes in the price levels between the years must be taken into account. It is usual to denote national income with reference to prices of a particular year.
4. Indirect taxes, included in prices, are to be deducted for getting the exact value of the products. Similarly, subsidies given by government to certain products should be added in evaluation of the product.
5. Add the value of exports or the income earned abroad and deduct the value of imports.

This method is widely used in the underdeveloped countries, but it is less reliable because the margin of error in this method is large. However, in India, this method is applied to agriculture, mining and manufacturers, including handicrafts. But the census of product method is not applied for the transport, commerce and communication sectors in India.

### ***Value Added vs. Final Goods Approach***

There are two approaches to avoid the possibility of double counting in the measurement of GNP:

- (i) Final goods method, and
- (ii) Value added method.

In the final goods method of estimating GNP, only final values of goods and services are computed, ignoring all intermediate transactions. Intermediate goods are involved in the process of producing final goods – the final flow of output purchased by consumers. Thus, the value of final output includes the value of intermediate products. Hence, to avoid double counting, only final values relating to final demand of the consumers should be reckoned.

For example, the price of bread incorporates the cost of wheat, flour etc. Wheat and flour are both intermediate products and are not treated as the final consumer's demand. Their values are paid up during the process of production. In the value of final product, bread, the values of these intermediate goods are hidden. Hence, a separate accounting of the values of intermediate goods, along with the accounting of the value of final product, would mean double counting. To avoid this, the computation of the value of final products only has been suggested.

Another method, however, is the "value added" method in which a summation of the increase in value (the value added), at each separate production stage, leading to output in final form, gives the value of GNP.

To avoid double counting of intermediate goods, one must carefully estimate the value added at each stage, of the production process. From the total value created at a given stage, we should thus subtract all the costs of materials and intermediate goods not produced in the stage.

Or, the value of inputs, at a given stage, should be deducted from the value of output. Even the value of inputs purchased from other firms or sectors should be subtracted. In short, GNP is obtained as the sum total of the values added by all the different stages of the production process till final output is reached in the hands of consumers to meet the final demand. The point may be clarified further with the help of an illustration as given in **Table 3**.

	(1) Production Stages	(2) Firm	(3) Sales Receipts	(4) Cost of intermediate	(5) Value added (Net Income) (3) - (4)
1.	Wheat	Farmer	500	0	500
2.	Flour	Flour Mill	700	500	+ 200
3.	Bread	Baker	900	700	+ 200
4.	Trading	Merchant	1000	900	+ 1000
		Total :	Sum of value added		= 1000

**Table 3 : Value Added Method**

In **Table 3** we have assumed a much simplified method or model of an economy, producing only a single final product, bread. In satisfying the consumer final demand for bread, it is assumed that there are four productive stages. First, a farmer cultivates wheat and sells it at Rs.500/-. Thus, Rs.500/- is the value added to the economy's output. We assume that this wheat is purchased by the flour mill to grind into flour. The mill sells the flour to the baker and fetches Rs.700/-. So, its net income is Rs.700/- - Rs.500/- = Rs.200/-. Thus, in turning wheat into flour (that is, the creation of form utility), the value added is Rs.200/-. The baker bakes a quantity of bread out of the flour and sells it to the merchant for Rs.900/-. In the process, the value added is Rs.200/-. The merchant renders trading service of creating place and time utility, and thus sells the stock of bread to the final consumer at Rs.1,000/-. The net income of the merchant is Rs.100/- which is his profit for merchandise business, a "productive" activity. Thus, the value added is Rs.100/- in the economic system. Obviously, the sum total of value added at each stage of production, Rs.500/- + Rs.200/- + Rs.200/- + Rs.100/- = Rs.1,000/- is the final value.

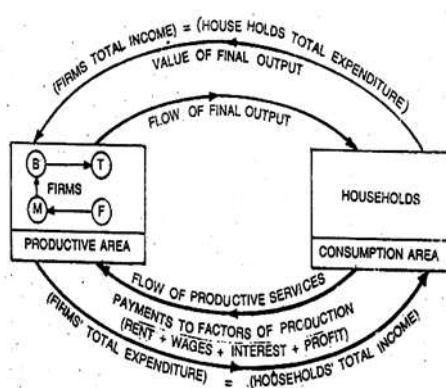
Evidently, the value of that product is derived by summation of all the values added in the path of the productive process. To avoid double counting, either the value of the final output should be taken in the estimate of GNP or the sum of values added should be taken. Value added is the difference between value of output and input at each given stage of production. The final product method reckons the quantum of goods and services and the aggregate of their values (measured at market prices) at the end of the year, while the value added method measures the flow of output and takes the sum total of net values created at each production stage during the year.

Apparently, both the methods given the same results, because both relate to the same phenomenon, though each in a different manner. Some economists, however, prefer the value added method on the following counts:

- (i) It provides a method to check up or tally the accuracy of GNP estimates.
- (ii) It enables us to know the contribution of each productive sector to the creation of GNP. Thus, national income at industrial origin can be easily compiled from the value added approach. Again, it is also helpful in constructing the input-output table and trading inter-industry transactions.

### **Circular Flow of Activity**

Incidentally, the economic system contains the flow of goods and services in the transactions between two economic sectors: households and firms. There is a circular flow of economic activity. Households buy the final goods and services produced by the firms. Thus, households' total expenditure becomes the income of the firms which is equal to the value of final output by the firms. The range of transactions which take place within the boundaries of firms – "the productive area" – are regarded as intermediate transactions or inter-industry relations. Values are created in the productive area. All net values added together determine the value of the final output, i.e., GNP. The final output flows from the productive area of firms to the consumption area of households. This point has been illustrated diagrammatically in **Figure 1**.



**Figure 1: Circular Flow of Activity**

In **Figure 1**, one can observe that intermediate transactions occur within the productive area or firms. It represents intermediate transactions from the farmer (F) to the flour mill (M), to the baker (B), to the trader or merchant (T) – all taking place within the boundaries of the firms. The firms sell their final output to consumers – the households. Thus, there is a flow of final goods from the productive area or firms to the consumption area of households. Households' total expenditure = the value of final output - the income of the firms' sector. Again, there is a flow of productive services of factors from households to firms. The factors are rewarded in the form of rent, wages, interest and profits. The total factor income = the aggregate value of factor services = the total expenditure of firms = the total income of households. In short, total expenditure of firms = total income of households and total expenditure of households = total income of firms = the value of final output. Thus, the final value of output is just the same as final expenditure. It follows thus:

Total output = Total expenditure  
 Again, total expenditure = Total income  
 $\therefore$  Total output = Total income

### 7.3.2 Census of Incomes Method

In this method, income of all factors of production is added together. The data are compiled from books of accounts, reports, and published accounts. The following classification of incomes is considered as comprehensive:

- (a) Wages and salaries,
- (b) Supplemental labour income (social security, etc.),
- (c) Earnings of self-employed or professional incomes,
- (d) Dividends,
- (e) Undistributed profits,
- (f) Interest,
- (g) Profit of state enterprises.

However, transfer payments like gift subsidies etc. are to be deducted from the total of factor incomes. Thus, National Income is equal to the factor incomes minus transfer payments.

This method is also called the Factor Cost Method. Thus, the national income of a country, at factor cost, is equivalent to the sum total of the disbursements of their (factors) income. The symbolic expression of this method is as follows:

$$Y = (w + r + i + n) + (X - M) + (R - P)$$

Where,

- $w$  = wages
- $r$  = rent
- $i$  = interest
- $n$  = profits

However, certain precautions are necessary while following this method.

1. All transfer payments (government and personal) like gifts, pension etc., are to be deducted. Similarly, gambling, being transfer activity, is to be excluded.
2. All unpaid services (like services of housewife) are to be excluded. Thus, only those services for which payments are made should be included.

3. Financial transactions and sales of old property (including land) are to be excluded, as they do not add anything to the real national income. Thus, all capital gains and losses which are related to wealth, but not to real income, should be excluded.
4. Direct tax revenue to the government should be subtracted from the total income as it is only a transfer of income. Or else, it should not be reckoned at all.
5. Similarly, government subsidies should be deducted.
6. Add the value of exports and deduct the value of imports.
7. Add undistributed profit of companies, income from government property, and profits from public enterprises.

In India, the National Income Committee used the income method for adding up the net income from trade, transport, public administration, professional and liberal arts, and domestic services. Since, under Indian conditions, due to lack of popularity of personal accounting practices, it is difficult to ascertain the personal income of individuals, the income method is not wholly practicable

### 7.3.3 The Expenditure or Outlay Method

National income on the expenditure side is equal to the value of consumption plus investment. In this method, we have to :

- (i) estimate private and public expenditure on consumer goods and services.
- (ii) add the value of investment in fixed capital and stocks, with due consideration for net positive or negative inventories, and
- (iii) add the value of exports and deduct the value of imports.

This method is not as popular as the previous ones.

To express it in symbolic terms,

$$Y = (C + I + G) + (X - M) + (R - P)$$

Where,

C = Consumption expenditure,

I = Investment expenditure, and

G = Government purchases

The Bowley-Robertson Committee has suggested the adoption of the Census of Products Method for major sectors of India, and the Census of Income Method for some minor sectors, while the National Income Committee relied mainly upon the Census of Income Method. However, none of the above methods alone is perfect. Therefore, an integrated computation of them will give a wider perspective of the estimate.

The process of calculation of national income (by using the above discussed three methods) has been illustrated in a summarized way, with hypothetical data of an imaginary economy, in **Table 4 (A, B and C)**.

A.	Income Method	Rs. (Crores)
	Income: Wages, salaries, etc.	1,000
	Profits: Private and Public operations	500
	Rent	200
	Interest	100
		-----
	Total domestic income :	1,800
	Less: Stock appreciation	- 250
	Residual error	- 50
	Net property income from abroad	100
		-----
	FNP	1,600
	Less: Capital consumption	- 150
		-----
	National Income	1,450
		-----
B.	Expenditure Method	Rs. (Crores)
	Consumer's expenditure (C)	1,100
	Public authorities' current expenditure on goods/services (G)	600
	Gross Capital formation (Investment) at home including increase in stocks (I)	500
		-----
	Total domestic expenditure at market prices	2,200
	Plus: Exports and income from abroad	600
	Minus: Imports and income paid abroad	- 200
	Less: Taxes in expenditure	- 1,000
	Plus: Subsidies	50
		-----
	GNP at factor cost	1,600
	Less: Capital consumption	- 150
		-----
	National Income	1,450
		-----



C.	Output Method	Rs. (Crores)
	Agriculture, Forestry and Fishing	250
	Mining and quarrying	100
	Manufacturing	200
	Construction	100
	Gas, electricity and water	50
	Transport and communication	200
	Distributive traders	300
	Insurance, banking and finance	200
	Public administration and defence	150
	Other services	100
		-----
	Total domestic output	1,800
Less:	Stock appreciation	- 250
	Residual error	- 50
	Net property income from abroad	100
		-----
	GNP at factor cost	1,600
	Less: Capital consumption	- 150
		-----
	National Income	1,450
		-----

**Table 4 : Estimate of the National Income of Country X during a given year**

To be more realistic on this account, we have purposely assumed that the results in these three methods are not identical due to incomplete information. Thus, the expenditure statistics are taken as data. The difference between expenditure statistics and income and output statistics is regarded as a residual error in the above table.

#### **7.4 Difficulties in National Income Estimate**

While estimating national income statisticians and economists usually encounter the following sets of difficulties :

- (i) conceptual and
- (ii) statistical or practical

The conceptual problem relates to how and what is to be included and what is not in the measurement of national income. Logically, the concept of national income would imply that everything that is produced must be reckoned.

However, by definition, we consider only those things which are exchanged for money or carry some price. By convention, on the basis of the availability of information, certain guidelines have been laid down in the process of national income estimates.

A few of them are:

1. Farm products kept for self-consumption. These are to be included as national income and estimated by a guess and at the rate of market price of agricultural products that have been marketed.  
However, output of food from domestic poultry keepings or vegetables grown in the home or terrace gardens etc. are not included in national income, as no accurate estimate of their production is available.
2. Services of housewives. These are not to be included in national income as they have no price and no market for the services rendered for their own household work. But the value of the services of domestic servants are to be considered as national income. Obviously then, a person who marries his maidservant reduces the national income to that extent.
3. Unpaid services are not reckoned as national income.
4. Defence services, being indirectly productive must be included as national income. Their value will be equivalent to the defence expenditure incurred by the government.

There are statistical problems too. Great care is required to avoid double counting, otherwise there will be an exaggerated valuation of national output. Again, statistical data may not have perfect reliability when they are compiled from numerous sources. Skill and efficiency of the statistical staff and co-operation of people at large are also equally important in estimating national income.

In India, a special conceptual problem is posed by the existence of a large, unorganized and non-monetised subsistence sector where still barter system prevails for transacting goods. Here, a proper valuation of output is very difficult. A large part of India's national income is, therefore, as guess work without much accuracy.

Further, rural folk in India have no specific employment. Their occupation is of divergent nature. A person is a farmer as well as a carpenter at one and the same time. So, it is very difficult to decide the structure of national income by industrial origin.

Further, in a country like India, statistical difficulties are still more severe. Some of these are:

1. Accurate and reliable data are not adequate, as far as output in the subsistence sector is not completely informed. Small-scale and cottage industries also do not report their targets. Indigenous bankers do not furnish reliable data and so on.
2. India, is a country with large regional diversities. Thus, different languages, customs, etc. also create a problem in computing the estimates.
3. People in India are indifferent to the National Income Committee's inquiries. They are non-co-operative also.
4. Statistical staff is also untrained and inefficient.

Therefore, national income estimates in our country are not very accurate nor are they adequate.

### 7.5 Method of Deflating National Income

Usually, national income estimates are computed at current market prices. To know the real changes, therefore, we have to deflate them. That is, convert the given national income figures at market prices into constant prices.

Deflation is done with the help of wholesale price index number or the cost of living index number. Usually, cost of living indices are used for deflating per capita income series.

The following formula may be used for the purpose:

$$R = \frac{P_0}{P_t} \times Y$$

Where,

$P_0$  = base year price index

$P_t$  = current year price index

$Y$  = national income, or GNP at current price for the current year

The following illustration clarifies the point:

**Example:** Deflate the following:

Year	1970	1971	1972	1973	1974
National Income (Rs. '00 crores)	250	280	300	350	360
Wholesale price index	100	120	150	160	180

**Solution:**

*National income  
at constant prices*

<i>Year</i>	$\gamma$	$P$	$R = \frac{P_0}{P_t} \times \gamma$		
1970	250	100	$\frac{100}{100} \times 250$	=	250.00
1971	280	120	$\frac{100}{120} \times 280$	=	233.00
1972	300	150	$\frac{100}{150} \times 300$	=	200.00
1973	350	160	$\frac{100}{160} \times 350$	=	218.75
1974	360	180	$\frac{100}{180} \times 360$	=	200.00

## **7.6 Importance of National Income Data**

Thus, national income data are a collection of facts or estimates of the total real income of a country expressed in terms of money. They provide a quantitative measurement of the country's economic activity during a defined period. They are the most important statistical measures of the economic activity of a nation and are very useful in analyzing current economic conditions. National income data furnish a comprehensive view of the country's economic functioning.

The national income statistics may be said to be the index numbers of the economic progress of a nation. A continuous series of annual estimates of national income would suggest the trend of economic growth of the nation and how rapidly it is taking place. National Income trend clearly reveals the basic changes in the country's economy in the past and suggests trends for the future.

Simon Kuznets says: "Since the end product of each country's economic system is an index of its producing power, national income estimates furnish a comparison of the productivity of nations, per capita income figures, especially when adjusted for differences in the purchasing power of money, appear to measure the nation's economic welfare."

National income statistics contain data on consumption and investment expenditure. Hence, for studying changes in the disparities, the standard of living can easily be compared with the help of such statistics. Fiscal authorities can use them to study the incidence of taxation as well as for projecting the tax yields. For the purpose of economic planning, national income data furnish information about the aggregate and per capita income, the rate of capital formation and industrial sectional breakdown and the relative contribution of each sector.

## **7.7 National Income Accounts**

National income accounts are the systematic records and presentation of national income statistics. Thus, national income accounting, also known as "economic accounting" or "social accounting," transcends the mere compilation and publication of statistical information. Its purpose is to present data in such a form that interrelations among items are most easily discerned from the structure of statements.

Thus, national income accounts and statistics are two related but different things. Statistics are a collection of facts which are useful in themselves but which do not depend uniquely on the values expressed in other statistical collections. An accounting statements, on the other hand, is an integral grouping of statistical series, each of which is functionally connected to all others. National income accounts or social accounting means a systematic arrangement of data relating to the economic activity of the country.

A social accounting framework is useful for economists as well as policy-makers, as it represents the major economic flows and statistical relationships among the various sectors of the economic system. It is of particular interest and significance to the policy-makers because by studying national income series over a period of time, it becomes possible to forecast the trends of the economy more accurately. In many countries, annual economic planning is in the form of national budgets which are in fact nothing but forecasts of social accounts.

### **7.8 Social Accounting Method**

Recently, with the development of social accounting, national income is also being measured by the social accounting method. In the social accounts, transactions among various sectors such as firms, households, governments, etc. are recorded and their interrelationships are traced. From the total value of these transactions recorded in matrix form, the national income value is known.

The social accounting framework is useful for economists as well as for policy-makers, because it represents the major economic flows and statistical relationships among the various sectors of the economic system. It is of particular interest and significance to the policy-makers because by studying the national income series over a period of time, it becomes possible to forecast the trends of economy more accurately. In many countries annual economic planning is in the form of national budgets which are, in fact, nothing but forecasts of social accounts for the following years.

## Sectors for Social Accounts

In social accounting, the economy as a whole is divided into certain parts called “sectors.” “Sector” is a group of individuals or institutions having common interrelated economic transactions. Thus, sectors are usually delineated in such a manner that economic entities whose functions are similar are contained in one group. Thus, sectors are distinguished on a functional basis and not on any institutional criterion.

Conventionally, under the scheme of social accounting, the economy is divided into the following sectors:

- (i) Firms,
- (ii) Households,
- (iii) Government,
- (iv) Rest of the world, and
- (v) Capital sector.

“Firms” are producing entities of the economy. They undertake productive activities. Thus, they are all organizations which employ the factors of production to produce goods and services.

“Households” are consuming entities and represent the factors of production, who receive payments for services rendered to firms. Households consume the goods and services that are produced by the firms.

Thus, firms make payments to households for their services. Households spend money income so received, again on the goods/services produced by the firms. There is, thus, a circular flow of money between these two groups.

“The Government sector” refers to the economic transactions of public bodies at all levels, center, state and local. In their work concerning social accounting, Edey and Peacock have defined government as a “collective person” that purchases goods and services from firms. These purchases may be financed through taxation, public borrowings or any other fiscal means. The main function of the government is to provide social goods like defence, public health, education, etc. means to satisfy the collective wants of society. However, public enterprises like post offices and railways are separated from the government sector and included as “Firms.”

“The rest of the world sector” refers to saving and investment activities. It includes the transactions of banks, insurance corporations, financial houses, and other agencies of the money market. These are not included as firms. These agencies merely provide financial assistance to the firms’ activities.

### **The System of Social Accounts**

Social accounting is based on double-entry book-keeping principles. Like debit and credit sides, each sector account contains a balancing item (credit) of one sector is the allocation item (debit) of the other related sector.

A Firm’s account usually contains the following items:

#### **Debit side**

1. Payments to factors of production – households in the form of wages, interest, rent, dividend, profits.
2. Imputed cost retained by the firm such as depreciation allowances and undistributed profits.
3. Payment of corporate taxes, excise duties and licence fees, etc. to the government sector.
4. Payment to the government for buying its factor services.
5. Payment to firms for buying raw materials, machines etc.

#### **Credit side**

1. Households spending on goods and services produced by firms.
2. A firm’s items sold to other firms.
3. Government spending in buying goods from the firms.
4. Net export earnings.
5. Net income earned from abroad.

A Household account usually contain –

#### **Debit side**

1. Payment to firms for buying their goods and services.
2. Tax payment to government.
3. Transfer payments.
4. Individual saving.



**Credit side**

1. Income received by selling factor services to the firms.
2. Transfer payment made by the government to individuals.
3. Transfer payment made from a foreign country.

A Government sector account usually contains the following items:

**Debit side**

Public spending on goods and services of firms.

1. Government payment to administrative staff.
2. Amount of subsidies given to producers.
3. Debt servicing charges.
4. Transfer payments to individuals.
5. Transfer payments made abroad.

**Credit side**

1. Taxes received from firms and households.
2. Collection of fees, penalties, etc.
3. Interest, rent, dividend, etc. receipts of the government.
4. Foreign aid.

A Capital sector account will have the following items:

**Debit side**

1. Firms' savings
2. Households' savings.
3. Savings of the government.
4. Net external public borrowings.

**Credit side**

1. Aggregate expenditure on capital assets (investment in capital goods industries).
2. Net change in business inventories.

Assuming a close economy with only two sectors, firms and households, we may illustrate the sectoral accounting as shown in **Table 5**.

(Rs. Crores)

<b>Firms' Account</b>			
Payments	(Dr.)	Receipts	(Cr.)
	Rs.		Rs.
Purchase of factors services from households	1,000	Sale of consumption goods and services to households	1,000
<b>Households' Account</b>			
Payments	(Dr.)	Receipts	(Cr.)
	Rs.		Rs.
Purchase of consumption Goods and services from firms	1,000	Sale of factor services to firms	1,000

**Table 5 : Sectoral Accounts**

Another method is to present these data in the form of a matrix, a rectangular arrangement of entries into a set of rows and columns. Receipts or credit items of a sector are placed in the rows of the matrix, while payments or debit items are presented in the columns. A single matrix may be used for all sectoral items.

The above given data can be represented in a matrix form as shown in **Table 6**.

	(Rs. Crores)		Matrix
Receipts by:	Firms Payments by:	Household	Total
	(1)	(2)	(3)
(a) Firms	-	1,000	1,000
(b) Households	1,000	-	1,000
(c) Total	1,000	1,000	2,000

**Table-6 : Matrix**

Matrix is very important for tracing the inter-relationship between different economic entities or sectoral transactions.

While measuring the national income of any country, it must be remembered that –

- (i) Income is a “flow” concept. Thus, we do not measure the stock of economic goods or wealth at a given moment of time, but we measure the flow of economic goods produced by the nation in a year. Actually, there is a continuous flow production. But we, for the sake of convenience, take a time interval of one year into account and measure national income every year.

- (ii) The national income is measured as a “realized” flow. Thus, final goods which have already been produced during the year are to be accounted for. The value of incomplete goods are therefore to be excluded. We should not predict the values of the goods yet to come. We measure only what has already been produced. Remember, national income is a realized flow of goods and services. Thus, we can estimate national income for the year 1981 only in 1982, because then only can we have data of production between January, 1981 and December, 1981.

**Exercise :**

1. What is 'national income' interpreted in terms of (1) national product, (2) national dividend and (3) national expenditure?
2. What is Gross National Product as distinguished from Net National Product?
3. What is Disposable Personal Income? Is it relevant in the field of determination of National Income? Explain the difficulties of estimating National Income.
4. Explain the method of measuring National Income by the social accounting process system based on double-entry book-keeping principles.
5. Write short notes :-
  - (a) Base year price index
  - (b) Personal Savings
  - (c) National Income at Factor Costs
  - (d) Circular flow of activities

## **UNIT – VIII**

### **THEORY OF MONEY**

#### **8.1 What is money?**

'Money' is a generic term which denotes primarily the currency in vogue in any particular country.

History of the world indicates that man found it necessary to use money at an early stage of man's development because of the difficulties and inconveniences of exchange by direct barter. The inconvenience of barter system could be avoided by the use of money. Money is demanded because it is useful and does away with difficulties of barter system. Therefore, money is regarded as one of the most important discoveries of mankind. Since money represents generalized purchasing power, it has been the object of man's desire through ages.

Prof. Walker defines money as "Money is what money does".

Robertson defines it as "A commodity which is used to denote anything which is widely accepted in payment for goods or in discharge of other business obligations."

Economists stress that a thing which could be considered as money should be such that it should command general acceptability. Without general acceptability there could be no free and smooth exchange transactions.

Crowther holds "Anything that is generally acceptable as a means of exchange and that at the same time acts a measure and as a store of value is money". The analysis of this definition implies that money should perform three important functions, namely, it should be capable of being used as a medium of exchange, as a measure of value and a store of value. That does not mean that the role of money ends with the performance of these functions. In addition to these three functions, it performs other functions, the important among which is that also action the standard of deferred payment. Thus, primarily money is said to have functions four - medium, measure, standard and store.

**(i) Medium of Exchange**

The quality of general acceptability of money facilitates exchange. People want goods and services for various purposes. They can obtain them in exchange of money. Under the barter system, goods were exchanged against goods. However, it was very inconvenient to people from various angles such as lack of double coincidence of wants, difficulty of divisibility, storing of value etc. Consequently, the system had to be replaced by money. Money has removed all these difficulties. That's why now with the use of money buying and selling of goods has become easy and possible.

**(ii) Measurement of Value**

The another important function of money is the measurement of value of various goods and services which are exchanged. Money is the common measure of value. This has facilitated the determination of rate of exchange between money on one side and goods and services on the other. Now-a-days prices of various goods and services are expressed in terms of money which is an indication of the fact that money has been accepted as a common measure of value of goods and services.

**(iii) Store of Value**

Money serves as a store of value of goods and services. Man wants to provide for the future out of rewards he receives for his labour. He wants to keep some part of his earnings for tomorrow. This would possible only if the means through which savings is to be made is non-perishable not only physically but also from the point of its future value. Money has become a convenient means through which savings can be done easily. This facilitates capital formation too which is essential for economic development of the country. Thus, money plays a paramount role in capital formation and standard of storage of savings.

**(iv) Standard of Deferred Payment**

Payments which are made at some future dates are made in money since the value of money remains stable over a period of time. Lending involves future payment. Development of trade and commerce has also necessitated future payments. Thus, deferred payments have become a normal feature of modern commercial world. Since money remains stable in value and is non-perishable along with its general acceptability, deferred payment becomes possible. Thus, the money acts as a standard of deferred payment and thereby it has made a great contribution not only to modern commercial world but to transactions promoting human civilization.

**8.2 CONTINGENT FUNCTIONS**

There are also some contingent functions that money perform in an economic world.

**(i) Equalization of Marginal Utilities**

A rational person tries to spend his limited money income in such a manner that he obtains the maximum satisfaction or utility there from. If he were to spend his money on only one commodity, the problem would have been easy. But he has to spend his money upon a choice over various goods and services as well as various purposes in such a way that the spending yields maximum satisfaction to him. This could be done by equalizing marginal utilities in all directions as derived from consumption of various commodities. A principle of equi-marginal utility has to be applied and in doing so, money comes to our rescue because prices are measured in terms of money.

**(ii) Equalization of Marginal Productivity**

Producer is concerned with the marginal productivity. He would maximize production and profit when marginal productivity of factors of production is equalized. Even here, money plays an important role in determining rewards of the factors of production because factors of production are paid in terms of money equal to their marginal productivity.

**(iii) Distribution of National Income**

Distribution of national income is also undertaken in terms of money. National Income is generated by the four factors of production. It is to be distributed among the factors in accordance with their contribution. This is done in terms of money. Thus rent wages, interest and profit, as the share of remuneration for land, labour, capital and entrepreneurship is respectively determined in terms of money out of generated national income.

**(iv) Development of Credit System**

In the modern economic system with fast growing industrialization credit system has become very important. It is this credit system that gave rise to rapid development of industrial and commercial advancement. In business and commercial activities, instrument of credit is at the center and money is the basis of the credit system. Thus, money plays a great role in the development of credit system and also the banking system.

### **8.3 RESIDUARY FUNCTIONS**

**(i) Capital is given liquid form**

Money is the most liquid form of capital. Money imparts liquidity to other forms of capital. People need to keep capital in liquid form for various purposes or motives such as transaction, precautionary and speculative. All this become possible because of money.

**(ii) Full utilization of resources**

It is also possible to ensure full utilization of various resources by means of money. Idle resources can be mobilized and harnessed for the productive purpose with the help of money. If these resources are not mobilized, they cannot be properly utilized so as to increase production of goods and services.

In the light of functions of money discussed above, one would come to know the importance and dynamic role played by money. Economic and commercial development in modern times is made possible by the introduction of money. Through suitable changes in monetary policy of the country desired direction can be given to the economy to achieve socio-economic objectives. Thus money has occupied extra-ordinary place in the modern economy and so in the life of people.



## 8.4 INFLATION

### Types and Causes of Inflation

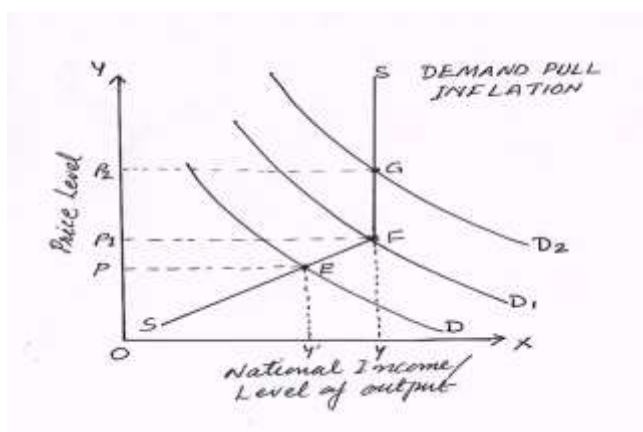
Basically, there are two types of inflations. They are also termed as the causes of inflation because of changes in demand have been identified, namely:

Demand-pull inflation

Cost-push inflation

Demand-pull Inflation:

This type of inflation is caused by an increase in the conditions of demand. It may be defined as a situation where total monetary demand persistently exceeds total supply of goods and services at current prices, so that prices are pulled upwards by the continuous upward shift of the aggregate demand function. It arises as a result of an excessive aggregate effective demand function and aggregate supply of goods and services in a slowly growing economy. Supply of goods and services will not match with rising demand. The productive ability of the economy is so poor that it is difficult to increase the supply at a quicker rate to match the increase in demand for goods and services.



In the above diagram on X axis we are measuring national income or level of output produced and on Y axis we are measuring price level. SS is the aggregate supply curve of economy. In the initial level the aggregate demand curve D intersects the aggregate supply curve SS at point F which is equilibrium position and equilibrium price is determined at OP level and Oy indicates the supply of goods and services.

As aggregate demand increases further, supply being constant, the price level will start increasing from OP to OP1 and OP2. But output will remain  $O_y$  as it indicates the full capacity utilization.

FOLLOWING ARE THE FACTORS THAT CAUSE THE INCREASE IN THE AGGREGATE DEMAND

1. Increase in money supply: Supply of money in circulation increases on account of the following reasons; deficit financing by government, expansion in public expenditure, expansion in bank credit and repayment of past debt by the government to the people, increase in legal tender money.

2. Increase in disposable income: Aggregate effective demand rises when disposable income of the public increases. Disposable income rise due to; reduction in the tax rate, increase in national income while tax level remains constant and decline in the level of savings.

3. Increase in private consumption expenditure and investment expenditure: An increase in the private expenditure, both on consumption and investment leads to the emergence of excess demand in an economy. When business is prosperous, business expectations are optimistic and prices are rising, more investment is made by private entrepreneurs causing an increase in factor prices. When the income rise, expenditure on consumer good rises.

4. Increase in Exports: An increase in the foreign demand for a country's exports reduces the stock of goods available for home consumption. This creates shortage in the country leading to the price rise in the country.

5. Existence of Black Money: The existence of black money in the country due to corruption, tax evasion, black marketing etc. increases the aggregate demand. People spend such unaccounted money extravagantly thereby creating unnecessary demand for goods and services, causing inflation.

6. Increase in population growth causes an increase in the demand for everything in a country.

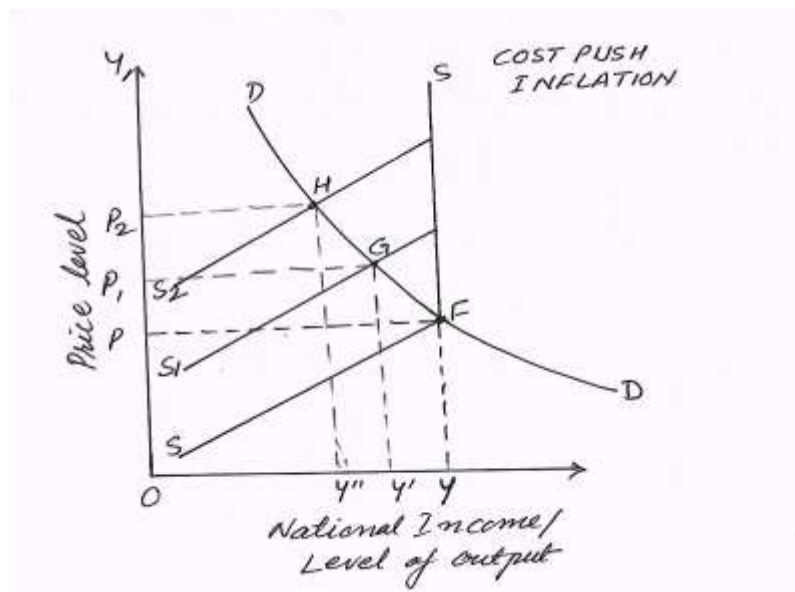
7. High rates of indirect taxes would lead to rise in prices.

8. Reduction in the rates of direct taxes would leave more cash in the hands of people including them to buy more goods and services leading to an increase in prices.

9. Reduction in the level of savings creates more demand for goods and services.

**Cost-push Inflation:** Cost-push inflation arises from anything that causes the conditions of supply to decrease. Some of these factors include a rise in the cost of production, an increase in the government taxation and a decrease in the quantity of goods produced. It refers to the situation where the prices are rising on account of increasing cost of production. Thus in this case, the rise in price is initiated by the growing factor costs. Such a price rise is termed as “Cost Push Inflation” as prices are being pushed by the growing factor costs. There are number of factors causing the increase in cost of production. Cost-push inflation may occur due to wage-push or profit-push.

1.



- Demand for higher wages by the labour class.
2. Fixing up of higher profit margins by the manufacturers.
  3. Introduction of new taxes and raising the level of old taxes.
  4. Increase in the prices of different inputs in the market.
  5. Rise in administrative prices by the government etc.

These factors in turn cause prices to rise in the market. Out of many causes, rise in wages is the most important one. It is estimated and believed that wages constitute nearly 70% of the total cost of production.

A rise in wages leads to a rise in the total cost of production and a consequent rise in the price level. Thus cost-push inflation occurs due to wage push or profit push.

The phenomenon of cost-push inflation is graphically illustrated in above figure. In the above figure, the **D** curve represents the aggregate demand function, and the **S** curves, the aggregate supply function. The full-employment level of income is **Oy**, which can be maintained only at rising price levels, **P**, **P<sub>1</sub>** and **P<sub>2</sub>**.

Now, if we begin with price level **P**, **F** is the point of intersection of the aggregate supply curve; **SS** and **D**. Let us assume that the aggregate supply function shifts upward as **S<sub>1</sub>**, which becomes a vertical straight line at point **E**, and merges with the **SF** line (the previous supply curve at full-employment level). The leftward shift in the supply curve may be due to either an increase in money wages due to trade union's successful collective bargaining, or to the profit-motivated monopolists or oligopolists, who might have raised the prices of goods.

As the aggregate supply curve shifts to **S<sub>1</sub>**, the new equilibrium point **A** is determined through the intersection of **S<sub>1</sub>** and **D** and **Oy'** will be the level of real output, which is less than the full-employment level. This means that with a rise in the price level, unemployment increases. It is regarded as the cost of holding the price level close to **P**.

Similarly, a further shift in the aggregate supply curve to **S<sub>2</sub>** on account of a further wage-push implies a new equilibrium point **B**. This causes the income level to fall further to **y''**, and prices to rise to **P<sub>2</sub>**.

However, if the government or the monetary authority is committed to maintain full employment, there will be more public spending or more credit expansion, causing the price level to rise to much more – such as from  $P$  to  $P_3$  and  $P_4$ . In the case, the sequence of equilibrium points become F-G-H.

### **K) Effects of Inflation**

Inflation affects different people or economic agents differently. Broadly, there are two economic groups in every society, ***the fixed income group and the flexible income group***. During inflation, those in the first group (fixed income) lose while those in the second group (flexible income) gain. The reason is that the price movement of different goods and services are not uniform. During inflation, most prices rise, but the rates of increase of individual prices differ. Prices of some goods and services rise faster than others while some may even remain unchanged.

The poor and the middle classes suffer because their wages and salaries are more or less fixed but the prices of commodities continue to rise. On the other hand, the businessmen, industrialists, traders, real estate holders, speculators and others with variable incomes gain during rising prices. The persons with flexible income become rich at the cost of the fixed income group. There is transfer of income and wealth from the poor to the rich.

**To further determine the effect of inflation on individuals, it will be necessary to discuss the effect of inflation on different groups:**

**a) Creditors and Debtors:** When there is inflation, creditors are generally worse off because, the real value of their future claims is reduced to the extent of the rate of inflation. On the other hand, when inflation occurs, debtors tend to pay less in real terms than they had borrowed. Therefore, it could be said that inflation favours debtors at the detriment of creditors.

**b) Salaried Persons:** Those with white-collar jobs lose during inflation because their salaries are slow to adjust when prices are rising.

**c) Wage Earners:** Wage earners may gain or lose depending on the speed with which their wages adjust to rising prices. If their union is strong, they may get their wages linked to the cost of living index. In this way, they may be able to protect themselves from the negative effects of inflation. Most often in real life there is a time lag between the rise in the wages of employees and the rise in price.

**d) Fixed Income Group:** These are recipients of transfer payments such as pensions, unemployment insurance, social security, etc. Recipients of interest and rent also live on fixed incomes. These people lose because they receive fixed payments while the value of money continues to fall with rising prices.

**e) Equity Holders and Investors:** These group of people gain during inflation as the rising prices expand the business activities of the companies and, consequently, increase profit. Thus, dividends on equities also increase.

However, those who invest in debentures, bonds, etc, which carry fixed interest rates, lose during inflation because, they receive fixed sum while purchasing power is falling.

**f) Businessmen:** Producers, traders, and real estate holders gain during periods of rising prices. On the contrary, their costs do not rise to the extent of the rise in prices of their goods. When prices rise, the value of the producer's inventories rise in the same proportion. The same goes for traders in the short run. The holders of real estates also make profit during inflation because the prices of landed property increase much faster than the general price level. However, business decisions are difficult in an environment of unstable price. In the long-run, there could be an increase in wages which will reduce profit thereby, having an adverse effect on future investment.

**g) Agriculturalists:** Agriculturalists are of three types, namely, landlords, peasant proprietors and landless agricultural workers. Landlords lose during rising prices because they get fixed rents. Peasant proprietors who own and cultivate their farms gain. Prices of farm products increase more than the cost of production. Prices of inputs and land revenue do not rise to the same extent as the rise in the prices of farm products. On the other hand, the wages of the landless agricultural workers are not raised by the farm owners, because trade unionism is absent among them. But the prices of consumer goods rise rapidly. So landless agricultural workers are losers.

**h) Government:** Inflation will have both positive and negative effects on the government. The government as a debtor gains at the expense of households who are its principal creditors. This is because interest rates on government bonds are fixed and are not raised to offset expected rise in prices. The government in turn levies less tax to service and retire its debt. With inflation, even the real value of taxes is reduced. Inflation helps the government in financing its activities through inflationary finance. As the money income of people increases, government collects that in the form of taxes on incomes and commodities. So the revenue of the government increases during rising prices.

**i) Measures to Control Inflation**

Inflation is caused by the failure of aggregate supply to equal the increase in aggregate demand. Therefore, inflation can be controlled by increasing the supplies of goods and reducing money income. The various measures to control inflation are discussed below:

**Monetary Measures:**The monetary measures to control inflation generally aims at reducing money incomes. These are:

**(a) Credit Control:** The central bank could adopt a number of methods to control the quantity and quality of credit to reduce the supply of money. For this purpose, *it raises the bank rates, sells securities in the open market, raises reserve ratio, and adopts a number of selective credit control measures, such as raising margin requirements and regulating consumer credit.*

**(b) Demonetization of Currency:** Another monetary measure is to demonetize currency of higher denominations. Such a measure is usually adopted when there is abundance of black money in the country.

**(c) Issue of New Currency:** The most extreme monetary measure is the issue of new currency in place of the old currency. Under this system, one new note is exchanged for a number of the old currency. Such a measure is adopted when there is an excessive issue of notes and there is hyperinflation in the economy.

**Fiscal Measures:** Monetary policy alone cannot control inflation. Therefore, it should be supplemented by fiscal measures. The principal fiscal measures are discussed below.

**(a) Reduction in Unnecessary Expenditure:** The government should reduce unnecessary expenditure on non-development activities in order to curb inflation.

**(b) Increase in Taxes:** To cut personal consumption expenditure, the rates of personal, corporate and commodity taxes should be raised and even new taxes should be levied, but the rates of taxes should not be too high as to discourage saving, investment and production.

**(c) Increase in Savings:** Another measure is to increase savings on the part of the people so that their disposable income and purchasing power would be reduced. For this the government should encourage savings by giving various incentives.

**(d) Surplus Budgets:** An important measure is to adopt anti-inflationary budgetary policy. For this purpose, the government should give up deficit financing and instead have surplus budgets. It means collecting more in revenues and spending less.



- (e) **Public Debt:** In addition, the government should stop repayment of public debt and postpone it to some future date till inflationary pressures are controlled. Instead, the government should borrow more to reduce money supply with the public.

### Other (Direct) Measures

Other measures to control inflation generally aims at increasing aggregate supply and reducing aggregate demand directly. These are:

**(a) To Increase Production.** The following measures should be adopted to increase production:

(i) The government should encourage the production of essential consumer goods like food, clothing, kerosene oil, sugar, vegetable oils, etc.

(ii) All possible help in the form of latest technology, raw materials, financial help, subsidies, etc. should be provided to different consumer goods sectors to increase production.

**(b) Rational Wage Policy:** Another important measure is to adopt a rational wage policy. The best course for this is to link increase in wages to increase in productivity. This will have a dual effect. It will control wage and at the same time increase production of goods in the economy.

**(c) Price Control:** Price control and rationing is another measure of direct control to check inflation. Price control means fixing an upper limit for the prices of essential consumer goods.

**(d) Rationing:** Rationing aims at distributing consumption of scarce goods so as to make them available to a large number of consumers. It is applied to essential consumer goods such as wheat, rice, sugar, kerosene oil, etc. It is meant to stabilize the prices of necessities and assure distributive justice.

**Conclusion:** From the various monetary, fiscal and other measures, discussed above, it becomes clear that to control inflation, the government should adopt all measures simultaneously.

## 8.4 DEMAND FOR MONEY

According to J.M. Keynes, money is demanded by the people to fulfill three important motives. These motives are the transaction motive, precautionary motive and speculative motive.

### 1. The Transaction Motive

People receive their income monthly, quarterly or even yearly. They spend this money income at much shorter intervals. Individual is required to spend money on his various wants throughout the month but income he receives once a month. Therefore, he needs to have stock of money to meet his all needs until the next pay day. The transaction motive can be sub-divided into (i) income motive and (ii) business motive.

#### (i) Income motive

The amount of money which a consumer holds to satisfy the transaction motive depends upon (i) the size of his income and (ii) the interval of payment. If the size of income is larger he would keep larger amount of his income for this motive and vice-versa. Similarly, it depends upon the length of the interval of time between successive pay days. The greater the interval, the larger is demand for money for transaction motive. In conclusion, it can be said community's demand for money under the income motive is the function of the size of personal incomes and of the average time between successive pay days.

#### (ii) Business motive

Business men also wish to hold a certain amount of money to meet day-to-day requirement of money. This stock of money held would be used for payment of raw materials, wages, transport and other current expenses incurred by the businesses. The amount of money held for this purpose is the function of the turnover of the firm. The larger the turnover, the greater would be the amount of money, the firm needs. It would be proportional to the total volume of business transactions carried out. However, the demand for money for transaction motive is a constant function of rate of interest. It is not affected by the changes in rate of interest.

### 2. The Precautionary Motive

The money people demand for this purpose arises out of its function as store of value. Money held under this motive is kept to provide for uncertainties and

emergencies. The individual needs a certain amount of money to keep provisions against unemployment, sickness, accident and many other eventualities. The amount of money held for this purpose depends upon the individual and on the conditions in which he lives. How much money is held for this motive depends upon social security measures of the government, size of income and man's attitude towards safety of future. It is also a constant function of rate of interest. What is true in case of individual, it is as well as true in case of firms also.

### **3. The Speculative Motive**

Money held under the speculative motive constitutes a store of value just as money held under the precautionary motive does, but it is a store intended to fulfill a different purpose. It constitutes a liquid store of value. The money demanded for this motive is generally used for gambling to make speculative gains. Therefore, it is a negative or decreasing function of rate of interest. More liquidity is demanded at a low of rate of interest and less at a high rate of interest.

## **8.5 SUPPLY OF MONEY**

### **The constituents of Money Supply**

Money is just like one of the commodities but its supply cannot be increased like any other commodities. The supply of money is adamantly determined by the monetary authority of the country i.e. central bank of the country and treasury department. The supply of money depends upon the decision of the monetary authority whether to increase or decrease the quantity of money in the economy. In case of money, instead of supply getting adjusted to demand, demand will get adjusted to the supply of money. The total money in the economy refers to the total volume of money held by the people in the form of coins and currency notes, bank money and other such liquid assets. Total of all these constitutes the supply of money in the economy. Bank money includes demand deposits, time deposits and current deposits.

Supply of money indicates the demand for goods and services because money represents purchasing power. Under bank money, ready cash held by all the banks is not included because it forms the basis of credit. Likewise, stock monetary gold with Central Bank is also excluded from the total supply of money. It is because gold reserves forms the basis of international money supply and it is not permitted to circulate in the country. In the same manner, ready cash with Central Bank and the government is also not included in money supply of the country. The reason is that it constitutes the reserves on which the demand deposits of the public are supported. Lastly, the liquidity preference of the people also influence money supply in the economy. If it is high, then in that case volume of bank deposits will get reduced and vice-versa. So, even the general public can influence supply of money depending upon their liquidity preference.

**Deflation – concept, causes, effects and Measure to control Deflation.**

The concept of deflation is opposite to inflation. It is defined as *a situation when the general income level and price level are falling*. It is also known as negative inflation. During deflation the income level falls against the available supply of goods and services. The stage of deflation arises when -

- Prices are falling continuously
- People prefer to hold money with them and do not keep goods.
- The available supply of goods does not dispose off on the prevailing prices.
- People expect more reduction in prices thus reduce their consumption to bring prices down.

The main causes of deflation are -

- Primary causes are fall in demand for goods and services.
- *People* due to one reason or the other reduce their consumption on the purchase of goods & services due to which *prices* start falling.
- Sometime people start saving more than before which causes reduction in the aggregate demand and *the* available supply is sold at falling prices.
- If due to some reason the level of investment in all economy is falling. It will negatively affect the economy. The demand for capital goods will fall and prices will tend to come down.
- Decline in incomes of the people can also cause deflation in the economy. Due to reduction in the income level of the people the aggregate demand for goods services falls short of the aggregate supply, thus prices start falling.

- Excess of supply due to some reasons can also cause deflation because in this case the aggregate supply will exceed the aggregate demand *hence* the price level will fall.

### **Effects of Deflation**

Consistent fall in the general price level in the economy (deflation) might not be good for the economy. Effects of long term deflation are as follows

**Cyclical unemployment:** Deflation usually happens due to a fall in Aggregate Demand in the economy. This will lead to businesses cutting the output levels which will result in retrenchment/laying off of workers. Moreover, if consumers delay spending in anticipation of falling prices economic activity falls, unemployment increases.

**Bankruptcies:** As the value of money is increasing, it becomes difficult for debtors to repay the load. Moreover, during deflation firms will be having lower profits due to falling prices and will find it difficult to meet their liabilities. This might lead to greater number of bankruptcies. Businesses see profits fall; as they do so dividends and investment returns fall and so share prices fall.

**Deflationary spiral:** Consistent fall in prices may trigger deflationary spiral. As firms make less revenue, this leads to less profits, they might not be willing or able to invest which will have negative implications on the economic growth. Further, as firms cut cost by lay off of employees, there is less income for the households and the aggregate demand might fall. Due to a fall in consumer and business confidence the economy might fall into a deflationary spiral.

The principle problem of deflation is that it leads to a **rise in the real value of debt**. In the early stages low interest rates and low prices encourage borrowing but as the real weight of the borrowing is recognised so borrowing is reduced.

It is sometimes difficult to control deflation and **Monetary policy can prove ineffective** when interest rates (nominal) are already low.

### **Measure to control Deflation**

Following are the remedies suggested to control deflation.

- If the central bank reduces the interest rate then the commercial banks will also advance loans at a lower interest rate which will boost up the investment, resulting increase in demand for capital goods and employment. Thus incomes will increase price level will start rising.

- In order to increase the aggregate demand the government has to increase its expenditures. By increasing expenditures incomes of the people will rise and price level will tend to move upward.
- By Printing extra money through the central bank and injecting in the economy the government can increase the aggregate demand which will further enhance the price level.
- By encouraging the private sector for investment through various immunities like subsidies or tax reduction the aggregate demand can be used
- People should start using their savings on consumer goods or investment.
- To increase exports and reduce the imports, the income level of the people and prices level can be raised

**Exercise :**

1. Define and explain the concept of money.
2. What are the functions fo money?
3. Explain the role of 'money' in an exchange economy. What are it's contingent and residuary functions?
4. Discuss various motives for demand of money.
5. Wht is inflation? What are the types and causes of inflation?
6. Discuss the effects of inflation.
7. Explain measures to control the inflation?
8. What do you understand by deflation? Explain its causes, effects and suggest remedies to solve the problem of deflation.

## UNIT – IX

### SAVING, INVESTMENT AND BANKING

#### 8.1 THE CONCEPT OF SAVINGS

Saving means economic surplus. It may be defined as an accounting difference between current income and current consumption. Keynes defined savings as an excess of income over expenditure of consumption.

In the case of an individual, saving is that part of income which is not consumed by him. And in the case of the community, the aggregate of the unconsumed part of the community, the aggregate of the unconsumed part of national income of all members of the community represents saving. Symbolically,

$$S = Y - C$$

where,            S - denotes saving  
                      Y - stands for income, and  
                      C - stands for consumption.

This symbolic expression of saving is applicable both to the individual as well as to the community.

According to Keynes, saving is the function of income, *i.e.*,  $S = f(Y)$ . That is to say, as income increases, saving also increases and *vice versa*. Saving depends on the propensity to save, which can be derived from the propensity to consume.

Thus, propensity to save ( $S/Y$ ) is equal to 'one minus the propensity to consume ( $C/Y$ )' symbolically, therefore:

$$S/Y = 1 - (C/Y)$$

According to Keynes, the consumption function (or the propensity to consume) is a stable function of income in the short period. It follows from this that the saving function (or the propensity to save) would also be a stable function of income.

It should be noted that though the propensity to save is stable function of income, saving (individual or aggregate) is an increasing function. Thus, the marginal propensity to save ( $\Delta S/\Delta Y$ ) is always greater than zero, but less than unity

Symbolically,  $1 > (\Delta S/\Delta Y) > 0$ .

Aggregate domestic savings are the sum of savings made by the households, firms and government.

- (1) Household's saving = Disposable personal income - Consumption expenditure.
- (2) Firms' saving = Profits (or gross income)- (Dividends+ Business taxes).
- (3) Government's saving = Public revenue - current expenditure.

Savings of households and firms taken together constitute private savings. Government's savings constitute public savings. Therefore, Total Saving = private saving + public savings. Again, personal savings or household savings is the vital component of aggregate savings. According to RBI's report of Currency and Finance, in India, in 1980-81, of the total savings in the country, the household sector accounted for 80.3 per cent, domestic private corporate sector 5.4 per cent, and government sector 14.3 per cent.

### **8.1.1 Personal Savings**

The household sector's savings are called personal savings or the savings of individuals. Professor Irwin Fisher defines individual's savings as "the difference between their current income and their current expenses, the latter including personal tax payment as well as consumption expenditures."

While considering the sum of individuals' savings, it must be noted that there are savers and dissavers. Usually, young people save and old people dissave. A considerable part of all personal saving is done with a view to future liquidation. People save with a view to have assets to spend after retirement or to provide financial help to their dependents in the event of their deaths, which means liquidation of savings in the future.

Therefore, Net individuals' saving of the community = Total personal saving – Total dissavings.

In a modern society, personal savings may take one or more of the following forms.



- (i) Contractual saving such as life insurance premiums, contributions to provident funds, etc. These kinds of savings are obligatory in nature. They are relatively stable.
- (ii) Holding of liquid assets. Individuals may increase their holdings of liquid assets such as cash balances, bank deposits, shares, bonds and securities.
- (iii) Liquidation of old debts. When an individual pays a sum of money to his creditor for cancellation of a debt, it amounts to a saving of his income.
- (iv) Direct investments. Some individuals may invest part of their income directly in farm activity, business or purchasing a home. This is also saving.

In rural areas, such savings are found in the form of land improvements, irrigation works, construction of dwellings, etc.

## **8.2 DETERMINANTS OF SAVINGS**

The rate and size of savings in an economy are determined by a multitude of factors. A humble attempt is made to analyse a few of them which are vital determinants.

### **8.2.1 The Level of Income**

As Keynes stresses, saving is basically a function of income. Saving increases with income. Of course, there can hardly be a proportionate relationship between the size of income and savings, but empirical evidence has proved that there is a marked correlation between the two. However, the amount of personal savings depends primarily on the disposable income. Thus, the saving income ratio ( $S/Y$ ) tends to rise with an increase in income. It has been observed that the marginal propensity to save ( $\Delta S/\Delta Y$ ) tends to be high in high-income group sectors of community. Indeed, in developed countries, where per capita income is high, the saving income ratio is also high. According to the world Economic Survey 1960, gross domestic saving in the U.S.A. amounted to 18.6 per cent and that of India less than 7 per cent.

- (i) *Absolute Income Hypothesis:* According to Keynes, saving is a function of the absolute level of income. Other things being equal, a rise in absolute income causes an increase in fraction of that income to be saved. The absolute income hypothesis of savings was further developed by J. Tobin and A. Smithies as "Drift Hypothesis." In the "Drift Hypothesis", it has been argued that the level of National Income increases over a period of time and along with it, the average propensity to consume tends to diminish so that average propensity to save increases over a period of time.
- (ii) *Relative Income Hypothesis:* Rose Friedman and Dorothy Brady have tried to furnish an answer to this inconsistency by propounding the concept of relative income hypothesis. According to them, the rate of savings depends on the relative position of the individual on the income scale rather than on his absolute level of income. That is to say, the consumption spending of a family depends on its relative position in the income distribution of approximately similar families.
- (iii) *Permanent Income Hypothesis:* Keynes believed that the current income determines current consumption and savings. Modern economist to like Milton Friedman, however, observe that the expectations of income in the future do have a significant bearing upon the present consumption spending and savings out of a given income of community. Kisselyoff, for instance, mentions that the present dissaving among those people who expect their incomes to rise in future is found to be more frequent. In view of this, Mr. Friedman propounded the "Permanent Income Hypothesis". Friedman holds that the basic determinant of consumption and savings is permanent income. The relationship between saving and permanent income is proportional. A person's permanent income, in any particular year, is not revealed by his current income in that year, but is dependent upon the expected income to be received over a long period of time. Permanent income is the amount which the consumer unit could consume (or believes that it could) while maintaining its wealth intact. Friedman states that permanent income may be interpreted as the mean income regarded as permanent by the consumer unit in consideration. Permanent income depends on the far-sightedness of a person. Indeed, a person's actual income, in any specific year, may be greater than or less than his permanent income.

### **8.2.2 Income Distribution**

Aggregate savings rate also depends upon the distribution of income and wealth in the community. If there is a greater degree of inequality of income among the people, that aggregate savings rate, would tend to be high, as the richer section of the community has a high propensity to save. A country with a low per capita income and a fair distribution of national income would imply a low savings rate. Thus, with an improvement in the distribution of income or correction of income inequalities through fiscal and other measures, the aggregate savings rate may tend to decline in the initial stage. Thus, the egalitarian goal of redistribution of income and wealth may come in the way of capital formation by causing a reduction in the domestic aggregate savings. Nonetheless, the ideal of just and fair income distribution cannot be sacrificed on this ground.

### **8.2.3 Consumption Motivations**

Saving is the residual part of income left after consumption. Thus, to know the factors affecting saving, we must know what factors determine consumption. The consumption of the community depends upon a variety of factors and motivations. According to Duesenberry, the consumption pattern and its size are determined by (i) the consumption of certain types of goods required by physically and socially generated needs, (ii) these needs can be satisfied alternatively by a large number of qualitatively different kinds of goods, (iii) these different kinds of goods have qualitative variations and ranking which form the community's scale of preference.

In fact, the pattern of consumption and its volume depends, in general, upon the standard of living of the people. Duesenberry, thus, states that "the level of saving actually achieved by anyone represents the outcome of the conflict between his desire to improve his current standard of living and his desire to obtain future welfare by saving." In this context, therefore, motivations regarding saving and consumption expenditure must be analysed. Duesenberry points out that usually while choosing consumption goods, people prefer higher quality goods to lower quality goods with a view to improve their standard of living. A person's physical needs usually remain the same. But, his social need vary from time to time. The social needs of a person depend upon his age, occupation, social position, marginal position and marginal status. The consumption of certain goods – especially ostentatious articles - is caused by maintenance of self-esteem or the acquisition of prestige. In a society where there is a system of differential social status, this is a vital determinant of consumption expenditure.

In short, the consumption pattern of a person is based on his budget constraint and the desire to save. However, any rational balancing in consumption decisions is far from frequent.

#### **8.2.4 Wealth**

Holding of wealth or liquid assets by a person also affects his consumption decisions. Out of current income a person would consume more and save less if he possesses adequate amount of liquid assets like cash balances, bank deposits, etc. and feels that his life in future is well secured. Similarly, an appreciation in the value of financial assets also would induce the person to consume and save less.

#### **8.2.5 Habit**

Habit is a major determinant of consumption pattern. As a matter of fact, at anyone moment, a consumer already has a well-established set of consumption habits. The habit of consumption is formed by taste, likings, fashion, and other psychological influences on the minds of consumers. By nature of his habit, when a person is a spendthrift, his saving will be relatively less out of a given income than that of a person who considers saving as a virtue. Thus, aggregate saving in an economy depends upon the types of habits of the people in general.

Habit conforms to the standard of living of the community. Habit, in the long run, may not be a very constant factor. It is subject to change. In general, people want to improve their standard of living by improving the quality of the goods they consume. Public policies are also devised to improve the living standards of the masses. With an increase in income or otherwise, through dissaving, there may be a drive to spend more on superior goods. There is always a psychological impact of "superior effectiveness" of certain goods such as comfort, convenience, beauty, etc. which induces people to spend more and save less, in due course of time.

In this context, Duesenberry mentions that the "demonstration effect" in modern society serves as a powerful habit-breaker. The "demonstration effect" refers to an increase in consumption is reduction in saving through imitation of superior standards. According to Duesenberry the widespread imitation of superior standards causes an upward shift in the aggregate consumption function, thereby reducing the rate of saving.

The "demonstration effect" implies that a high frequency of contact of a person with superior consumption by others will break his habits and induce him to spend more on expensive goods by weakening his desire for saving. It has been observed that when people habitually use one set of goods, they tend to be dissatisfied if there is a demonstration of superior consumption by others. More knowledge of the existence of superior goods is not an effective habit-breaker. It is the demonstration effect which is a powerful habit-breaker. One may be reminded of a common saying here that "what you don't know won't hurt you, but what you do know does hurt you. ' "

Poor countries are saving-deficient. Their problem of low saving rate is further accentuated by their desire to imitate the superior consumption standard of developed nations induced by international demonstration effect.

#### **8.2.6 Population**

A high growth of population has an adverse effect on the per capita income which causes an adverse effect on the saving-income ratio.

Again, the age distribution of the population also affects the volume of aggregate saving in the economy. Aggregate personal saving depends upon the dissaving of old, retired people and the saving of the young group. A community's aggregate saving would be zero when the positive saving of the young people is just balanced off by the dissaving of the retired people to maintain their consumption expenses. If a society has a large proportion of young people in relation to old people, net aggregate saving will be positive. Thus, the aggregate saving ratio in a community tends to vary with the age structure of its population, even with constant per capita income. It follows thus that when the population is stable in all respects, net saving will rise with the increasing per capita income in an economy.

#### **8.2.7 Objective and Institutional Factors**

There are a number of objective factors - mostly institutional by nature which affects the capacity and willingness to save of the people at large. Political stability and security of life and property encourage people to save more. Similarly the existence of a good banking system and other developed financial institutions of money and capital market such as Unit Trust, Life Insurance Corporation, financial houses, shares of good corporations, government bonds and securities, etc. induce people to save more under the economics of interest-earning motive by providing a wide range of remunerative investment opportunities.

The taxation structure and fiscal policy also affect savings in the economy. A vigorously progressive direct taxation leads to a reduction in voluntary personal saving. Similarly, high and widespread indirect taxes will force the consumer to spend more on maintaining his given standard of living. This will cause a reduction in his personal saving. Similarly, high corporate taxation will reduce the net profit of business houses and curb their capacity to save.

On the other hand, certain concessions provided in the taxation schemes can help in promoting voluntary saving. For instance, exemption of interest-earning from bank deposits, outright deductions of life insurance premium, contribution to provident fund, etc. serve as good stimuli to saving.

Price stability or check on inflation by governmental effort can also sustain saving, while hyper inflation may lead to dissaving or reduction in saving.

Likewise, windfall gains and losses also effect saving. The former will lead to a rise in savings and the latter will induce dissaving.

### **8.2.8 Subjective Motivations for Savings**

People are induced to save more when there are strong subjective factors which motivate them to save. Keynes enlisted the following main motives which lead to individuals to save:

- (1) Precaution - to build up a reserve against unforeseen contingencies.
- (2) Foresight - to provide for future needs.
- (3) Calculation - to enjoy interest and a larger real consumption at a future date.
- (4) Improvement - to improve standard of living gradually.
- (5) Independence - to enjoy a sense of independence and the power to do things with accumulated savings.
- (6) Enterprise - to make speculation or undertake business projects.
- (7) Pride - to bequeath a fortune.
- (8) Avarice - to satisfy pure miserliness. .

Likewise, savings of business firms are induced by the following motives:

- (i) Enterprise - to carry out further capital investment.
- (ii) Liquidity - to meet emergencies of business.
- (iii) Improvement - to expand business investments.
- (iv) Prudence - to have financial prudence in discharging debts.

### 8.2.9 Rate of Interest

According to classical economists, saving is the direct function of the rate of interest. To put it symbolically:

$$S=f(i)$$

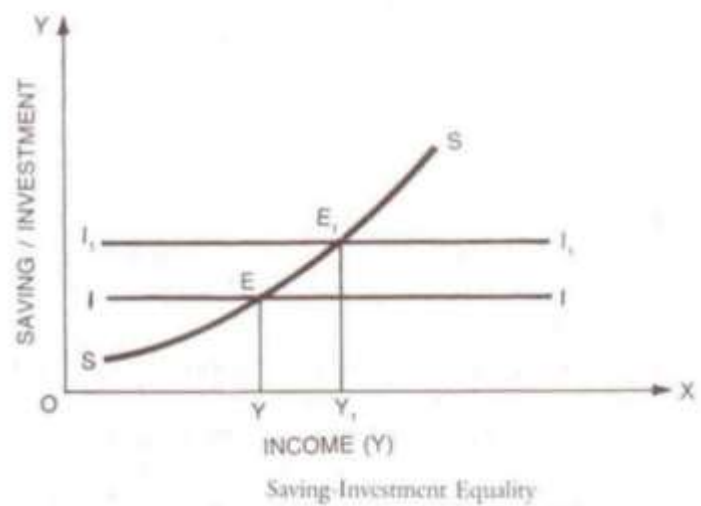
where  $S$  stands for saving and  $i$  stands for the rate of interest. It suggests that saving tends to rise with an increase in the rate of interest and vice versa. Keynes, however, did not agree with this view. He asserted that saving is a function of income.

But, it remains a fact that the personal saving of some individuals who are motivated by economic considerations is certainly induced to save more when the rate of interest rises. They may be willing to curtail their consumption or try to earn more income in order to save more. But, a mere rise in the rate of interest is not enough. Income also must rise. Income is the basic determinant of one's capacity to save. Saving comes out of income and not from rate of interest. But a high rate of interest may give a psychological push to the economic motive behind saving.

However, the rate of interest is an important factor in the mobilisation of saving. People would be induced to pass on their saving to those institutions which offer a high rate of interest. Thus, from the point of view of holding of near money assets, the rate of interest constitutes a significant influence. A person would like to keep his savings in that type of bond from which the relative yields will be highest as against any other type available.

### 8.3 SAVING-INVESTMENT RELATIONS

In Keynes's view, investment does not depend significantly upon the level of income. It mainly depends on dynamic factors such as population growth, territorial expansion, and progress of technology and above all, business expectations of the entrepreneur. Thus, it is unpredictable, unstable and autonomous as against savings which is stable, predictable and induced. Thus, it is fluctuations in investment that cause variations in income which in turn bring about equality between saving and investment. According to Keynes, varying levels of income cannot be sustained in an economy unless the amounts of savings at these levels of income are offset by an equivalent amount of investment. Thus, Keynesian theory draws the equilibrium relations between income, saving and investment. According to Keynes, varying levels of income cannot be sustained in an economy unless the amounts of savings at these levels of income are offset by an equivalent amount of investment. Thus, Keynesian theory draws the equilibrium relations between income, saving and investment. It stresses that the equilibrium level of income is realised where saving out of income is just equal to the actual amount of investment. This is depicted in Figure.





In Figure, I-I is the original investment schedule which is a horizontal straight line showing that investment is completely autonomous in the sense that it does not vary much with income. This is the fundamental postulate of Keynesian theory. 1-1 is the new investment schedule indicating a shift in the I-function due to the forces of certain dynamic factors. The curve SS is the saving schedule showing how the amount of saving increases with income. But, it is a stable phenomenon and, therefore, usually, there cannot be a shift in its curve. From the diagram it appears that the income is determined by the saving and investment schedules. Initially, 1schedule and S-schedule intersect at point E, and we have an income level OY, where obviously  $S=I$ . Thus, the Keynesian theory of shifting equilibrium shows the S and I equality at varying levels of income.

Of course, the Keynesian formulation of saving-investment relationship in its functional sense admits the divergences between saving and investment, but only at virtual levels and not at observable levels of income. The equilibrium level of national income is obviously the observable level of income where there is corresponding equality between "observable" savings and "observable" investment. And, for given savings and investment schedules, there is, of course, only one equilibrium level of income corresponding to the equality between S and I. In a static Keynesian system, there can be divergence between savings and investment only when the economy is not in equilibrium.

#### **8.4 UNDEREMPLOYMENT EQUILIBRIUM**

The classical economists held that saving being a function of the rate of interest; it automatically flows into an equal amount of investment, led by changes in the rate of interest which tend to generate a full employment level of income in the economy. Thus, in classical economics, full-employment condition was assumed to be a normal phenomenon. Keynes, however, pointed out that in a modern capitalist economy, usually, the saving-investment equality takes place at an income level which may be significantly below the full-employment level. Thus, more realistically, a modern free-enterprise economy tends to have under-employment equilibrium as its normal feature.

The Keynesian idea of "underemployment" equilibrium has been elucidated by Professor Kurihara in terms of the following strategic functions in the Keynesian theory of employment: (i) the interest-inelastic function, (ii) the interest-inelastic liquidity function.

Kurihara observes that from empirical investigation, it has been found that there is no significant correlation between the interest rate and the quantum of investment. Thus, a mere adoption of a cheap money policy cannot be very effective in stimulating the level of investment such that a rise in saving is automatically transmitted into investment to establish the saving-investment equilibrium at full-employment level.

Similarly, the saving schedule is income-elastic, but it is interest inelastic in practice. The interest-inelasticity in saving function suggests that with a fall in interest rate, in view of insufficient investment, demand for liquidity, however, cannot cause a decline in the propensity to save. As such, saving-investment equilibrium is likely to take place at less than full-employment level.

It has been said that drastic changes in the rate of interest can affect the saving schedule. This is true. But, here the liquidity function comes in the way. Kurihara points out that at a very low rate of interest, the liquidity function becomes perfectly interest-elastic, which has two unhealthy influences: *(i)* it tends to discourage inducement to invest, by its depressing effect on the marginal efficiency of capital of high rate of interest, which is essential to overcome a strong liquidity preference of some people, and *(ii)* it is neither feasible nor advisable for the monetary authority to expand money supply indefinitely and lower the rate of interest to the bottom, just for the sake of stimulating private investment. Consequently, the investment functions at a point of full-employment level. The point of effective demand, thus, tends to materialise at an under-employment equilibrium level in a real economy. It must be noted that Keynesian theory refers here to privately induced investment only. Public investment which is autonomous depends on the plan and public policy can be shifted upward up to the full-employment ceiling in a decided manner.

## **8.5 Indian Capital Market**

### **8.5.1 MEANING AND FUNCTIONS OF CAPITAL MARKET**

Capital market is a growing component of the financial, system in India. The capital market differs from the money market in terms of maturity, structure and liquidity. The money market comprises financial instrument having a maturity period of one year or less than one year. It involves short-term transactions.

Capital market contains financial instruments of maturity period exceeding one year. It involves long-term transactions. Capital market instruments are relatively less liquid in comparison to the money market instruments. Capital market in a broad sense encompasses all kinds of arrangements and financial institutions involved in long term funding. Capital market is, however, commonly referred to the stock markets in the country. From the stock markets point of view, capital market comprises both primary and secondary market. The primary market deals with new issues made by the companies. The secondary market relates to the trading in the existing securities. An investor can buy securities in the primary market, but can sell only in the secondary market.

#### **Functions of Capital Markets**

Capital market is the financial pillar of industrialized country. It is the catalysts agent of development. It renders several functions, such as:

- Transformation of savings into investment. Capital market mobilizes savings from the households to the producers who are the investors. It provides inter-mediation between savers and investors on a long-term basis.
- Flow of funds. It channelises the allocation of the funds from less profitable to more profitable channels. It thus leads to optimum utilization of resources. It enables surplus and idle funds to be used more effectively, efficiently and productively.
- Macro-economics financial balancing. Capital market mobilises funds from surplus units to deficit units through appropriate financial inter-mediation.
- It facilitates the project financing and growth of corporate sector.
- It provides better returns to the savers by offering numerous alternatives in the portfolio investments.

India is heading on to the growing private sector in its mixed economy. As such, private savings and capital plays pivotal role in its growth process. A healthy growth of capital market is, therefore, essential to promote expanding savings and investment in the country.

### **8.5.2 STRUCTURE OF THE INDIAN CAPITAL MARKET**

Usually, capital markets are classified in two ways:

- On the basis of issuer,
- On the basis of instruments.

In terms of issuer type, these are:

- (a) Markets for corporate securities, and
- (b) Markets for government securities.

In terms of instruments, these are:

- (a) Equity markets, and
- (b) Debt markets.

Over the years, there has been a substantial development of the Indian capital market. It comprises various sub-markets. In recent years, its structure has grossly changed. Various new instruments and new institutions have cropped in. Broadly speaking, there are the following sub-markets:

- (1) Corporate market for both securities (both new and old);
- (2) Government securities market;
- (3) Debt instrument market; and
- (4) Market for institutional schemes. (Such as mutual funds, etc).

There are both primary and secondary markets for all kinds of these markets. The primary market is the source of raising funds directly from the public. The secondary market is meant to provide liquidity and trading facilities.

The Indian secondary market structure comprises:

- Regular stock exchanges. Presently 21 in numbers in major Indian cities.
- Over the Counter Exchange of India (OCEI). This is meant for smaller companies. It has no trading ring.
- National Stock Exchange.

### 8.5.3 CAPITAL MARKET FOR CORPORATE SECURITIES

There has been a growing trend of corporate sector in India. Nearly 2 lakh companies have registered in the country. Exceeding 8,000 companies are listed on all stock exchanges of the country.

Companies enter into the capital market for the following reasons:

- Modernization
- New projects
- Expansion
- Assets acquisition
- Capital restructuring
- For listing their securities on stock exchanges

#### Sub-brokers

With the establishment of Securities and Exchange Board of India (SEBI) and abolition of Controller of Capital Issues, there has been a remarkable shift from 'control' to 'regulatory' system in the Indian capital market.

### 8.5.4 CAPITAL MARKET FOR GOVERNMENT SECURITIES

Indian government is a big borrower. It borrows through gilt-edged securities - i.e., repayments of principal and interest is totally secured with budgetary provisions.

The government securities are of three types:

- (i) Long-term : exceeding 10 years;
- (ii) Medium-term : ranging between 5-10 years;
- (iii) Short-term : between 1-5 years.

Government securities are held in the form of:

- Stock Certificates
- Bearer Bonds

Stock certificate certifies that the holder is registered in the book of the Public Debt Office of the government. It also indicates interest rate. Bearer bond certifies the entitlement to specified sum. It also indicates the interest rate.

Besides, the government of India floats securities called:

- (i) Social security certificate,
- (ii) Capital investment certificate,
- (iii) Deposit certificates,
- (iv) Annuity certificates,
- (v) Annuity deposit certificates,
- (vi) Zamindari compensation bonds and rehabilitation grant bonds,
- (vii) National savings certificates,
- (viii) National defense certificates, and
- (ix) National deposit certificates.

The growth of government securities market depends on the public debt programme of the government.

#### **8.5.5 GROWTH PROSPECTS OF INDIAN CAPITAL MARKET**

Indian capital market has a vast growth potential. Presently it has captured only about 10 percent of household savings in mobilisation for the corporate sector. In other developed countries more than 20-25 percent of household savings are tapped by their capital markets. Moreover, over 25 percent population goes for share holdings in these countries. In India such percentage is just less than 5.

In 1997-98, however, of the household sectors savings, 2 percent claimed by the UTI , shares and debentures, 12.4 percent by government securities, and 4.3 percent by the non-banking deposits. On the other hand, 45.6 percent share claimed by the bank deposits. This means bank-deposits are still popular avenues in India.

Liberalisation, financial regulations and activities of SEBI as well as positive industrial policy would help in attracting more funds into the Indian capital market.

## **Characteristics of Indian Capital Market**

Indian capital has the following main features that may favour more savings mobilisation:

- Fast growth of mutual funds
- Banks subsidiaries for. financial services into the capital market
- Growth of the merchant banking
- Floatation of mega issues
- Growing debt instruments Issue of debentures
- Avoidance of underwriting
- Increased transparency through SEBI's regulations
- Liberalisation policy of the government
- Emerging new financial instruments such as convertible bonds, foreign currency rates, zero coupon bonds, discount bonds, warrants, etc.

## **Current Scenario**

The SEBI is playing active role in its regulatory reform to further strengthen investors' protection and monitoring and modernising the Indian capital market. There has been enhancement of integrity, transparency and efficiency of operations of the securities market.

The government has established the National Venture Fund for Software and IT industry (NVFSIT) in the year 2000. It is managed by the Small Industry Development Bank of India (SIDBI) Venture Capital Ltd. (VCL).

In short, capital market in India is an important source of funds for public as well as private sector undertaking.

## 8.6 Commercial Banking

### 8.6.1 EVOLUTION OF BANKING

Banking, in its crude form, is an age-old phenomenon. It was in existence even in ancient times. Revilpout, a French writer, for instance, mentions about bank and bank notes in Babylon 600 B.C. In India, the references to money lending business are found in the *Manu Smriti* also. Chaldean, Egyptian and Phoenician history also records the existence of rudimentary banking in early days.

Prof. Marshall in his book, *Money, Credit and Commerce*, (1923) writes about the activities of money-changers in the temples of Olympia and other sacred places in Greece, around 2,000 B.C. To quote him, "Private money-changers began with the task of reducing many metallic currencies, more or less exactly, to a common unit of value, and even to accept money on deposit at interest, and to lend it out at higher interest permitting meanwhile drafts to be drawn on them."

As a matter of fact, the origin of banking lies in the business of money changing in ancient days. Another factor that supported the emergence of banks in the early period was the need for borrowing by the monarchical governments from finance companies. In the Middle Age, in Italy the first bank called the 'Bank of Venice' was established in 1157, on this ground, particularly, when the authorities of the state of Venice were in financial trouble due to war.

In England, however, the bankers of Lombardy had taken the initiative to start modern banking along with their trading activities in London. But, commercial banking began there only after 1640, when goldsmiths started receiving deposits from the public for safe custody and issued receipts for the acknowledgments which were being used as bearer demand notes later on.

Crowther, thus, speaks about three ancestors of a modern commercial bank, *viz.*, the merchant, the money-lender and the goldsmith. The merchants or traders issued documents like 'hundi' to remit the funds. Modern banks introduced cheques, or demand drafts for remittance purposes. Money-lenders gave loans. Bankers too gave loans. Goldsmiths received deposits and created credit. Banks also received deposits and adopted the process of credit in a similar fashion, by issuing cheques.



In short, the evolution of commercial banking is related to the practice of safe-keeping of gold and other valuables by the people with merchants/goldsmiths/ money-lenders.

Etymologically, however, the word 'bank' is derived from the Greek word *banque*, or the Italian word *banco* both meaning a bench - referring to a bench at which money-lenders and money-changers used to display their coins and transact business in the market place.

In England, initially the Bank of England was established in 1694 on Italian lines to support government with finance.

Modern joint-stock commercial banks, however, came into the picture with the passage of the Banking Act of 1833 in England.

In India, however, modern banking started when the English agency houses in Calcutta and Mumbai began to serve as bankers to the East India Company and the Hindustan Bank was the first banking institution of its kind to be established in 1779.

### **8.6.2 WHAT IS A BANK?**

Commercial banks are the most important source of institutional credit in the money market.

A commercial bank is a profit-seeking business firm, dealing in money and credit. It is a financial institution dealing in money in the sense that it accepts deposits of money from the public to keep them in its custody for safety. So also, it deals in credit, *i.e.*, it creates credit by making advances out of the funds received as deposits to needy people. It thus, functions as a mobiliser of saving in the economy.

A bank is, therefore, like a reservoir into which flow the savings, the idle surplus money of households and from which loans are given on interest to businessmen and others who need them for investment or productive uses.

A bank is an important institution of the money market as it gives short-term loans to its customers.

### **Definition of Bank**

On account of the multifarious activities of a modern bank, it becomes very difficult to give a precise definition of the word "Bank". The Oxford Dictionary defines a bank as "an establishment for the custody of money, which it pays out on a customer's order." This, however, is not a very satisfactory definition, since it ignores the most important function of a bank that of creating money or creating credit.

Most commonly, then, banks have been defined as dealers in debt. This definition, of course, more aptly describes a bank's activities. Sayers more clearly states: "We can define bank as an institution whose debts (bank deposits) are widely accepted in settlement of other people's debts to each other." Crowther, thus, puts it: "The banker's business is then, to take debts of other people, to offer his own in exchange and thereby to create money."

A banking company in India has been defined in the Banking Companies Act, 1949 as one "which transacts the business of banking which means the accepting, for the purpose of lending or investment, of deposits of money from the public, repayable on demand or otherwise and withdrawable by cheque, draft, order or otherwise. "

Acceptance of chequable demand deposits and lending them to others are the two distinctive features of a banking institution. On this account, Post Office Saving banks are not regarded as banks in the true sense of the term, since they do not lend money, even though some of them have introduced the cheque system. Similarly, there are other financial institutions like the Unit Trust of India (UTI), the Life Insurance Corporation (LIC), the Industrial Finance Corporation of India (IFCI);-the Industrial Development Bank of India (IDBI), etc. which lend money to others but do not accept chequable demand deposits. Therefore, they are not regarded as banks. They are called non-banking financial institutions.

### **Difference between Banking and Money-lending**

A banking business is, however, distinct from a pure money-lending business. A money-lender usually advances his own funds. A bank accepts deposits from the public, which are withdrawable by cheques, and the funds so accumulated are lent to its needy customers against goods or securities or by discounting bills. Further, the bank pays interest to its depositors, and the deposits are withdrawable by cheques. Money-lenders generally do not receive deposits from public, and even if they receive such deposits, it is not obligatory on their part to pay a uniform interest rate on such deposits; and these deposits are not chequable. Further, very often; when there is credit stringency, bankers may borrow from other banks or central bank to lend to their customers. Money-lenders obviously do not do so.

### **8.6.3 KINDS OF BANKS**

Financial requirements in a modern economy are of a diverse nature, distinctive variety and large magnitude. Hence, different types of banks have been instituted to cater to the varying needs of the community.

Banks in the organised sector may, however, be classified into the following major forms:

- (1) Commercial banks;
- (2) Co-operative banks;
- (3) Specialised banks, and
- (4) Central bank.

#### **(1) Commercial Banks**

Commercial banks are joint stock companies dealing in money and credit. A commercial bank may be defined as a financial institution that accepts chequable deposits of money from the public and also uses the money with it for lending. The most distinctive function of a commercial bank is that it accepts deposits called demand deposits from the public which are chequable, *i.e.*, withdrawable by means of cheques. Acceptance of chequable deposits alone, however, does not give it the status of a bank. Its another essential function is to make use of these deposits for lending to others.

Commercial banks usually give short-term loans and advances. They occupy a dominant place in the money market. They, as a matter of fact, form the biggest component in the banking structure of any country. The commercial banks in India are governed by the Indian Banking Regulation Act, 1949 brought up to date to include additional rules thereto. Under the law, commercial banks are not supposed to do any other business, except banking.

In capitalist countries, like the UK and the USA, commercial banks are usually in the private sector, owned by shareholders. In socialist countries like Russia, they are completely nationalised. In France, however, though it has a capitalist economy, all commercial banks are state-owned.

### **Commercial Banks in India**

In India, however, there is a mixed banking system. Prior to July 1969, all the commercial banks-73 scheduled and 26 non-scheduled banks. except the State Bank of India and its subsidiaries - were under the control of private sector. On July 19, 1969, however, 14 major commercial banks with deposits of over 50 crores were nationalised. In April, 1980, another six commercial banks of high standing were taken over by the government.

At present, there are 20 nationalised banks plus the State Bank of India and its 7 subsidiaries constituting public sector banking which controls over 90 per cent of the banking business in the country.

### **(2) Co-operative Banks**

Co-operative banks are a group of financial institutions organised under the provisions of the Co-operative Societies Act of the states. These banks are essentially co-operative credit societies organised by members to meet their short-term and medium-term financial requirements..

The main object of co-operative banks is to provide cheap credit to their members. They are based on the principles of self-reliance and mutual co-operation.

The co-operative banking system in India is, however, small sized in comparison to the commercial banking system, Its credit outstanding is just less than one-fifth of the total credit outstanding of the commercial banks. Nonetheless, cooperative credit system is the main institutional source of rural, especially, agricultural finance in India.

Co-operative banking system in India has the shape of a pyramid *i.e.*, a three-tier structure, constituted by: (i) primary credit societies; (ii) central co-operative banks; and (iii) state co-operative banks.

Primary credit societies lie at the total or base level. In rural areas there are primary agricultural credit societies (PACs), which cater to the short and medium-term credit needs of the farmers.

In urban areas, to provide non-agricultural credit, urban co-operative banks and employees' credit societies are formed. Urban banks usually provide short-term loans to their members, who are small borrowers. They also accept deposits from members and non-members, too. Thus, their functions and working are more or less similar to those of commercial banks. But by nature, their form is only co-operative and that is a major distinction between these and commercial banks which are joint stock companies.

The Central Co-operative Banks (CCBs) are federations of primary societies belonging to a specific district. By furnishing credit to the primary societies, central co-operative banks serve as an important link between these societies and the money market of the country. No central co-operative bank lends to individuals. It lends to societies only. The State Co-operative Banks (SCBs) lie at the apex of the entire co-operative credit structure. Every State Co-operative Bank's basic function is to furnish loans to the central co-operative banks in order to enable them to help and to promote the lending activities of the primary credit societies. The State Cooperative Banks, thus, serve as the final link between the money market and the cooperative sector of the country.

### **(3) Specialised Banks**

There are specialised forms of banks catering to some special needs with this unique nature of activities. There are, thus, foreign exchange banks, industrial banks, development banks, land development banks etc.

Foreign Exchange Banks or simply exchange banks are meant primarily to finance the foreign trade of a country. They deal in foreign exchange business, buying and selling of foreign currencies, discounting, accepting and collecting foreign bills of exchange. They also do ordinary banking business such as acceptance of deposits and advancing of loans, but in a limited way. In India, there are 15 foreign commercial banks basically undertaking such activities only.

Industrial Banks are primarily meant to cater to the financial needs of industrial undertakings. They provide long-term credit to industries for the purchase of machinery, equipments etc.

In India, there are some special financial institutions which are called "development banks". Presently, at the all-India level, there are five such industrial development banks: (i) the Industrial Development Bank of India (IDBI), (ii) the Industrial Finance Corporation of India (IFCI), (iii) the Industrial Reconstruction Corporation of India (IRCI), for large industries, (iv) the Industrial Credit and Investment Corporation of India (ICICI), and (v) the National Small Industries Corporation (NSIC) catering to the needs of the small industries. All these institutions have been founded by the Government, except the ICICI which is owned by the private sector.

Similarly, at the state level, there are: (i) the State Financial Corporations (SFCs), (ii) the State Industrial Development Corporations (SIDCs), and (iii) the State Industrial Investment Corporations (SIICs) serving as industrial development banks.

Land Development Banks (LDBs) are meant to cater to the long and medium-term credit needs of agriculture in our country. They are mainly district level banks. Since the LDBs give loans to their members on the mortgage of land, previously they were called land mortgage banks. There are state land development banks at the top level and primary land development banks at the base or local level.

Agricultural Refinance and Development Corporation (ARDC) is a kind of agricultural development bank which provides medium and long-term finance to agriculture in our country. ARDC operates by making provisions of refinance to State Land Development Banks, State Co-operative Banks and Scheduled Commercial Banks which are its shareholders.

The Export-Import Bank of India (EXIM BANK) has been instituted for planning, promoting and developing exports and imports of the country.

In Western countries, there are specialised banks such as discount houses, investment banks, labour banks etc., catering to the specialised needs of the people.

#### **(4) Central Bank**

A central bank is the apex financial institution in the banking and financial system of a country. It is regarded as the highest monetary authority in the country. It acts as the leader of the money market. It supervises controls and regulates the activities of the commercial banks. It is a service-oriented financial institution primarily concerned with the ordering, supervising, regulating and development of the banking system in the country. As the central bank is able to influence monetary and credit conditions and financial developments in a country, it is charged with the responsibility of carrying out the monetary and credit policies.

India's central bank is the Reserve Bank of India, established in 1935.

A central bank is usually state-owned. But it may also be a private organisation. For instance, the Reserve Bank of India (RBI), was started as a shareholders' organisation in 1935, however, it was nationalised after Independence, in 1949.

Although the central bank is state-owned, it functions as a semi-government institution, free from parliamentary control.

#### **8.6.4 FUNCTIONS OF COMMERCIAL BANKS**

Commercial banks perform several crucial functions, which may be classified into two categories: (a) Primary functions, and (b) Secondary functions.

Primary banking functions of the commercial banks include:

1. Acceptance of deposits from the public;
2. Lending of funds;
3. Use of cheque system; and
4. Remittance of funds.

##### **1. Acceptance of Deposits from the Public**

Accepting deposits is the primary function of a commercial bank. By receiving deposits from the public, commercial banks mobilise savings of the household sector.

Banks generally accept deposits in three types of accounts: (i) Current Account, (ii) Savings Account, and (iii) Fixed Deposits Account.

Deposits in Current Account are withdrawable by the depositors by cheques for any amounts to the extent of the balance at their credit, at any time without any prior notice. Deposits of current account are, thus, known as demand deposits. Such accounts are maintained by commercial and industrial firms and businessmen, and the cheque system is the most convenient and very safe mode of payment.

Savings Accounts are maintained for encouraging savings of households. Withdrawals of deposits from savings accounts are not freely allowed as in the case of current account. There are some restrictions on the amount to be withdrawn at a time and also on the number of withdrawals made during a period. Indian commercial banks have, however, relaxed these rules of savings accounts to a certain extent in recent times. Banks pay a rate of interest on the savings account deposits as, prescribed by the central bank.

Deposits in fixed account are time deposits. In the normal course, deposits cannot be withdrawn before the expiry of the specified time period of the deposits. A premature withdrawal is, however, permitted only at the cost of forfeiture of the interest payable, at least partly. On these deposits commercial banks pay higher rates of interest, and the rate becomes higher with the increase in duration.

By creating such varieties of deposits, banks motivate savers and depositors in a variety of ways and encourage savings in the economy. Further, by keeping deposits with banks, depositors' money is not only secured and remains in safe custody, but it yields interest also. Moreover, banks' demand deposits are in the form of liquid cash, for they serve as money to the business community and, therefore, is called bank money.

## **2. Lending of Funds**

Another major function of commercial banks is to extend loans and advances out of the money which comes to them by way of deposits to businessmen and entrepreneurs against approved such as gold or silver bullion, government securities, easily saleable stocks and shares, and marketable goods.

Bank advances to customers may be made in many ways: (i) overdrafts, (ii) cash credits, (iii) discounting trade bills, (iv) money-at-call or very short-term advances, (v) term loans, (vi) consumer credit, (vii) miscellaneous advances.



*(i) Overdraft:* A commercial bank grants overdraft facility to an account holder by which he is allowed to draw an amount in excess of the balance held in the account" up to the extent of stipulated limit. Overdraft is permissible in current account only, Suppose, a customer has Rs.50,000 in his current account with the bank. Bank grants him overdraft facility up to Rs.10,000. Then, this customer is entitled to issue cheques up to Rs.60,000 on his account. Obviously, the overdraft facility sanctioned up to Rs.10,000 by the bank in this case is as good as credit granted by the bank to that extent.

*(ii) Cash Credit:* Banks give credit in cash to business firms in industry and trade, against pledge or hypothecation of goods, or personal guarantee given by the borrowers. It is essentially, a drawing account against credit sanctioned by the bank and is operated like a current account on which an overdraft is sanctioned. It is the most popular mode of advance in the Indian banking system.

*(iii) Discounting Trade Bills:* The banks facilitate trade and commerce by discounting bills of exchange called trade bills. Traders often draw bill of exchange to meet their obligations in business transactions. Such a trade bill is payable in cash on maturity, after a stipulated date. But many times the holder of such bills may be in urgent need of cash before the maturity period. In such circumstances, he may seek help from the bank. Since trade bills are negotiable instruments, the bank will discount them. That is, the bank will pay cash to the endorser of trade bills, equivalent to the amount of bills minus the amount of discount. And, when the bill matures, the bank will claim the amount from the drawee (the person who is liable to honour the bill). Obviously, discounting of bills by the bank amounts to granting of credit to the party concerned till the maturity date of the bill. This method of bank lending is widely adopted for two reasons: *(i)* such loans are self-liquidatory in character; and *(ii)* these trade bills are rediscountable with the central bank.

*(iv) Money at Call or Very Short-term Advances:* Bank also grant loans for a very short period, generally not exceeding 7 days to the borrowers, usually dealers or brokers in stock exchange markets against collateral securities like stock or equity shares, debentures, etc., offered by them. Such advances are repayable immediately at short notice hence, they are described as money at call or call money.

(v) Term Loans: Banks give term loans to traders, industrialists and now to agriculturists also against some collateral securities. Term loans are so-called because their maturity period varies between 1 to 10 years. Term loans as such provide intermediate or working capital funds to the borrowers. Sometimes, two or more banks may jointly provide large term loans to the borrower against a common security. Such loans are called participation loans or consortium finance.

(vi) Consumer Credit: Banks also grant credit to households in a limited amount to buy some durable consumer goods such as television sets, refrigerators, etc., or to meet some personal needs like payment of hospital bills, etc. Such consumer credit is made in a lump sum and is repayable in installments in a short time. Under the 20-point programme, the scope of consumer credit has been extended to cover expenses on marriage, funeral etc., as well.

(vii) Miscellaneous Advances: Among other forms of bank advances there are packing credits given to exporters for a short duration, export bills purchased/ discounted, import finance - advances against import bills, finance to the self-employed, credit to the public sector, credit to the cooperative sector and above all, credit to the weaker sections of the community at concessional rates.

### **(3) Use of Cheque System**

It is a unique feature and function of banks that they have introduced the cheque system for the withdrawal of deposits.

There are two types of cheques: (i) the bearer cheque, and (ii) the crossed cheque. A bearer cheque is encashable immediately at the bank by its possessor. Since it is negotiable, it serves as good as cash on transferability. A crossed cheque, on the other hand, is one that is crossed by two parallel lines on its face at the left hand corner and such a cheque is not immediately encashable. It has to be deposited only in the payee's account. It is not negotiable.

In modern business transactions, the use of cheques to settle debts is found to be much more convenient than the use of cash. Commercial banks, thus, render an important service by providing an inexpensive medium of exchange such as cheques. In fact, a cheque is also considered as the most developed credit instrument.

#### **(4) Remittance of Funds**

Commercial banks, on account of their network of branches throughout the country, also provide facilities to remit funds from one place to another for their customers by issuing bank drafts, mail transfers or telegraphic transfers on nominal commission charges. As compared to the postal money orders or other instruments, bank drafts have proved to be a much cheaper mode of transferring money and have helped the business community considerably.

In addition to these, commercial banks perform a multitude of other non-banking functions which may be classified as (a) agency service, and general utility services.

##### **Agency Services**

Bankers perform certain functions for and on behalf of their clients, such as:

- (a) To collect or make payments for bills, cheques, promissory notes, interest, dividends, rents, subscriptions, insurance premia, etc. For these services, some charges are usually levied by the banks.
- (b) To remit funds on behalf of the clients by drafts or mail or telegraphic transfers.
- (c) To act as executor, trustee and attorney for the customers will.
- (d) Sometimes, bankers also employ income-tax experts not only to prepare income-tax returns for their customers but also to help them to get refund of income-tax in appropriate cases.
- (e) To work as correspondents, agents or representatives of their clients.

Often, bankers obtain passports, traveler's tickets, secure passages for their customers, and receive letters on their behalf.

##### **General Utility Service**

Modern commercial banks usually perform certain general utility services for the community, such as:

- (a) Letters of credit may be given by the banks at the behest of the importer in favour of the exporter.
- (b) Bank drafts and traveler's cheques are issued in order to provide facilities for transfer of funds from one part of the county to another.
- (c) Banks may deal in foreign exchange or finance foreign trade by accepting or collecting foreign bills of exchange.
- (d) Banks may act as referees with respect to the financial standing, business reputation, and respectability of customers;

- (e) Shares floated by government, public bodies and corporations may be underwritten by banks;
- (f) Certain banks arrange for safe deposit vaults, so that customers may entrust their securities and valuables to them for safe custody.
- (g) Banks also compile statistics and business information relating to trade, commerce, and industry. Some banks may publish valuable journals or bulletins containing research on financial, economic and commercial matters.

### **Banks Play an Important Role in a Modern Economy**

- (1) They constitute the very life-blood of modern trade, commerce and industry, as they provide the necessary funds for their working capital such as to buy raw materials, to pay wages, to incur current business expenses in marketing of goods, etc
- (2) Banks encourage people's savings habit through their various savings deposit schemes.
- (3) They also mobilise idle saving resources from household to business people for productive use.
- (4) They transmit money from place to place with economy and safety.
- (5) Their agency services are, no doubt, of immense value to the people at large, as they ease their difficulties, save their time and energy and provide them safety and security.

### **8.7 Central Bank and Instruments of Credit Control**

Central banking is a comparatively new phenomenon. In most countries, except England, the central bank is a twentieth century financial institution. In the U.S.A., the Central Bank of the Federal Reserve System was established in 1913; in India, the Reserve Bank of India was set up in 1935.

### **8.7.1 CENTRAL BANK: AN APEX FINANCIAL AUTHORITY**

The essential feature of a central bank is its discretionary control over the monetary system of the country. A bank is called a central bank because it occupies a pivotal position in the monetary and banking structure of the country in which it operates. Thus, the central bank acts as the leader of the money market and in that capacity; it supervises, controls and regulates the activities of the commercial banks. It is recognised as the apex monetary institution or the highest financial authority.

The central bank has been defined by R.P. Kent as "institution charged with the responsibility of managing the expansion and contraction of the volume of money in the interest of the general public welfare. Thus, we may define the central bank as an institution whose main function is to help, control and stabilise the monetary and banking system of the country in the national economic interest.

The above stated definition of a central bank clearly justifies its need and importance. The banking system can work as a system only if there is an institution at the top to direct its activities. Without such a direction, the system would be nothing but a collection of unconnected units, each following an independent policy, often contradictory to one another. Thus, the central bank is essential to regulate the activities of commercial banks, integrate them, and direct their policies according to the best national economic interest.

### **8.7.2 FUNCTIONS OF A CENTRAL BANK**

The powers and range of functions of central banks vary from country to country. But there are certain functions which are commonly performed by the central banks:

1. It issues the currency notes of the country.
2. It is the custodian of the foreign exchange reserves of the country.
3. It serves as banker to the government.
4. It serves as banker to commercial banks.
5. Being a monetary authority, it regulates the banks' credit creation activity and performs the function of a controller of credit.
6. It promotes the economic development of the country.

## **1. Central Bank as a Bank of Note Issue**

The central bank is legally empowered to issue currency notes - legal tender. Commercial banks cannot issue currency notes. The central bank's right to issue notes gives it the sole or partial monopoly of note issue, while in India, the Reserve Bank of India has a partial monopoly of note issue, for example, one rupee notes are issued by the Ministry of Finance, but the rest of the notes are issued by the Reserve Bank.

According to De Kock, following are the main reasons for the concentration of the right of note issue in the central bank:

- (a) It leads to uniformity in note circulation and its better regulation.
- (b) It gives distinctive prestige to the note issue.
- (c) It enables the State to exercise supervision over the irregularities and malpractices committed by the central bank in the issue of notes.
- (d) It gives the central bank some measure of control over undue credit expansion by the commercial banks, since expansion of credit obviously leads to an increased demand for note currency.

The central bank keeps three considerations in mind while issuing currency notes, namely, uniformity, elasticity and security. The right of note issue is regulated by law. According to law, every note issued must be matched with an asset of equal value (assets such as, government securities, gold and foreign currencies, and securities). This is necessary to inspire public confidence in paper currency.

## **2. Central Bank as a Custodian of Foreign Exchange Reserves**

The central bank holds all foreign exchange reserves - key currencies such as U.S. dollars, British pounds, and other prominent currencies, gold stock, gold bullion, and other such reserves - in its custody. This right of the central bank enables it to exercise a reasonable control over foreign exchange, for example, to maintain the country's international liquidity position at a safe margin and to maintain the external value of the country's currency in terms of key foreign currencies.

### **3. Central Bank as Banker to Government**

As the government's banker, the central bank maintains the banking accounts of government departments, boards, and enterprises and performs the same functions as a commercial bank ordinarily performs for its customers. It accepts deposits of commercial banks and undertakes the collection of cheques and drafts drawn on the bank; it supplies government with the cash required for payment of salaries and wages to their staff and other cash disbursements and transfer funds of the government from one account to another or from one place to another. Moreover, it also advances short-term loans to the government in anticipation of the collection of taxes and raises loans from the public. It also makes extraordinary advances during periods of depression, war, or other national emergencies. In addition, the central bank renders a very useful banking exchange required to meet the repayment of debts and service charges or for the purchase of goods and other disbursements abroad, and by buying any surplus foreign exchange which may accrue to the government from foreign loans or other sources.

The central bank also serves as an agent and adviser to the government. As agent of the government, it is entrusted with the task of managing the public debt and the issue of new loans and treasury bills on behalf of the government. It also underwrites unsold government securities. Moreover, the central bank is the fiscal agent to the government and receives taxes and other payments on government account. By acting as financial adviser to the government, the central bank discharges another important service: it advises the government on important matters of economic policy such as deficit financing, devaluation of currency, trade policy and foreign exchange policy.

The central bank also functions as a representative of the State in international financial matters. It is entrusted with the task of maintaining the nation's reserves of international currency.

### **4. Central Bank as Banker to Commercial Banks**

Broadly speaking, the central bank functions as banker to commercial banks in three capacities: *(i)* as custodian of cash reserves of commercial banks; *(ii)* as lender of last resort; and *(iii)* as clearing agent.

Thus, the central bank acts, as a conductor and leader of the banking system of the country. It acts as a friend, philosopher, and guide to commercial banks.

*(i) Custodian of cash reserves of commercial banks:* Commercial banks find it convenient to keep their reserve requirements with the central bank because its notes command the greatest confidence and prestige and the government's banking transactions are conducted by this institution. Thus, in every country, commercial banks keep a certain percentage of their cash reserves with the central bank by custom or by law.

In fact, the establishment of central banks makes it possible for the banking system to secure the advantages of centralised cash reserves. The significance of centralised cash reserves lies in the following facts:

- (a)* Centralisation of cash reserves in the central bank is a source of great strength to the banking system of the country as it inspires the confidence of the public in the commercial banks.
- (b)* Centralised cash reserves can form the basis of a much longer and more elastic credit structure than those scattered among numerous individual commercial banks.
- (c)* Centralised cash reserves enable the central bank to provide additional funds to those banks which are in temporary difficulties. In fact, the central bank can function as lender of the last resort on the basis of the centralized cash reserves with it.
- (d)* Centralisation of cash reserves is conducive to the growth of the economy and to the increased elasticity and liquidity of the banking system in particular and of the credit structure in general.
- (e)* Centralisation of cash reserves also enables the central bank to influence and control credit creation of commercial banks by increasing or decreasing the cash reserves of the latter, that is, through the technique of the variable reserve ratio.

*(ii) Lender of the last resort:* As lender of last resort, in periods of credit stringency, the central bank gives temporary financial accommodation to commercial banks by rediscounting their eligible bills. The central bank is the ultimate source of money in the modern credit system. The function of the lender of last resort implies that the central bank assumes the responsibility of meeting directly or indirectly all reasonable demands for accommodation from commercial banks.



The central bank's function as lender of last resort has evolved out of its rediscounting function during emergency periods. The real significance of rediscount functions according to De. Kock, lies in the fact that it increases the elasticity and liquidity of the entire credit structure.

By providing a ready medium for the conversion in cash of certain assets of banks. It helps to maintain their liquidity. It also makes possible a considerable degree of economy in the use of cash reserves, since commercial banks can conduct a large volume of business with the same reserve and capital.

*(iii) Clearing Agent:* As the central bank becomes the custodian of cash reserves of commercial banks, it is but logical for it to act as a settlement bank or a clearing house for other banks. As all banks have their accounts with the central bank, the claims of banks against each other are settled by simple transfers from and to their accounts. This method of settling accounts through the central bank, apart from being convenient, is economical as regards the use of cash. Since claims are adjusted through accounts, there is usually no need for cash. It also strengthens the banking system by reducing withdrawals of cash in times of crisis. Furthermore, it keeps the central bank of informed about the state of liquidity of commercial banks in regard to their assets.

## **5. Central Bank as Controller of Credit**

By far the most important of all functions of the central bank in modern times is that of controlling credit operations of commercial banks. Credit, the source of many blessings in a modern economy, also may become, unless we control it, a source of confusion and peril. The social and economic consequences of changes in the purchasing power of money are serious and since credit plays a predominant part in the settlement of business transactions, it is essential that it should be subjected to control. Monetary policy is implemented by the central bank through the weapon of credit control.

## **6. Central Bank as Promoter of Economic Development**

The modern central bank accomplishes a number of development and promotional functions. Today, the central bank is regarded as an inevitable agency for promoting the economic growth of a country. It is an institution responsible for the maintenance of economic stability and for assisting the growth of the economy within the framework of the general economic policy of the State. Thus, the central bank has to take all such steps as are necessary, to meet the economic requirements of economic development of the country.

It is responsible for the development of an adequate and sound banking system to cater to the needs not only of the trade and commerce but also of agriculture and industry. The central bank has to ensure, in the interest of economic progress, that the commercial banks operate on a reasonably sound and prudent basis.

Thus, the major task of the central bank lies in the development of highly organised money and capital markets that may help accelerate economic progress by assisting the huge investment activities in capital formation and other productive sectors. During the planning era, the central bank's role as adviser to government on economic matters in general, and on financial matters in particular, is of considerable importance.

Thus, the central bank of a developing country has an important role to play in the process of development. In underdeveloped countries, the central bank has not only to provide adequate funds and to control inflation, through credit regulation, but it also has to undertake the responsibility of spreading banking facilities, providing credit at cheap rates to agriculture and industry, protecting the market for government securities and channeling credit into desirable avenues. Moreover, in underdeveloped countries, there are institutional gaps in the money and capital markets which hinder economic growth. The banking system is not properly organised as a large section of the money market consists of unorganised, indigenous bankers. Thus, promotion of sound, organised, well-integrated institutions and agencies of money and capital market becomes an important function of a central bank in a developing economy. From deficiency of non-existence of institutions such as savings banks, agricultural credit agencies, insurance companies, and the like to collect and mobilise savings and make them available for productive investments is the main cause of the low rate of capital formation. Hence, the growth of such institutions in these countries is a precondition for capital formation which is a key to economic development. Evidently, therefore, the central bank of a developing country has a vital role to play in building such financial infrastructure for rapid economic development.

As the Planning Commission of India puts it, central banking has to take "a direct and active role, first, in creating or helping to create the machinery needed for financing development activities all over the country and secondly, in ensuring that the finance available flows in the directions intended."

The central bank also collects and disseminates economic statistics of a wider range. As such, the government of the country has to lean heavily upon the central bank for seeking economic and financial advice in the course of development planning.

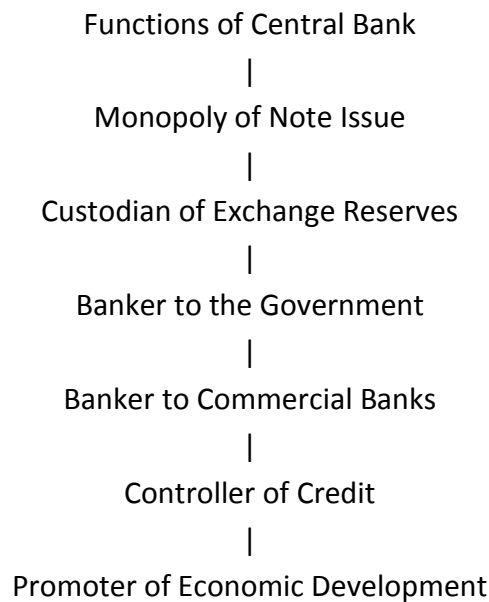
In addition, the central bank may also undertake miscellaneous functions such as providing assistance to farmers through co-operative societies by subscribing to their share capital, promoting finance corporations with a view to providing loans to large-scale and small-scale industries, and publishing statistical reports on trends in the money and capital markets.

In short, a central bank is an institution which always works in the best economic interests of the nation as a whole.

In view of all these functions, as discussed above, it follows that a modern central bank is much more than a Bank of Issue.

Chart 1 summarises the functions of a central bank.

### **Chart I: Functions of Central Bank**



### **8.7.3 FUNCTIONS OF RESERVE BANK OF INDIA**

The Reserve Bank of India was set up on 1<sup>st</sup> April, 1935. The central office of the bank is located in Bombay.

The Reserve Bank of India renders all the functions of a good central bank. Its major functions are as follows:

#### **1. Monetary Management**

The Reserve Bank of India is mainly constituted as an apex authority for monetary management.

According to the Preamble to the Reserve Bank of India Act, 1934, the basic function of the bank is to "regulate the issue of bank notes and the keeping of reserves with a view to securing monetary stability in India and generally to operate the currency and credit system of the country to its advantage."

The Reserve Bank controls and regulates the flow of credit in the economy. It uses quantitative controlling weapons, such as bank rate policy, open market operations, and the reserve ratio requirement. Since 1956, it has increasingly relied on and resorted to selective credit controls for accelerating the rate of growth and for checking inflationary spurts.

## **2. Issue of Bank Notes**

The Reserve Bank has the sole right to issue currency notes, except one rupee notes - which are issued by the Ministry of Finance. The RBI follows a minimum reserve system in note issue. Initially, it used to keep forty per cent of gold reserves in its total assets. But, since 1957, it has to maintain only Rs. 200 crores of gold and foreign exchange reserves.

## **3. Custodian of Exchange Reserves**

The Bank has been entrusted with the responsibility of maintaining the exchange value of the rupee. It has the custody and management of the country's international reserves.

## **4. Banker to the Government**

It is obligatory for the RBI to transact government business. It has to maintain and operate the government's deposit accounts. It collects receipts of funds and makes payments on behalf of the government. It represents the Government of India as the member of the IMF and the World Bank.

## **5. A Banker's Bank**

According to the Banking Companies' Act of 1949, originally, each scheduled bank has to maintain with the Reserve Bank of India a balance equal to five per cent of its demand liabilities and two per cent of its time liabilities. The Act, amended in 1962, specifies that three per cent of the total liabilities should be kept as reserve requirement.

The Reserve Bank of India also serves as lender of last resort, by rediscounting eligible bills of exchange of commercial banks, during the period of credit stringency.

## **6. Promoter of Development**

The bank performs a number of developmental and promotional functions. Apart from credit regulation, the Reserve Bank effectively channelises credit, especially to priority sectors, such as agriculture, exports, transport operations, and small-scale industries. It makes institutional arrangements for rural and industrial finance. For instance, special agricultural credit cells have been set up by the bank. The Industrial Development Bank of India has been set up to solve the allied problems of the industries.

The bank also assists the government in its economic planning. The bank's credit planning is devised and coordinated with the five year plans of the country. The bank also collects statistical data and economic information through its research departments. It compiles data on the working of commercial and co-operative banks, on balance of payments, company and government finances, security markets, price trends, and credit measures. It publishes a monthly bulletin, with weekly statistical supplements and annual reports, which present a good deal of periodical reviews and comments pertaining to general economic, financial and banking developments, including the bank's monetary policy and measures, adopted for the qualitative and quantitative monetary management.

#### 8.7.4 CENTRAL BANK AND MONETARY MANAGEMENT

The significance of a central bank lies in its function of managing the monetary system of the country. It also maintains the monetary standard for the country, internally as well as externally. In the absence of a central bank, the management of the monetary system lies in the hands of the government. But the government cannot carry out this function of monetary management as well as a central bank can, because the government does not have the requisite facilities, in the absence of an apex monetary institution, to know the money market intimately and to recognise its requirements under various changing conditions. Moreover, the government may pursue a monetary policy which is politically biased, and which is, therefore, undesirable in the general interest of the nation. Again, under a democratic set-up, the party in government is subject to change so that it is quite likely that there will be lack of continuity in the pursuit of a uniform and continuous monetary policy. Also, every political party has its own rationale, on fiscal and monetary objectives. Very rarely in history has a country been as fortunate as to be blessed with major political parties which have held nearly identical views on such objectives. This has been a characteristic of human life from the beginning but differences of opinion have deepened since the middle of the 19th century. This political disharmony has traveled like a tidal wave and, today, every country suffers from the uncertainty of a uniform fiscal and monetary policy. A discontinuous, irrational monetary policy followed by the government harms the nation as a whole. Thus, a permanent body, a financial institution, like the central bank acting as an autonomous organisation is inevitable. A central bank though it is nationalised in most cases and is a semi-government institution, is free from the influence of political parties or motives. By the nature of its business, it is intimately connected with the banking system and money market of the country and can definitely regulate the monetary system of the country in the general interest of the nation. Hence, a central bank is an indispensable institution for monetary and financial management in any economy. The mere establishment of a central, autonomous financial authority, however, does not guarantee freedom from political influences. Such an authority can only be created by statute, *i.e.* a law of the national legislature. This financial authority, therefore, is called a Statutory Body. However, a party in power, at a given time, can always amend, rescind or replace the statute by a new statute which will specify regulation aimed at making the central financial authority *a functionary of government (i.e., a party in a democracy) in power and not a functional institution*. This is the present position as it exists today.

The modern economy is a credit economy. Credit has assumed increasingly wide significance in sustaining the base of the modern economic system. The entire financial structure of the present money economy is founded upon the base of the credit system.

Although credit is a concomitant of modern economic advancement, it is like money, a weapon, the misuse of which spells disaster to the system. Credit, the source of many blessings in a modern economy, also becomes, unless we can control it, a source of confusion and peril. The social and economic consequences of changes in the purchasing power of money are serious and, since credit plays a predominant part in settlement of business transactions, it is essential that credit should be subjected to control. On the need for control of credit De Kock writes, "For many years it has been almost universally accepted that the creation and distribution of credit, under the intricate economic organisation existing in most countries, should be subjected to some form of control. The main reason for this was that credit comes to play a predominant part in the settlement of monetary and business transactions of all kinds, and thus to represent a powerful force for good or evil."

The control of credit is recognised as the main function of a central bank. It is a function which embraces, the most important questions of central banking policy. In fact, the heart of monetary policy lies in control, *i.e.*, monetary management.

### **Objectives of Credit Control**

The important objectives of credit control may be listed as follows:

1. *Stabilisation of the general price level.* The traditional objective of credit control was that of keeping exchange rates stable through the medium of a mono-metallic or bi-metallic standard. But, in recent times, greater importance is attached to the stabilisation of prices as the ultimate goal of a central bank's credit control policy. Stabilisation of the general price level and hence stability of the value of money were considered essential for the smooth operation of the economic system and for national economic welfare.

2. *Stabilisation of the money market:* Some economists stress that the credit control policy of a central bank should aim at the stabilisation of the money market. Credit control should be such that demand and supply be adjusted at all times. However, this objective has not been widely recognised because it is incompatible with the goal of stabilising the other phase of economic activity.
3. *Promoting economic growth.* It is widely realised that credit control should be conducive to economic growth. It should not act as an inhibitory factor. It should promote and maintain a high level of employment and income.

#### **8.7.5 INSTRUMENTS OF CREDIT CONTROL**

Under the monetary management of the central bank, credit control stimulates expansion of credit at one time and checks it at another. The principal instruments of credit control, at the disposal of the central bank, may be classified as:

(1) quantitative or general, and (2) qualitative or selective.

The general instruments are directed towards influencing the total volume of credit in the banking system, without special regard for the use of which it is put. Selection or qualitative instruments of credit control, on the other hand, are directed towards the particular use of credit and not its total volume.

Quantitative weapons of credit control consist of (a) bank rate policy; (b) open market operations; and (c) variable reserve ratios.

These methods have a quantitative or a general effect on credit regulation. They are used for changing the total volume of credit or the terms on which bank credit is available, without regard for the purpose for which credit is used by borrowers. But the central bank today, also, makes use of certain qualitative or selective methods by which it controls, in addition to the aggregate volume of credit, the flow of credit in particular directions.

Selective credit control aims at regulating (stimulating or restricting) the uses to which credit are put. The main methods of selective credit control are: (a) margin requirements; (b) regulation of customer's credit; (c) control through directives; (d) rationing of credit; (e) moral suasion and publicity; and (f) direct action.



## **7.6 BANK RATE POLICY (BRP)**

The bank rate is a traditional weapon of credit control used by a central bank. In order to perform its function as lender of last resort to commercial banks, it will discount first-class bills or advance loans against approved securities.

A specific idea regarding the technique of bank rate can be had from the Reserve Bank of India's definition of the bank rate policy which consists of varying the terms and conditions under which the market may have temporary access to the central bank through discounts of selected short-term assets or through secured advances. Thus, the bank rate policy seeks to influence both the cost and availability of credit to members of the bank. Cost, of course, is determined by the discount rate charged, and the availability depends largely upon the statutory requirements of eligibility of bills for discounting and advances, as also the maximum period for which the credit is available.

The bank rate obviously is distinct from the market rate. The former is the rate of discount of the central bank, while the latter is the lending rate charged in the money market by the ordinary financial institutions.

### **The "Modus Operandi" of Bank Rate**

The bank rate policy signifies manipulation of the rate of discount by the central bank in order to influence the credit situation in the economy. The principle underlying the bank rate policy is that changes in bank rate are generally followed by corresponding changes in the money market rates, making credit costlier or cheaper, and affecting its demand and supply.

If the bank rate is raised, its immediate effect is to cause an increase in bank's deposit and lending rates. The prices which bankers are prepared to pay on the amounts deposited with them by their customers increase, so that the volume of the bank deposits increases. Commercial banks employ a substantial proportion of the funds deposited with them to form the basis of loans and advances that they make to their customers, and in as much as the banks are now paying more for these deposits, they must charge higher rates for loans and advances made to their customers. So when the central bank raises the bank rate, the cost of borrowing of the commercial banks will increase, so that they will also charge higher rates for loans and advances made to their customers.

So when the central bank raises the bank rate, the cost of borrowing of the commercial banks will increase, so that they will also charge a higher interest rate on loans to their customers and, thus, the market rate of interest will go up. This means that the price of credit will increase. As many business operations are normally conducted on the basis of bank loans, the price (interest) which has to be paid for this accommodation is, of course, a charge against profit to the business. In consequence, the sudden increase in the interest rate will reduce or wipe out the profit of the business, so that industrial and commercial borrowers reduce their borrowings.

In other words, increased market rate or increase in the cost of borrowing will discourage business activity, *i.e.*, their demand for credit falls. As a result of the contraction of demand for credit, the volume of bank loans and advances is appreciably curtailed. This, in effect, will check business and investment activity so that unemployment will ensue. Consequently, income in general will fall, people's purchasing power will decrease and aggregate demand will fall. This, in turn, will affect the entrepreneurs adversely. When demand falls, prices will come down, and, as a result, profit will decline. The rate of investment is basically determined by the rate of profitability, and thus, in view of falling profits, investment activities will contract further. So, a cumulative, downward movement in the economy sets in.

In brief, an increase in the bank rate leads to a rise in the rate of interest and contraction of credit, which, in turn, adversely affects investment activities and consequently, the economy as a whole.

Similarly, a lowering of the bank rate will have a reverse effect. When the bank rate is lowered, the money market rates fall. Credit, then, becomes cheaply available and the business community will come forward to borrow more. Thus, the expansion of credit will increase investment activities, leading to an increase in employment, income and output. Aggregate demand will increase, prices will rise, and profits will increase which, in turn, will boost production and investment activities further. Consequently, a cumulative upturn of the economy will develop.

## Limitations of Bank Rate Policy

The following are the chief limitations of bank rate policy:

- (i) Existence of an Organised and Developed Money Market. Efficacy of the bank rate in controlling credit requires a close correspondence between the bank rate and the structure of interest rates in the money market, so that changes in the bank rate will be followed by changes in the market rates. This presupposes the existence of a highly organised money market. Unfortunately, most underdeveloped countries do not have an organised money market. The wide range and multiplicity of money rates in such an organised money market will make the success of the bank rate policy doubtful. The absence of any conventional relationship between the central bank and other segments of the money market will further add to the ineffectiveness of the bank rate policy.
- (ii) Existence of Well-developed Bill Market. The canons of eligibility for rediscounting bills by the central bank presupposes, in the operation of the bank rate policy, a soundly developed bill market. Underdeveloped bill markets, thus, limit the bank rate operations. Further, in an unorganised money market like that of India, where the indigenous, unorganised monetary sector lies beyond the ambit of control of the central bank.
- (iii) Banks' Need for Rediscounting. The need for commercial banks to approach the central bank for rediscounting facilities is an important factor in determining the successful working of the bank rate policy. But commercial banks will have no need to approach the central bank when they have ample liquid resources at their disposal, *i.e.*, when they have enough excess resources.
- (iv) Practice of Free Exchange Rate System. The successful operation of the bank rate policy in correcting the balance of payments disequilibrium of the country presupposes an economic system in which prices, wages, and interest levels are readily movable, *i.e.*, the economic structure is elastic, the country is on the gold standard and there are no artificial exchange restrictions on the international flow of capital. Obviously, due to the world-wide suspension of the gold standard, government control over prices, wages etc. and artificial exchange restrictions have considerably limited the influence of the bank rate policy.

- (v) Business Expectations. The psychological reaction to a change in the bank rate should also be considered for the effectiveness of the bank rate policy. If, in a boom period, businessmen are unduly optimistic, their demand for credit will be interest-inelastic and the bank rate will be ineffective. Similarly, during a depression, when businessmen are pessimistic, they will not respond favourably to the incentive of low interest rates.
- (vi) Interest-inelasticity of Bank Deposits. The axiom that a rise in the bank rate and, thus a rise in interest rates payable on deposits by commercial banks will cause an increase in bank deposits is questionable. A large majority of people save because of the precautionary motive, and their savings depend on their earning capacity, *i.e.*, their income. These savers do look for a rise in the interest rates on deposits, but they usually deposit with banks for the purpose of safety. Thus, it is actually the increases in income rather than interest rate that promote savings by the people which augment bank deposits.

Again, rediscounting of bills by commercial banks is a precondition for the effective working of the bank rate. If rediscounting is a regular practice, it will result in the establishment of a sensitive connection between the market rates and the bank rate. If the practice is only occasional, the market rates may be out of tune with the bank rate. In unorganised money markets, banks usually operate with high cash reserves, so that they do not feel the need to borrow from the central bank. In predominantly agricultural underdeveloped countries, with unorganised money markets, commercial banks find it difficult to secure sound proposals for the investment of their funds; to that extent they are forced to keep their cash balances idle. As a result, they do not need to borrow from the central bank. Besides, the lack of adequate papers eligible for rediscounting in underdeveloped countries also severely limits the significance and operational of the bank rate as a discount rate.

Moreover, commercial banks in such countries are accustomed to rely on themselves to ensure liquidity of their assets because of wide seasonal fluctuations and this has necessitated their keeping high cash reserves. A historical reason for this is that in most of these countries, the central banks were started in the thirties, when a cheap money policy had to be followed, for revival after the Great Depression, and conditions were not favourable to the growth of the practice of rediscounting.

The demand for bank advances being very low, banks had enough cash balances which rendered rediscounting or borrowing from the central bank unnecessary and superfluous. Prof. Sen summarises this fact in the following words: "The absence of rediscounting practices is, therefore, to be explained by the pursuit of a cheap money policy, the habit of banks of keep comparatively large cash reserves, and the lack of demand for bank advances following the onset of the world trade depression of the thirties."

Furthermore, in undeveloped money markets, the bank rate is not generally a "penal" rate, because interest rate in the indigenous banking sector are higher than the bank rate. Thus, the axiom that money rates should follow the bank rate scarcely materialises under such conditions.

Another important factor is that the efficacy of the bank rate demands sufficient elasticity in the economic system, so that cost reduction, prices, and trade tend to adjust with changed conditions. This condition is, however, rarely fulfilled even if developed economies. It is, therefore, meaningless to expect such an economic condition in underdeveloped countries with their bottlenecks and imperfections.

Sir Mitra has observed: "In developing nations with planned economies where the public sector accounts for the larger part of the nation's Investment is equipped with a set of more direct and powerful instruments, the bank rate loses much of its importance and is, in fact, relegated to a secondary place."

Anyway, the Bank rate has great psychological value as an instrument of credit control and enhances the prestige of the central bank. The bank rate is generally a reflection of the central bank's opinion of the credit situation and economic position in the country. As Gibson said, a rise in the bank rate may be regarded as "the amber coloured light" of warning to commercial credit and business activities while a fall in bank rate may be looked upon as "the green light" indicating that the coast is clear and the ship of commerce may proceed on her way with caution."

In conclusion, although it must be admitted that the bank rate policy has very limited significance in underdeveloped as well as developed money markets in view of the present day conditions and government policies, it has nevertheless a useful function to perform in conjunction with other measures of credit control. Central banks of the present day, however, have to rely more upon other instruments of credit control than the bank rate policy alone in regulating the cost, availability and supply of credit money.

### **8.7.7 OPEN MARKET OPERATIONS**

Open market operations imply deliberate direct sales and purchases of securities and bills in the market by the central bank on its own initiative to control the volume of credit. In a broad sense, open market operations simply imply the purchase or sale by the central bank of any kind of eligible paper like government securities or any other public securities, or trade bills, etc. In practice, however, the term is applied, in most countries, to the purchase or sale of government securities (short-term as well as long-term) only by the central banks.

**Working of Open Market Operations:** When the central bank sells securities in the open market, other things being equal, the cash reserves of the commercial banks decrease to the extent that they purchase these securities; by selling securities, the central bank also reduces, other thing being equal, the amount of customers' deposits with commercial banks to the extent that these customers acquire the securities sold by the central bank. In effect, the credit-creating base of commercial bank is reduced and hence credit contracts.

In short, the open market sale of securities by the central bank leads to a contraction of credit and reduction in the quantity of money in circulation. Conversely, when the central bank purchases securities in the open market, if makes payments to the sellers by cheques drawn on itself, the sellers usually being commercial banks or customers of commercial banks. The banker's accounts are credited and, therefore, there is an increase in the commercial banks' cash reserve (which is the base of credit creation) and as also an increase in the customers' deposits with commercial banks (which is the principal constituent of money supply.)

In short, open market purchases of securities by the central bank lead to an expansion of credit made possible by strengthening the cash reserves of the banks. Thus, on account of open market operations, the quantity of money in circulation changes. This tends to bring about changes in money rates. An increase in the supply of money through open market operations causes a downward movement in the money rates, while a decrease of money supply raises money rates. Open market operations, therefore, directly affect the loanable resources of the banks and the rates of interest. Changes in rates of interest in turn tend to bring about the desired adjustments in the domestic level of prices, costs, production and trade.

In short, the central bank follows a policy of open market selling of securities when contraction of credit is desired, especially during a boom period when the stability of the money market is threatened by the over-expansion of credit by commercial banks. Conversely, during a depression when the money market is tight and expansion of credit is desired, the central bank follows the policy of open market buying of securities.

### **Limitations of Open Market Operations**

The following are the major limitations of open market operations:

1. Lack of well-developed securities market. There must be a broad, strong and active securities market for large-scale and successful open market operations. Lack of such a market renders open market policy ineffective.
2. Contradictions between bank rate and open market operation. The sale of securities by the central bank may prove ineffective in curbing the loanable resources of the banks so long as the possibility of rediscounting leaves the door open to replenish the reserve as before.
3. Restricted dealings. The success of open market operations is limited by the preparedness of the central bank to incur losses. In the case of short-term securities, the loss is relatively less. Therefore, open market operations are often restricted to dealings in short-term securities only.
4. Difficulties in execution. To execute a purchase policy by the central bank is not as difficult as the sale of securities in open market operations. Similarly, for commercial banks, a policy of credit contraction is easier to implement than a policy of expansion. Thus, by the operation of money factors alone, "open market operations can stop booms but cannot prevent slumps."
5. Precautions for stabilising the government securities market. Another drawback of the open market operations policy is that when a large-scale of securities is effected by the central bank, the prices of securities adversely affect bank assets and upset the government's borrowing programme. In such conditions, the central bank has to stabilise the securities market and, to that extent, the scope of open market operations to influence the credit situation is limited.

6. Assumption of a constant velocity. The theory of open market operations assumes that the circulation of bank deposits and legal tender money has a constant velocity. However, in practice, these conditional relationships are difficult to obtain always. In the first place, neither will the cash reserve of commercial banks, nor the quantity of money in circulation always increase or decrease in proportion to the purchase or sale of securities respectively by the central bank. This can happen if there is another disturbing factor operating simultaneously. For instance, the effect of the purchase of securities by the central bank on the supply of bank cash may be neutralised, partly or fully, by the outflow of capital, or by an unfavourable balance of payments or by the withdrawal of deposits by the public for hoarding purposes. Likewise, an inflow of capital or dishoarding may neutralise the effect of the sale of securities by the central bank.

Secondly, commercial banks do not always either expand or contract credit in accordance with the change in their cash reserves. According to De Kock, "there are many circumstances of money, economic or political nature, which may deter a commercial bank from employing increased cash reserves fully, if at all or from contracting credit when its reserves are reduced." Moreover, with regard to the relation between an increase in the credit base, *i.e.*, cash reserves, and the creation of credit, there are certain technical factors which must be taken into consideration by all banks. For instance, unless the banking system, as a whole, adopts a policy of credit expansion, the expanding banks would tend to lose some part of their cash reserves to the non-expanding banks and might, thus, be compelled to contract again.

In many countries, a rigid cash ratio is not maintained by the commercial banks and hence, open market operations are not effective. Thus, under favourable conditions of credit expansion and insufficient demand for credit on the part of borrowers, an increase in the cash reserves cannot produce its proportionate effect on credit expansion.

Notwithstanding these limitations, open market operations are a useful instrument of monetary policy. They constitute a more direct and effective way of controlling credit than the bank rate policy.



### **Usefulness of Open Market Operations**

The open market operations policy of the central bank can serve the following purposes:

- (1) As a complementary to the bank rate policy it tends to enhance the efficacy of the bank rate. It may be used to prepare the ground for changes in the bank rate. When credit contraction is desired, the central bank may raise bank rates as well as sell securities in the open market, so that the cash reserves (credit base) of banks are also reduced. Conversely, when central bank may, at the same time, buy securities in the open market and, thus, provide additional cash to commercial banks to enable them to increase their advances.
- (2) It assists government borrowings. By purchasing government bills and bonds and such other securities when the prices are low and selling them when their prices are high, the central bank can maintain stability in the prices of government securities and thereby promote public confidence in the instruments of public debt.
- (3) It may be useful in contracting extreme trends in business by buying securities during periods of slack business and selling them in period of inflationary boom.
- (4) It may be adopted to influence the balance of payments position favourably. Open market sales operations, for instance, will have a contractionary effect on credit and a deflationary situation will develop so that the domestic price level will fall. Exports will be encouraged due to increased foreign demand on account of lower prices, whereas, imports will be restricted due to high costs of foreign goods. Thus, a favourable balance of payments will follow.

On these accounts, open market operations have come to be recognised as an important technique of monetary management. The growing importance of open market operations is due to the decline of bank rate as an instrument of credit control after the first war and the consequent need for another and more direct method. In the thirties, open market operations became necessary in order to implement the policy of cheap money.

### **Superiority of Open Market Operations**

As a method of influencing money supply, open market operations are superior to bank rate because the initiative lies in the hands of the monetary authority, in the case of the former, while it rests with the commercial banks in the case of the latter. In other words, while bank rate policy is only an indirect way of controlling credit, open market operations are more direct. Moreover, the bank rate directly affects only short-term interest rates; long-term rates are affected only indirectly. Open market operations, on the other hand, have a direct influence on the prices of long-term securities and, therefore, on long-term interest rates. They have a direct and immediate effect on the supply of money and credit and, therefore, on money and interest rates. Thus, this method is largely used nowadays to influence interest rates in the country and prices of government securities in the market.

In the opinion of some economists, however, open market operations can achieve little. They can be successful only as a supplement to the discount rate policy. Keynes, on the other hand, maintains that open market operations, undertaken extensively and skillfully, could achieve the purpose without a discount rate policy, if they are supplemented by state organisation of investment or, failing this, by compensatory planning or public works. However, the general opinion is that open market operations must always be supplementary to the bank rate policy.

### **Relation between BRP and OMO**

Both these weapons of credit control have their merits and demerits (as discussed above). Each, by itself, will not succeed in producing the desired result, and, therefore, must be supplemented by the others in order to be effective. For instance, when the bank rate is raised, with a view to controlling credit, open market sales of securities should follow so that credit contraction will be more effective. However, if the bank rate is raised and the open market purchase policy is adopted *simultaneously*, the rise in the bank rate will prove to be ineffective, because banks will then increase their cash reserve by selling securities.

They will not, then, feel the necessity of rediscounting bills. Conversely, if the open market purchase policy is adopted, with a view to credit expansion, a simultaneous decrease in the bank rate will help in achieving the desired goal.

In fine, therefore, it can be said that the efficiency of the bank rate and of the open market policy are interrelated. Open market operations are generally undertaken to prepare the market for changes in the bank rate, which has far reaching influence over the market.

However, as the Reserve Bank of India itself admitted, open market operations in India have not been solely designed to suit the role of a full fledged instrument of credit control. But, open market operations can be carried out for sundry purposes and some of these may achieve success in the underdeveloped money markets of the backward countries. These countries may very well undertake open market operations in order to neutralise seasonal movements in the economy. In busy seasons, the credit stringency can be relaxed by releasing excess liquidity through open market purchase operations.

In India, open market operations have been resorted to more for the purpose of assisting the government in its borrowing operations and for maintaining orderly conditions in government securities market than for influencing the availability and cost of credit. The objectives of what is called grooming the market, such as acquiring securities nearing maturity to facilitate redemption and to make available on tap a variety of loans to broaden the gilt-edged market, have been more striking features of the open market operations in India.

#### **8.7.8 VARIABLE CASH RESERVE RATIO (VCRR)**

The variable cash reserve ratio is comparatively new method of credit control used by central banks in recent times. In 1935, the U.S.A.'s Federal Reserve System adopted it, for the first time. In countries where the money market is unorganised or underdeveloped, increasing recourse is now taken to this method of credit control.

The variable reserve ratio device springs from the fact that the central bank, in its capacity as *Bankers' Bank*, must hold a part of the cash reserves of commercial banks. The minimum balances to be maintained by the member banks with the central bank are fixed by law and statutory powers have been conferred on the central bank to alter the quantum of these minimum reserves. The customary minimum cash reserve ratio is an important limitation on the lending capacity of banks. Thus, variations in the reserve ratio reduce or increase the liquidity and, consequently, the lending power of the banks also. Therefore, the cash reserve ratio is raised by the central banks also. Therefore, the cash reserve ratio is raised by the central bank when credit contraction is desired and lowered when credit is to be expanded.

Thus, like other techniques of monetary control, the variation of cash reserve requirements has a dual purpose; requirements can be lowered as well as increased. A reduction of reserve requirements immediately and simultaneously augments the lending capacity of all the banks. Conversely, raising a cash reserve ratio immediately and simultaneously reduces the lending capacity of all member banks. The fundamental assumption of this method is that the excess cash reserve (being the base of credit) realised through the lowering of the minimum reserve ratio, results in the expansion of credit, and similarly, the contraction of cash reserve due to the raising of minimum, cash reserve requirements will result in the contraction of credit.

Therefore, the reserve requirement ratio is a powerful instrument which affects the volume of excess reserve with commercial banks as well as credit creation multiplier of the banking system. To clarify the point, suppose commercial banks have Rs. 10 crores of total reserve funds with the central bank and that the legal cash reserve ratio is 10 per cent of the total deposits. If, with the existing deposits, the required reserves of the banks are Rs. 3 crores, the excess reserves amounting to Rs. 7 crores will support a tenfold (the multiplier being ten, as the reserve ratio is ten percent) increase in the deposits, *i.e.*, Rs. 70 crores of credit creation {Rs. 7 x (100/70) crores}. If, on the other hand, the reserve ratio is doubled, *i.e.*, if it is raised to 20 per cent, the required cash reserves are Rs. 6 crores, and the excess reserves would be Rs. 4 crores only. This excess reserve of Rs. 4 crores, with the 20 per cent reserve requirements, would obviously support only a fivefold (the multiplier now being 5) increase in the bank deposits *i.e.*, Rs. 20 crores of credit creation only {*i.e.*, Rs. 4 x (100/20) crores}. Thus, raising of the reserve requirements affect credit contraction, and conversely, a reduction in the reserve ratio brings about credit expansion.

## **OMO versus VRR**

The variable reserve ratio, as an instrument of monetary control, is regarded as decidedly superior to open market operations in the following particulars:

- (i) The variable reserve ratio is a straight direct method of credit control. It can give results more promptly than open market operations. The cash reserves of a bank can be altered by just a stroke of the pen. A declaration by the central bank that commercial banks must maintain a large percentage of their deposit liabilities as balances with the central bank than they have been doing immediately decreases their deposits. Likewise, an expansion of credit can be promptly attained by reducing the minimum cash reserves to be maintained with the central bank.

Thus, the variations in reserve ratio reduce the time lag in the transmission of the effect of monetary policy to the commercial banking system. Aschheim, therefore, opines that "If results of the variation of reserve requirements were the same as the results of open market operations in all respects by the speed of transmission preference for the former weapons over the latter would be quite plausible."

- (ii) The successful working of open market operations requires a broad-based, developed, securities market. The variable reserve ratio has no such limitations. Thus, in countries where the securities market is not extensively developed, the variable reserve ratio has greater significance as a technique of monetary control.

- (iii) Large-scale open market operations may affect the value of government securities and, thus, there are chances of loss being incurred by the central government and commercial banks, because their assets consist of a large stock of government securities. The variations in reserve ratios, on the other hand, yield the desired results in the controlling credit, without fear of any such loss.

Unlike the open market operations, the variable reserve ratio is capable of functioning without "ammunition." Thus, it does not tend to increase or decrease the supply of earning assets of the central bank, a fear which is very significant from the point of view of central banking policy and treasury financing.

- (iv) The variable reserve ratio is applicable simultaneously to all commercial banks in influencing their potential credit-creating capacity. Open market operations affect only those banks which deal in securities.

Thus, some economists consider that the variable reserve ratio is "a battery of the most improved type" that a central bank can add to its armory. On the other hand, there are economists who opine that the variable ratio reserve has not yet developed as a delicate and sensitive instrument of credit control. To them, as compared to open market operations, the variable reserve ratio lacks precision in the sense that it is inexact, uncertain or rather clumsy as regards changes not only in the amount of cash reserve but also in relation to the place where these changes can be made effective. The changes in reserve involve larger sums than in the case of open market operations. Further, open market operations can be applied to a relatively narrow sector.

The variable reserve ratio is comparatively inflexible in the sense that changes in reserve requirements cannot be well adjusted to meet or localise situations of reserve stringency or superfluity. Moreover, the variable reserve ratio is discriminatory in its effect. Banks with a large margin of excess reserves would be hardly affected, while banks with small excess reserves would be hard pressed. This means that the variable reserve ratio always causes injustice to the small banks, often without reason. On this account, many economists favour open market operations rather than the variations in reserve ratio for achieving monetary control.

It has been suggested, however, that open market operations and the variable reserve ratio should be complementary to each other. A judicious combination of both will overcome the drawbacks of each weapon when used individually and produce better results. Thus, the suggestion is that the increase in reserve requirements, for instance, may be combined with an open market purchase policy rather than open market sales policy.

## 8.8 OBJECTS AND FUNCTIONS OF THE RBI

### 8.8.1 Objectives

The Preamble to the Reserve Bank of India Act, 1934 spells out the objectives of the Reserve Bank as: "to regulate the issue of bank notes and the keeping of reserves with a view to securing monetary stability in India and generally to operate the currency and credit system of the country to its advantage."

Prior to the establishment of the Reserve Bank, the Indian financial system was totally inadequate on account of the inherent weakness of the dual control of currency by the Central Government and of credit by the Imperial Bank of India. The Hilton-Young Commission, therefore, recommended that the dichotomy of functions and division of responsibility for control of currency and credit and the divergent policies in this respect must be ended by setting-up of a central bank called the Reserve Bank of India - which would regulate the financial policy and develop banking facilities throughout the country. Hence, the Reserve Bank of India was established with this primary object in view.

Another object of the Reserve Bank has been to remain free from political influence and be in successful operation for maintaining financial stability and credit.

The fundamental object of the Reserve Bank of India is to discharge purely central banking functions in the Indian money market, *i.e.*, to act as the note-issuing authority, bankers' bank and banker to government, and to promote the growth of the economy within the framework of the general economic policy of the government, consistent with the need of maintenance of price stability.

A significant object of the Reserve Bank of India has also been to assist the planned process of development of Indian economy. Besides the traditional central banking functions, with the launching of the five-year plans in the country, the Reserve Bank of India has been moving ahead in performing a host of developmental and promotional functions, which are normally beyond the purview of a traditional central bank.

As has been stated by the First Five Year Plan document, "central banking in a planned economy can hardly be confined to the regulation of the overall supply of credit or to a somewhat negative regulation of the flow of bank credit. It would have to take on a direct and active role, firstly, in creating or helping to create the machinery needed for financing developmental activities all over the country and secondly, ensuring that the finance available flows in the directions intended."

The Reserve Bank of India, as such, aims at the promotion of monetisation and monetary integration of the economy, filling in the "credit gaps" and gaps in the financial infrastructure, catering to the financial needs of the economy with appropriate sectorial allocation, as well as supporting the planners in the efficient and productive deployment of investible funds with a view to attain the macro-economic goals of maximisation of growth with stability and social justice.

### **Functions**

The Reserve Bank of India performs all the typical functions of a good central bank. In addition, it carries out a variety of developmental and promotional functions attuned to the course of planning in the country.

Its major functions may be stated as follows:

- (1) Issuing currency notes, *i.e.*, to act as a currency authority.
- (2) Serving as banker to the government.
- (3) Acting as bankers' bank and supervisor.
- (4) Monetary regulation and management.
- (5) Exchange management and control.
- (6) Collection of data and their publication.
- (7) Miscellaneous developmental and promotional functions and activities.
- (8) Agricultural finance.
- (9) Industrial finance.
- (10) Export finance.

#### **8.8.2 THE RBI AS CURRENCY ISSUING AUTHORITY**

The Reserve Bank has the sole right to issue currency notes, except one rupee notes which are issued by the Ministry of Finance. The RBI follows a minimum reserve system in the note issue. Initially, it used to keep 40 per cent of gold reserves in its total assets. But, since 1957, it has to maintain only Rs. 200 crores of gold and foreign exchange reserves, of which gold reserves should be of the value of Rs. 115 crores. As such, India has adopted the "managed paper currency standard."

As a currency authority, the Reserve Bank provides different denominations of currency for facilitating the transactions of the Central and State Governments, and caters to the exchange and remittance needs of the public, banks as well as the Government departments.



The bank has established 14 offices of the Issues Department for the discharge of its currency functions. At all the other centres of the country, the currency requirements are met by the Bank through currency chests. Currency chests are maintained by the bank with the branches of the SBI group, Government Treasuries and Sub-Treasuries, and public sector banks

### **Currency Chest**

A currency chest is a pocket edition of the Issue Department. The stock of notes and coins kept in the currency chests varies as per the needs of the respective areas served by the Treasury or an agency of the bank.

The following advantages are claimed for maintaining currency chests by the bank:

1. The currency chests provides remittance facilities to banks and the public.
2. They facilitate treasuries and bank branches to function by keeping relatively small cash balances.
3. They facilitate the exchange of rupee coins for notes, as well as the issue of new for old/soiled notes.

Above all, the Banking Department of the Reserve bank manages seasonal variations in currency circulation. In the busy season, the currency flow is expanded, in the slack season, it is contracted. During the busy season when there is an increased demand for cash from the public. It is first reflected in the depletion of the cash balances of the commercial banks and through them in the cash balances of the Banking Department. The Banking Department then transfers eligible securities to the Issue Department, on the basis of which the Issue Department issues more currency notes. This is how the currency expansion takes place. During the slack season, the process is reversed.

The following are the important provisions made under the RBI Act, 1934 regarding the issue of currency notes by the Reserve Bank:

- (i) The Issue Department of the Bank alone can issue notes of Rs. 2 and those of higher denominations.
- (ii) The assets of the Issue Department should be completely segregated from those of the Banking Department of the Reserve Bank.
- (iii) All the notes issued by the Reserve Bank of India are legal tender and are guaranteed by the Central Government.

- (iv) The design, form and material of the notes issued by the RBI should have the approval of the Central Government.
- (v) The Central Government is empowered to demonetise any series of the notes issued by the RBI.
- (vi) No stamp duty is payable by the RBI in respect of notes issued by it.
- (vii) The Central Government has to circulate rupee coins through the RBI only.
- (viii) The RBI is obliged to supply rupees coins in exchange for bank and currency notes or bank and currency notes in exchange for coins.

### **8.8.3 THE RBI AS A BANKER TO GOVERNMENT**

The Reserve Bank of India serves as a banker to the Central Government and the State Governments. It is its obligatory function as a central bank. It provides a full range of banking services to these Governments, such as:

- (i) Maintaining and operating of deposit accounts of the Central and State Government.
- (ii) Receipts and collection of payments to the Central and State Governments.
- (iii) Making payments on behalf of the Central and State Governments.
- (iv) Transfer of funds and remittance facilities to the Central and State Governments.
- (v) Managing the public debt and the issue of new loans and Treasury Bills of the Central Government.
- (vi) Providing ways and means advances to the Central and State Governments to bridge the interval between expenditure and flow of receipts of revenue. Such advances are to be repaid by the government within three months from the date of borrowal.
- (vii) Advising the Central and State Governments on financial matters, such as the quantum, timing and terms of issue of new loans. For ensuring the success of government loan operations, the RBI plays an active role in the gilt-edged market.

- (viii) The bank also tenders advice to the government on policies concerning banking and financial issues, planning as well as resource mobilisation. The Government of India consults the Reserve Bank on certain aspects of formulation of the country's Five Year Plans, such as financing pattern, mobilisation of resources, institutional arrangements regarding banking and credit matters. The government also seeks the bank's advice on policies' regarding international finance, foreign trade and foreign exchange of the country. The Reserve Bank has constituted a sound research and statistical organisation to carry out its advisory functions effectively.
- (ix) The Reserve Bank represents the Government of India as member of the International Monetary Fund and the World Bank.

#### **8.8.4 THE RBI AS A BANKER'S BANK AND SUPERVISOR**

The Reserve Bank of India serves as a banker to the scheduled commercial banks in India. All the scheduled commercial banks keep their accounts with the Reserve Bank.

According to the Banking Companies' Act of 1949, originally, each scheduled bank had to maintain with the Reserve Bank of India a balance as cash reserves equal to 5 per cent of its demand liabilities and 2 per cent of its time liabilities. The Act, amended in 1962, specifies that 3 per cent of the total liabilities should be kept as reserve requirement.

The Reserve Bank of India serves as a clearing agent for commercial banks. It provides clearing and remittance facilities to the scheduled commercial banks at centres where it has offices or branches.

The Reserve Bank of India also serves as 'a lender of last resort' by rediscounting eligible bills of exchange of commercial banks during the period of credit stringency. The bank can, however, deny rediscounting facility to any bank without assigning any reason therefore.

In recent years, however, to contain inflationary pressures and to check heavy borrowings by commercial banks, the Reserve Bank with its tight and discretionary lending policy has been operating as a lender of 'regular resort' rather than of 'last resort.'

## Supervision of Banks

Apart from being the bankers' bank, the Reserve Bank is also entrusted with the responsibility of supervision of commercial banks.

Under the Reserve Bank of India Act and the Banking Regulation Act, 1949, the Reserve Bank of India has been vested with a wide range of powers of supervision and control over commercial and co-operative banks.

The various aspects of the supervisory/regulatory functions exercised by the Reserve Bank may be briefly mentioned as under:

1. **Licensing of Banks.** There is a statutory provision that a company starting banking business in India has first to obtain a licence from the Reserve Bank. If the Reserve Bank is dissatisfied on account of the defective features of the proposed company, it can refuse to grant the licence. The bank is also empowered to cancel the license of a bank when it will cease to carry on banking business in India.
2. **Approval of Capital, Reserves and Liquid Assets of Banks.** The Reserve Bank examines whether the minimum requirements of capital, reserve and liquid assets are fulfilled by the banks and approves them.
3. **Branch Licensing Policy.** The Reserve Bank exercises its control over expansion of branches by the banks through its branch licensing policy. In September 1978, the RBI formulated a comprehensive branch licensing policy with a view to accelerate the pace of expansion of bank offices in the rural areas. This was meant to correct regional imbalance of the banking coverage in the country.
4. **Inspection of Banks.** The Reserve Bank is empowered to conduct inspection of banks. The inspection may relate to various aspects such as the banks' organisational structure, branch expansion, mobilisation of deposits, investments, credit portfolio management, credit appraisal, profit planning, manpower planning, as well as assessment of the performance of banks in developmental areas such as deployment of credit to the priority sectors, etc. The bank may conduct investigation whenever there are complaints about major irregularities or frauds by certain banks. The inspections are basically meant to improve the working of the banks and safeguard the interests of depositors and thereby develop a sound banking system in the country.

5. Control Over Management. The Reserve Bank also looks into the management side of the banks. The appointment, re-appointment or termination of appointment of the chairman and chief executive officer of a private sector bank is to be approved by the Reserve Bank. The bank's approval is also required for the remuneration, perquisites and post retirement benefits given by a bank to its chairman and chief executive officer. The Boards of the public sector banks are to be constituted by the Central Government in consultation with the Reserve Bank.
6. Control Over Methods. The Reserve Bank exercises strict control over the methods of operation of the banks to ensure that no improper investment and injudicious advances are made by them.
7. Audit. Banks are required to get their Balance Sheets and Profit & loss Accounts duly audited by the auditors approved by the Reserve Bank. In the case of the SBI, the auditors are appointed by the Reserve Bank.
8. Credit Information Service. The Reserve Bank is empowered to collect information about credit facilities granted by individual banks and supply the relevant information in a consolidated manner to the banks and other financial institutions seeking such information.
9. Control Over Amalgamation and Liquidation. The banks have to obtain the sanction of the Reserve Bank for any voluntary amalgamation. The Reserve Bank in consultation with the Central Government can also suggest compulsory reconstruction or amalgamation of a bank. It also supervises banks in liquidation. The liquidators have to submit to the Reserve Bank returns showing their positions. The Reserve Bank keeps a watch on the progress of liquidation proceedings and the expenses of liquidation.
10. Deposit Insurance. To protect the interest of depositors, banks are required to insure their deposits with the Deposit Insurance Corporation. The Reserve Bank of India has promoted such a corporation in 1962, which has been renamed in 1978 as the Deposit Insurance and Credit Guarantee Corporation.
11. Training and Banking Education. The RBI has played an active role in making institutional arrangement for providing training and banking education to the bank personnel, with a view to improve their efficiency.

### **8.8.5 EXCHANGE MANAGEMENT AND CONTROL**

Under Section 40 of the Reserve Bank of India Act, it is obligatory for the bank to maintain the external value of the rupee.

The Reserve Bank of India is the custodian of the country's foreign exchange reserves. It has authority to enter into foreign exchange transactions both on its own and on behalf of the government. It is obligatory for the bank to sell and buy currencies of all the member countries of the International Monetary Fund to ensure smooth and orderly exchange arrangements and to promote a stable system of exchange rates.

The Reserve Bank of India has resorted to the technique of exchange control to allocate its limited foreign exchange resources according to a scheme of priorities.

In India, exchange control was introduced under the Defence of India Rules in September, 1939. It was, however, statutorily laid down by the Foreign Exchange Regulation Act of 1947. This has been again stipulated by the Foreign Exchange Regulations Act, 1973.

#### **Objectives of Exchange Control in India**

The primary objective of exchange control in India is to regulate the demand for foreign exchange for various purposes against the supply constraints. When the government finds a shortage of foreign exchange due to the low level of external reserves on account of deficit in the balance of payments, exchange control becomes necessary. Exchange control implies a kind of rationing of foreign exchange for the various categories of demand for it.

The Reserve Bank of India implements exchange control on a statutory basis. The Foreign Exchange Regulation Act, 1973 empowers the bank to regulate investments as well as trading, commercial and industrial activities in India, of foreign concerns (other than banking), foreign nationals and non-resident individuals. Moreover, the holding of immovable property abroad and the trading, commercial and industrial activities abroad by Indian nationals are also regulated by the Bank under exchange control.

The Reserve Bank manages exchange control in accordance with the general policy of the Central Government.

In India, exchange control is grossly related to and supplemented by trade control.

While trade control is confined to the physical exchange of goods, exchange control implies supervision over the settlement of payments - financial transactions pertaining to the country's exports and imports. Comparatively, exchange control is more comprehensive than trade control, since it covers all exports and imports as well as invisible and capital transactions of the country's balance of payments.

Under the present exchange control system, the Reserve Bank does not directly deal with the public. The bank has authorised foreign exchange departments of commercial banks to handle the day-to-day transactions of buying and selling a foreign exchange. Further, the bank has given money changer's licences to certain established firms, hotels, shops, etc. to deal in foreign currencies and traveler's cheques to a limited extent.

The Reserve Bank has issued some directions to the authorised dealers and money changers in dealing with foreign exchange which are published in the *Exchange Control Manual*.

Under exchange control, there is check on foreign travel. An Indian visiting abroad is given a fixed sum of foreign exchange only. The present limit is U.S. \$ 500.

There is exchange control on exports, whereby all exporters are required to make a declaration on the prescribed form from the customs/postal authorities that foreign exchange only representing the full export value of the goods has been or will be disposed of in a manner and within a period specified by the Reserve Bank and shall receive payment by an approved method. To facilitate export promotion, however, the bank issues blanket foreign exchange permits for lump sums for specified purposes to eligible registered exporters.

Similarly, all non-resident accounts are also governed by the exchange control regulations. There are various categories of non-resident accounts such as: (a) non-resident accounts, (b) ordinary non-resident accounts, (c) non-resident (external) accounts, and (d) blocked accounts.

"Non-resident bank accounts" refers to the accounts of the overseas branches and correspondents of authorised dealers.

"Ordinary non-resident accounts" are those which are maintained by Indians who have gone abroad for the purpose of employment, business or vacation. Balances in these accounts cannot be transferred abroad without the Reserve Bank's approval.

"Non-resident (External) Accounts" are meant to encourage Indians abroad to remit their savings to India.

"Blocked account" implies that the Reserve Bank is empowered to "block" the accounts in India if any person whether an individual, firm or company, resident outside India and to direct that payment of any sums due to that person may be made to such blocked account. In the normal course, balances in the blocked account cannot be invested in India.

The Foreign Exchange Regulation Act, 1973 also puts a check on foreign investment in India.

In short, in our country, the scheme of exchange control is largely governed by the Foreign Exchange Regulation Act, 1973.

**Exercise :**

1. What is meant by saving? What are the determinants of savings as identified by Keynes?
2. Explain the Saving-Investment relations as viewed by Keynes. What is the role of rate of interest in it?
3. Give an idea of the structure of the Indian Capital Market? What are the prospects of its growth?
4. What is the role of Banks in a modern economy? How many kinds of Banks generally exist in a modern economy?
5. What are the functions of a Central Bank? What is the importance of Central bank in monetary management?
6. State the functions of the Reserve Bank of India as the central banking agency in our country.
7. Write short notes on :-
  - (a) Open market operation
  - (b) Variable cash reserve ratio
  - (c) Weapons of credit control
  - (d) Exchange control



## UNIT – X

### PARALLEL ECONOMY

#### 10.1 MAGNITUDE OF POVERTY IN INDIA

Poverty is a plague affecting all parts of the world and it has many faces and dimensions. One of the most important and most common manifestations of poverty is the denial of access to the basic necessities of human existence.

##### 10.1.1 'Absolute' and 'Relative' Poverty

Poverty is multidimensional.

'Absolute' poverty is poverty below the breadline. Those who suffer from 'absolute poverty' have no guarantee that they will be able to meet the fundamental costs of living as a human being. The World Bank has fixed the norm of one dollar one person per day for this purpose.

A situation of need can also be expressed in terms of the living and working conditions of other members of the same society at the same time. In this sense, poverty is 'relative' to disparity of wealth and income. It is the extreme form of inequality in standards of living and degree of protection against insecurity. In this case, poverty applies to individuals and families whose income and other resources, including living conditions and the rules governing poverty, employment and labour, are distinctly below the average level of the society in which they live.

##### 10.1.2 Extent of Poverty in India

In India, poverty has been defined as that situation in which an individual fails to earn income sufficient to buy him bare means of subsistence.

To quantify the extent of poverty and measure the number of 'poor' in the country, professional economists have made use of the concept of 'poverty line'. (The concept of the 'poverty line' was introduced in Indian economic analysis in 1971, it was first defined at the end of the nineteenth century in Great Britain.

Among these economists we may specifically mention the studies conducted by Bardhan, Minhas, Dandeknt and Ruth, Ojha, Ahluwalia, Veidyanathzm, Blmtyd lain and Tendulkar, Ravallion and Datt.

All of these studies do not look so much at the whole spectrum of income distribution in India as at the problem of poverty as such. More specifically, the question that has attracted attention most is whether the proportion of the population living below the 'poverty level' has increased or decreased in recent years.

Line of Poverty and Head-Count Ratio: In order to define the 'poverty line', all of these studies –

- have determined the minimum nutritional level of subsistence,
- have estimated the cost of this minimum diet,
- on the basis of the per capita consumption expenditure, have delineated the line of poverty.

Where changes in the magnitude of poverty have to be estimated between two different years, account has been taken of changes in the price level by using deflators of one type or another. Roughly, the same procedures are used in the various studies.

Most of these use the data generated by the NSSO through is consumption expenditure surveys, in which households are asked how much of different goods they consume. These surveys are expected to be representative as they are large surveys. Based on these surveys, NSSO publishes data which says how many persons have a monthly per capita consumption expenditure of say Rs. 0 Rs. 30, Rs. 31-50, Rs. 51-70, etc. Using this distribution one can estimate how many consumed less than the normative poverty line. Such estimates of poverty are also known as "Head-count ratio".

A problem with the head-count ratio is its insensitivity to the intensity of poverty. In other words, a head-count ratio simply measures the number of poor below the poverty line. It does not tell us anything about the income shortfall of the poor.

It may be desirable to group the poor into, say, three distinct categories, viz. (i) the most destitutes, (ii) the destitutes, and (iii) the poor. There are a number of analytical and policy uses to which the disaggregated information can be put to.

The discrepancy between the structures of minimum wages and the poverty line can be easily calculated,

If the official poverty line may be deemed to define the society's norm of subsistence, it would be possible to determine with fair precision the two lower levels of subsistence,

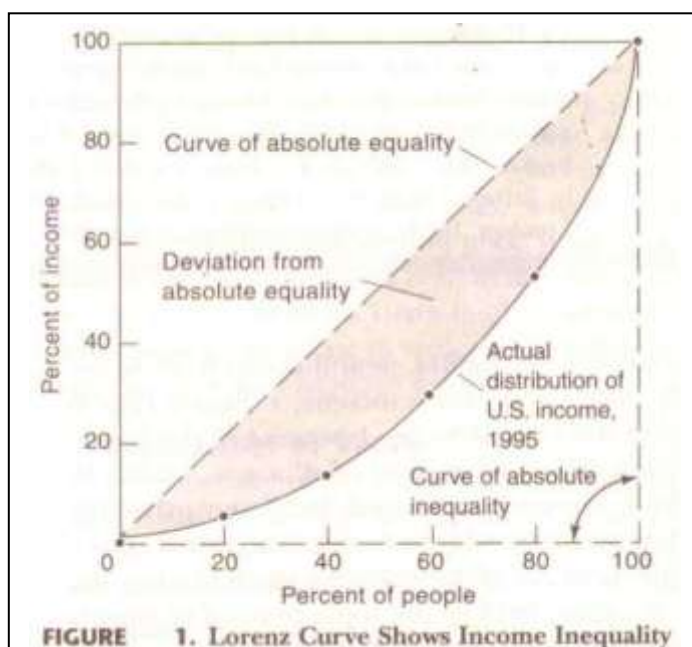
The other correlates of poverty, such as, low calorie intake resulting in low physical strength, perhaps also insufficient development of mental faculties which go with poor education and low educational potential, and low trainability, can be scientifically investigated to determine at least the magnitude of the problem of those families which lie deeply entrapped in these kinds of vicious circles and have lost the ability to escape.

A large body of economists also seems to share this view. What is required is a measure of poverty that includes fulfillment of certain basic human needs.

## 10.2 How to Measure Inequality among Income Classes

How can we measure the degree of income inequality? At one pole, if incomes were absolutely equally distributed, there would be no difference between the lowest 20 per cent and the highest percent of the population: Each would receive exactly 20 percent of the total income. That's what absolute equality means.

The reality is far difference. The lowest fifth, with 20 percent of the households, garners less than 4 percent of the total income. Mean while the situation is almost reversed for the top 5 percent of house holds, who get more than 20 percent of the income.



We see that the solid rust-colored actual distribution-of income curve lies between the two extremes of absolute equality and absolute inequality. The shaded area of this Lorenz curve (as a percentage of the triangle's area) measures relative inequality of income. (How would the curve have looked back in the roaring 1920s when inequality was greater? In a Utopia where all have equal inheritances and opportunities?)

We can show the degree of inequality in a diagram known as the Lorenz curve, a widely used device for analyzing income and wealth inequality. Figure - 1 is a Lorenz curve showing the amount of inequality listed in the columns of Table-A; that is, it contrasts the patterns of (1) absolute equality, (2) absolute inequality, and (3) actual 1995 American inequality.

Absolute equality is depicted by the gray column of numbers in column (4) of Table-A. When they are plotted, these become the diagonal dashed rust-colored line of Figure 1's Lorenz diagram.

At the other extreme, we have the hypothetical case of absolute inequality, where one person has all the income. Absolute inequality is shown in column (5) of Table A and by the lowest curve on the Lorenz diagram—the dashed, right-angled black line.

Any actual income distribution, such as that for 1995, will fall between the extremes of absolute equality and absolute inequality. The rust-colored column in Table-A presents the data derived from the first two columns in a form suitable for plotting as an actual Lorenz curve. This actual Lorenz curve appears in Figure 1 as the solid rust-colored intermediate curve. The shaded area indicates the deviation from absolute equality, hence giving us a measure of the degree of inequality of income distribution. A quantitative measure of inequality that is often used is the Gini coefficient, which is 2 times the shaded area.

### **Distribution of Wealth**

One source of the inequality of income is inequality of ownership of wealth, which is the net ownership of financial claims and tangible property. Those who are fabulously wealthy - whether because of inheritance, skill, or luck - enjoy incomes far above the amount earned by the average household. Those without wealth begin with an income handicap.

(1)	(2)	(3)	(4)	(5)	(6)
Income class of households	Percentage of total income received by households in this class	Percentage of households in this class and lower ones	Percentage of Income received by this class and lower ones		
			Absolute equality	Absolute Inequality	Actual distribution
			0	0	0.0
Lowest fifth	3.7	20	20	0	3.7
Second fifth	9.1	40	40	0	12.8
Third fifth	15.2	60	60	0	28.0
Fourth fifth	23.3	80	80	0	51.3
Highest fifth	48.7	100	100	100	100.0

**Table A : Actual and Polar Cases of Inequality**

By cumulating the income shares of each quintile shown in column (2), we can compare in column (6) the actual distribution with polar extremes of complete inequality and equality.

In market economies, wealth is much more unequally distributed than is income, as Figure 2(b) shows in the United States; 1 percent of the house-holds own almost 40 percent of all assets. Studies by New York University's Edward Wolff show that the distribution of wealth has become much more unequal. Because of the booming stock market, the share of wealth held by the top 1 percent of people has doubled over the last two decades. Given the sharp and growing increases in wealth inequality, Wolff, along with legal scholars Bruce Ackerman and Anne Alston, have proposed that the United States consider instituting a progressive wealth tax to go along with its progressive income tax.

The vast disparities in ownership of wealth have spurred radicals over the ages to propose heavy taxation of property income, wealth, or inheritance. Revolutionaries have agitated for expropriation by the state of great accumulations of property. In recent years, a more conservative political trend has muted the call for redistribution of wealth. Economists recognize that excessive taxation of property income and wealth dulls the incentives for saving and may reduce a nation's capital formation. Particularly in a world of open borders, countries with high tax rates on wealth may find that the wealth has fled across the borders to tax havens or Swiss bank accounts.

Poverty is caused primarily by unemployment. As a matter of fact, poverty and unemployment go together. The concept of employment is however a complex phenomenon. This is because it has to be related by some notion of value of the work accomplished. The question of valuation is thus very important in this context. Employment cannot always be defined in terms of physical activity only.

The production may arise in the intellectual field or in the aesthetic field, provided it has demand in the commercial sense. The complexity in the field of employment is further aggravated by the fact that a host of activities in an under-developed economy take place in the sphere of self employment that does not bear any record.

Widespread are the “unpaid family labour” for an economy of peasants and artisans where the concept of employment practically loses its straightforward meaning and economic activities merges into the wider complex of family based production. Thus, a huge non-money economy exists side by side with exchange economy but nevertheless adds to the G.N.P.

According to economists, there are three important aspects of employment – the (i) income aspects, the (ii) production aspects and the (iii) recognition aspects. On the one hand, employment begets income to the labour, it generates production for the consuming society and again it gives a recognition or position in the society to the person concerned. Without employment, a person virtually is pushed out of the economic world as a participant. Employment can thus be a factor in self-esteem and indeed in esteem by others.

### **Full Employment**

The concept of full employment is not easy to define. In a very simple version, it may mean that the total available supply of labourer is completely absorbed in gainful employment. There is voluntary unemployment in every society. There is frictional unemployment too.

According to Lerner, full employment means that those, who want to work at the prevailing wage rate are able to find work. Beveridge on the other hands defines full employment in way which means, having always more vacant jobs than unemployed man. It means that jobs are at fair wages, of such kind and so located and the unemployed man can reasonable be expected to take them.

Mrs. John Robinson categorically says that frictional unemployment cannot be considered as being consistent with full employment. In her opinion it is difficult to demarket unemployment which is due to frictions and unemployment which is due to deficiency of effective demand. However, in macroeconomic analysis, full employment is viewed as an equilibrium situation in which sum of demands in all labour markets tends to be equal to the sum of the supplies, though of course, there may be excess or deficiency in some pockets.

Unemployment may be open or disguised. The term 'disguised unemployment', is a common feature of an under-developed economy. It refers to a situation of employment with surplus man power in which some workers have such low marginal productivity that their removal from services will not affect the volume of total output; on the contrary, it may leave the aggregate product even increasing.

### **THREE SECTORS OF ECONOMY**

It is necessary to understand that value-addition takes place in the region where employment is created for the purpose of production. Thus, if raw material is produced in one country but industrially processed for value-addition in another country, the other country is enriched by way of employment and addition to G.D.P. In this way the rural sector of economy generally produces the primary products, by operating on natural resources in the sphere of agriculture, animal husbandry, forestry, poultry, pisci-culture, etc. Thus, it is called the primary sector of economy.

In the next place, the secondary sector comprises value-addition in manufacture or industries by transforming primary products into improved consumable items. This operation mostly takes place in urbanized regions and are said to constitute the secondary sector of the economy. But, that is not all. In order that consumable items reaches the doors of the consumers, some more inputs become necessary, like transportation, wholesale and retail shopping, financing of all the productive ventures, settlement of disputes, maintenance of law and order and requirement of governmental administration. All these purposes are served by services rendered in the third sector of economy known as the tertiary sector. Since an appropriate stage of density of population as well as bigger size of human settlement is required to sustain such activities, the tertiary sector is a marked feature of the urban region.

Thus, the entire issue of division of economy in different sectors – primary, secondary and tertiary, has to be understood in the context of demographic patterns, reflected in level of urbanization together with economic factor like level of industrialization and the social factor reflected in level of education, health, motivation and efficiency of the people in the performances of production as well as rendering of services.

From valuation point of view all these factors are extremely important in-as-much as the valuation of real estate or plant and machinery depends upon the productivity of the different agents of production like land, labour, capital and organization. In assessing a long-term view of the prospect of value-addition considered in the perspective of the forces at work in the above demographic, economic or social fields and even the political scenario at large claim serious consideration. The treatment of the entire micro economic as well as macro economic issues thus deserves particular focus from the valuation angle.

### **10.3 PARALLEL ECONOMY (Black Economy)**

A particular feature that holds back the economic progress of the country of the third world requires also to be discussed in the realm of economics. As we have seen the urban-rural relationship is an important factor in economic analysis, since rural areas have predominantly primary sector to thrive on, while the urban sector comprises the economic activities in the secondary and tertiary sectors. In the modern world, urbanization is taken as an index of economic development as it means the harbouring of a growing secondary sector and fast growing tertiary sector therein. A note of warning need be added while increasing the rate of urbanization as a marked feature of developing countries.

The growing urbanization of developing countries means high rate of immigration of population from rural to the urban sectors. Two classes of people are generally marked out as migrants – the upper class comprising the richer section in quest of better amenities of life and the poorer section in search of employment driven by loss of work in the rural hinterland. These people of the poorer section find accommodation in the informal sector of economy comprising day labours, masons, hawkers, vendors, pavement sellers and similar segment who struggle to eke out a living.



While the flight of richer section deprives the rural economy of adequate purchasing power to sustain a healthy market in the rural sector, the flight of poorer section only deteriorates the urban-economic scenario by swelling an informal sector which remains out of tax net and frustrates monetary measures initiated by the government. However pitiable are the condition in general, there are quite a few who escape the tax-net along with other businessmen and traders in no small measure.

Let us now discuss the parallel economy that is known as underground economy comprising the unreported transactions, the magnitude of which is a major headache.

The parallel economy arises out of the following manner of distorted growth pattern. The economy gets divided in the three following sectors:

- (i) Formal sector
- (ii) Informal sector
- (iii) Illegal sector

The formal sector is suppose to comprise all transactions that are exposed to fiscal intervention and line within the ambit of the influence of the monetary policy pursued by the government. Here, too parallel economy has made a headway by underhand dealings in bribery, corruption and other abuses that have become a part of civic life. Donations to political parties from unaccounted sources constitute another big threat. In this way, the parallel economy grows by abusing the formal sector by using an illegal sector that comprises disbanded activities like drug trafficking, arms selling, etc. and by tolerating an informal sector which has become an unavoidable imperative to provide self-employment at large to helpless people who cannot be employed otherwise.

## **10.4 BLACK ECONOMY IN INDIA**

### **10.4.1 Meaning**

It is well known that there is a large amount of money income and wealth which has been and is being made and / or owned which is unaccounted in our tax system and, therefore, has not suffered tax. This unaccounted economic sector is referred to as black economy (alias the parallel economy, the underground economy, the unreported economy etc.).

We might distinguish here between 'black money' and 'black income'. While black money is a stock at a point of time, black income is a flow over a period of time. For policy purposes, the correct concept is that of black income, rather than black money

The black economy in India has been a matter of concern for a number of years. It has grown to enormous dimensions. It has become a threat to the ability of the official monetary—credit policy mechanisms to manage demand and prices in several vulnerable sectors of the economy. The fact is that it has permeated every section of society.

#### **10.4.2 Magnitude of Black Economy**

A number of efforts have been made to estimate the quantitative dimensions of the problem in the economy: A numerical review of the estimates given by the various economists and others reveals that almost all of them show a growing quantity of black income relative to GNP as well as in absolute terms. The aggregate of black income generated is estimated to have gone up from Rs. 50,977 crores in 1980-81 to Rs.10,50,000 crores in 2006-07. The process has only further accelerated due to ongoing liberalisation.

Raja J. Chelliah has estimated that black money is generated at the rate of 20 per cent of country's GDP. The corresponding figures were between 0 and 20 per cent for the EU, 15 per cent for U.S.A., 30 per cent for Italy and 25 per cent for France.

#### **10.4.3 Causes of Black Economy**

More important causes of black economy can be discussed as follows:

**Level and Structure of Taxation:** High effective rates of taxation are a major contributory factor to tax evasion and black income generation in India. Improved tax compliance can result from significant and sustained reductions in the effective tax burdens of those who are liable to tax.

As regards the composition of tax structure, it is generally believed that indirect taxes on commodities are more difficult to evade than direct taxes on income and wealth. That is why countries at earlier stages of development normally rely much more heavily on indirect taxes than more developed nations. Thus, there is some presumption that as a country develops over time the composition of its tax revenue would gradually shift in favour of direct taxes. It is urgent to increase the tax-net rather than enhance the tax-net.

**Weaknesses in Tax Administration:** The performance of the tax administration in India has been poor by international standards and has been deteriorating over the years. A recent study on the subject identifies the following as the causes of this:

- Information system. It is primitive and tamper-prone.
- Organisational structure. Functional specialisation is lacking leading to failure to integrate various information sources available in assessments and prosecution.
- Manpower policies. No serious efforts have been made to adopt incentive systems that induce tax officials to detect or attempt to prosecute tax evasion.
- Penalty and prosecution. These are increasingly oriented towards the punishment of technical violations rather than tax evasion.

**Pervasive Controls:** The controls violate basic economic law of demand and supply and create artificial scarcities by curtailing production, and (or supply) by inducing excessive demand by purchasers. They become a bee-hive of black income dealers, and producers in black markets; administrators of controls get their share in black incomes.

**Public Expenditure Programmes:** The black-market economy has also received sustenance from the poor design and faulty administration of many public expenditure programmes in India, usually through illegal leakages in these expenditures. Public savings have been cheated of taxes on these ill-gotten income, and the programmes' unit costs have also increased.

**Inflation:** Inflation generates black income in several ways.

- With a progressive income (and wealth) tax structure, defined with respect to nominal values, inflation increases the effective burden of taxation at any given level of real income (and wealth), and hence the incentive to evade.
- General inflation encourages illegitimate transactions. It is usually accompanied by pronounced scarcities and windfall gains in certain sectors which are unlikely to be fully declared to the tax authorities.
- Inflation hits hard fixed salaried income groups which include government servants. The pinch of inflation reduces their real income and as such they start misusing their official position by accepting bribes, etc, This generates black money.

**Political finance** It is widely believed that black money has become an important operational component of the Indian economy with many diverse links with the political system. The functioning of the political parties and system of election laws had been identified as a significant factor in black income generation by the various expert committees.

**Standards of Public Morality:** There has been a general deterioration in our moral standards. We may quote Prof B.B. Bhattacharya in this context, when he remarks: "Before 1991, money making was not considered a virtue. The significant change since liberalisation is that being rich is now all important and people, whether a professor, a musician or an industrialist, are evaluated in income earnings". This change is motivating people to be corrupt.

**High Cash-intensity:** The cash-GDP ratio in India, called cash—intensity, works out to about 10 per cent (against 3 to 4 per cent in advanced countries like UK, France, Switzerland, Germany, Japan, Belgium, Netherlands, etc.). The greater the cash transactions in an economy, the greater is the scope for money laundering without detection.

In addition, a peculiar phenomenon which is associated with the black money is the constant interchange between the black and white economies. The extent of this change too is very high. Various methods are adopted to convert black money into white and *vice-versa*.

## 10.5 Effects of Black Economy

Effect of black money on the state of economy can broadly be discussed under the following heads:

**Misinformation About the Economy:** The most obvious effect of substantial black money is misinformation about the actual state of the economy because it remains outside the purview of the economic policies. The presence of a sizeable black money casts doubts on the validity of the data on national income estimates, distribution of incomes, consumption, savings and the distribution of investment between public and private sectors. The economic planning loses effectiveness and important economic decisions are rendered meaningless because they are based on macroeconomic indicators which ignore the large black money component.

**Impact on Fiscal System:** Evasion of taxes has serious consequences for the economy's fiscal system. The most obvious effect is that the Government is deprived of large amounts of tax revenue.

The long-run consequence of such revenue loss is to reduce the built-in elasticity of the tax system. To raise a given target of revenue the Government is obliged to depend increasingly on discretionary hikes in tax rates or to expand the array of taxes. Both the measures have undesirable effect on the economy. While, as the first measure gives inducement to avoidance and evasion of tax, the second measure is bound to make an already complex tax structure more complicated.

**Implications for Resource Allocation:** It distorts resource allocation in the economy and often leads to wasteful use of money. Black money leads to conspicuous consumption and in turn results in the diversion of large funds to unproductive channels which ultimately put the economy out of gear.

**Effects on Income Distribution:** The household with a higher proportion of black income are more likely to understate their true incomes and to do so to a greater degree. With the given progressive structure of income taxation, the incentive to make black income through under statement of legal source incomes clearly increases with increase in income. So we should expect richer households to earn proportionately greater black incomes through this means. In this way, the distribution of income becomes even more skewed in favour of the rich with the growth of black money. The last manifestation of this is the Report of the IMF that over Rs. 1,800 crores are stashed away illegally in secret accounts in one country, Switzerland, by Indian nationals.

**Implications for Monetary Policy:** As regards stock dimensions of black money it is related to the stock of 'black liquidity'. The stock of 'black liquidity' is defined as the accumulation of black savings (from black incomes) in the form of cash and other readily convertible assets such as gold and silver. It is this 'black liquidity' which creates a lot of problems for monetary authorities to regulate the economy. Even the selective credit control measures which aim at regulating the flow of credit into particular uses and diverting credit from the less urgent to the more urgent uses in the economy are rendered ineffective owing to the existence of sizable 'black liquidity' in our country. In fact, it renders all the anti-inflationary policies of the monetary authorities ineffective.

**Black Income and Inflation:** Black income is more a cause and less an effect of inflation. Black operation lie at the root of fiscal deficit of the government, which is largely responsible for "excessive" increases in high-powered money and so in money supply in India year after year.

Above all, what Wanchoo Committee observed more than three decades ago still holds true: "One of the worst consequences of black money and tax evasion is, in our opinion, their pernicious effect on the general fibre of society. They put integrity at a discount and place a premium on vulgar and ostentatious display of wealth. It is, therefore, no exaggeration to say that black money is like a cancerous growth in the country's economy which, if not checked in time, is sure to lead to its ruination."

### **10.6 Remedies**

The various measures adopted by the government to deter income tax evasion and unearth black income can be studied under three parts, viz. (1) measures to deter tax evasion, (2) measures to unearth black money, and (3) new measures for dealing with black money.

#### **Measures to Deter Tax Evasion**

The statutory obligations of taxpayers include compulsory filing of tax returns by everyone with a taxable income, compulsory maintenance of accounts by businessmen and professionals and their compulsory auditing if income or turnover exceeds a specific limit, compulsory canalising of transactions involving payment exceeding Rs. 20,000 through banks, etc. However, in actual sense, these statutory provisions have not made much difference. The self-employed continue to escape the tax net either by not filing returns or by filing false returns with grossly under reported incomes.

#### **Use of PAN**

All income-tax payers are required to get a permanent account number (PAN) from the income tax department. A provision has been made for the compulsory mention of PAN or GIR in certain high value transactions. With increased usage of computerisation the data will be fully utilised for increasing the tax base and for preventing the leakage of revenue.

### **Surveys**

To bring new assesseees into the tax net and strengthen the information base for the detection of tax evasion by existing assesseees, a general survey is conducted by the income tax department. While the surveys have increased substantially the number of taxable new assesseees each year, the realised gain is much below the expected potential.

### **Tax Raids and Seizures**

Raids are conducted from time to time, by the tax enforcement machinery, on the premises of the people who are suspected of possessing black money. After the raids, wide publicity is usually given to the amount of money, or other assets that are seized. But a large part of these have to be returned to the owners, presumably because acceptable evidence incriminating the owners cannot be produced in the court of law. Hence, raids fail to make the desired impact.

### **Penalties and Prosecutions**

To discourage tax evasion, tax laws also provide for monetary penalties and for the prosecution (and imprisonment) of tax evaders. However, in actual practice, penalties have been imposed on only a very small proportion (less than one per cent) of total Assessments and these, too, have been pitifully small.

### **The Settlement Commission**

Following the recommendations of the Wanchoo Committee (1971), the Settlement Commission was established in 1976. Its objective was to provide a mechanism for the quick and final disposal of those cases where a tax evader was willing to make a confession and face the consequences.

### **Monitoring of Banks' Transactions**

In a bid to curb black money transactions in the banking system, the RBI has directed all commercial banks to submit details of all cash deposits and withdrawals of Rs. 10 lakh and above to the central bank.

It is urgent to release the country from the octopus grip of a black economy so that a healthy foundation of economic growth can be laid amidst a globalised world.

**Exercise :**

1. Define poverty in “absolute” and “relative” terms. Depict poverty as measured in the Lorenz Curve shown in the diagram.
2. Describe how the economy is usually said to comprise in three sectors. How this division in three sectors matches with the level of urbanization?
3. What do you understand by ‘informal sector’ in an economy? Explain how the growing urbanization lead to an informal sector in the developing countries.
4. What do you understand by ‘parallel economy’? How does it arise?
5. What are the effects of a parallel economy or black economy and how to combat it in the situation prevailing in our country?
6. Write short notes on :-
  - (a) Full employment
  - (b) Illegal sector
  - (c) Black income



# BOOK KEEPING AND ACCOUNTANCY

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## **ACKNOWLEDGEMENT**

Centre for Valuation Studies, Research & Training Association (CVSRTA) is thankful to the author of this subject Mr. Saumil Surti for preparing the study material, editing the same and also surrendering his right in favor of CVSRTA to get copyright in favor of CVSRTA. CVSRTA is also thankful to Prof. R.M. Patel for rendering the service as subject editor.

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## SECTION I

### ACCOUNTING CONCEPTS AND CONVENTIONS

#### Introduction

The basic purpose of accounting statements like the final accounts, cash flow statements etc is to provide financial information about an organization to the interested parties like investors, financial institutions, government, owners, management and even employees. Comparison of various organizations in respect of performance, profitability etc is possible only when there is complete uniformity in the preparation of the accounting statements or else there will be total confusion. In order to have consistency, financial accounting operates within the framework of what is called, as Generally Accepted Accounting Principles or what is popularly known as GAAPs.

#### Accounting principles

Accounting Principles refer to general laws or rules adopted in accounting as a guide or action or as the basis of conduct of practice. It should have universal acceptability. The language of accounting should be understandable to the persons to whom the communication is made. In order to communicate the message in the same sense in which it is sought to be conveyed to them, a number of principles have been agreed upon and followed by accountants in writing of accounts and in the presentation of financial statements. **It is therefore essential to standardize the accounting principles and policies in order to ensure Transparency, consistency and comparability. Accounting principles can be divided in to Accounting concepts and Accounting conventions.**

### Accounting concepts

Accounting concepts generally mean postulates, assumptions or conditions upon which accounting are based. They have developed to make accounting convey the same meaning to all the people as far as practicable. There are a number of accounting concepts agreed upon by accountants. They are as follows –

- 1) **Concept of Entity** – For accounting purposes the owner of the business is treated as separate from the business, there can be transactions between the owner and his own business. For example every person acts in two different capacities i.e. at home Ramesh and in business Ramesh & co. This concept helps in keeping private affairs of the proprietor away from the business affairs.

Thus if proprietor invests Rs.1,00,000/- in the business, it is deemed that the proprietor has given Rs.1,00,000/- to the business and it is shown as liability in the books of the business because business has to ultimately repay it to the proprietor. Similarly if proprietor withdraws Rs.10,000 from business it is charged to him.

- 2) **Concept of Dual aspect** – This is the basic concept of accounting. As per this concept, every business transactions have a dual effect. For **example** Manohar started business with cash Rs.1,00,000/- there are two effects of this transactions: Asset Account and Capital Account. The business gets Asset (Cash) of Rs.1,00,000 and on the other hand the business owes Rs.1,00,000 to Manohar as capital. This can be expressed in the form of an equation as follows:-

Capital + Liabilities = Assets.

$$1,000 + 2,000 = 3,000$$

Thus the total Assets are always equal to total liabilities.

#### BALANCESHEET

Liabilities	Rs.	Assets	Rs.
Capital (Pc)	1,00,000	Assets	1,10,000
Liabilities (Pc)	10,000	(Pd & Rd)	
	<b>1,10,000</b>		<b>1,10,000</b>

**Note:** - In other words the total of both sides of the balance sheet should tally.

The Balance Sheet or financial statement which is part of accounting tallies because of the following reasons:-

- Increase of one asset and Decrease of another asset.
- Increase of one liability and Decrease of another liability.
- Increase of an asset and simultaneously increase of a liability.
- Decrease of an asset and simultaneously decrease of a liability.

- e. Increase of a liability and simultaneously increase of an asset.
- f. Decrease of a liability and simultaneously Decrease of an asset.

3) **Concept of going concern** – It is assuming that business will continue for a fairly long time, unless and until it has entered into a state of liquidation. It is as per this assumption that the accountant does not take into account forced sales value of assets while valuing them. Similarly, depreciation on assets is provided on the basis of expected lives of the assets rather than their market values.

Since the concern is kept continuously alive for a long period of time, financial and accounting policies are directed towards maintaining such continuity of activity.

**Example:** It is generally assumed that the business will not liquidate in the near foreseeable future because of going concern.

4) **Realisation concept** – According to this concept profit should be accounted only when it is actually realized. Revenue is recognized only when a sale is affected, or the services are rendered. A sale is considered to be made when the property in goods passes to the buyer and he is legally liable to pay. However, in order to recognize revenue receipt of cash is not essential. Even credit sale results in realisation as it creates a definite asset called Account Receivable.

Incomes like commission, interest, rent etc are shown in profit and loss account on accrual basis though they may not be realized in cash on the date of preparing accounts.

**Example:** A machine was purchased for Rs.1,00,000 on 01.01.2006 and on 31.12.2006 its net realization value was Rs. 1,50,000. Do you prefer to count this profit? If you count which concepts will be violated – Realisation.

5) **Accrual concept** – The accrual system is a method whereby revenues and expenses are identified with specific periods of time like a month, half year or a year. It implies recording of revenues and expenses of a particular accounting period whether they are received/paid in cash or not. Under cash system of accounting, the revenues and expenses are recorded only if they are actually received or paid in cash irrespective of the accounting period to which they belong to. But under accrual method, the revenues and expenses relating to that particular accounting period only are considered.

6) **Concept of accounting period** – Though the life of the business is indefinite, the measurement of income and studying the financial position of the business after a very long period would not help in taking timely corrective steps or to enable periodic distributions of income to proprietor with reasonable safety. Therefore it is necessary for the concern to stop at regular intervals and see back how it is fairing.

An accounting period is the interval of time at the end of which income statements and financial position statements are prepared to know results and resources of the business. Although shorter periods are frequently adopted for purposes of comparative studies, the normal accounting period is twelve months.

**Example:** Economic life of an enterprise is split into the periodic interval as per going concern concept.

- 7) **Money measurement concept** – In accounting everything is recorded in terms of money. Events or transactions which cannot be expressed in terms of money are not recorded in the books of accounts, even if they are very important or useful for the business. Purchase and sale of goods, payment of expenses and receipt of income are monetary transactions which find place in accounting etc. death of an executive, resignation of a manager are the events which cannot be expressed in money.

**Example:** Human assets have no place in accounting records is based on Money measurement.

**Example:** According to money measurement concept, currency transactions and events are recorded in the books of accounts in the ruling currency of the country in which transaction takes place.

- 8) **Cost concept.** – According to this concept cost price is the basis for recording the asset in the books of accounts. The current market value or realizable value shall not be considered in recording the capital assets. The cost means the historical cost at which these assets are actually acquired. This cost generally means the expenditure incurred to bring an asset in to its present working condition and location. Their current realizable value may be more or less than cost, but it should be ignored. It should be noted that cost concept does not specify that asset should appear in the balance sheet as cost only. It will be recorded at cost price and then subsequently depreciated as per the rates prescribed.

a) **Example:** “Assets should be valued at the price paid to acquire them” is based on Cost concept

b) **Example:** If a machinery is purchased for Rs. 1,00,000 the asset would be recorded in the books at Rs. 1,00,000 even if its market value at that time happens to be Rs. 1,40,000. In case a year after, the market value of the asset comes down to Rs. 90,000 it will ordinarily continue to be shown at Rs. 1,00,000 and not Rs. 90,000 due to Cost concept.

**Cost attach concept** – An asset is recorded at its cost and cost is calculated after considering cost attach concept. According to this concept, the expenditure incurred in connection to an asset should be considered for making valuation of its cost. It means individual costs are not relevant but all the related costs should be attached or merged. After attaching or adding such related costs, it is possible to have meaningful information regarding actual cost.

**a) Example:**

Expenditure incurred for bringing the asset in to working condition should be added to the cost of asset because they are related to each other. But expenditure incurred for maintaining the asset in working condition is not added to the cost of the asset because such expenses are recurring and they are not related to the cost of assets.

**b) Example:**

For calculating cost of finished goods not only the cost of raw materials is considered but also the cost of wages and other manufacturing expenses are required to be considered as they are related to each other.

**c) Example:**

RPG Ltd. purchased equipment from PQR Ltd. for Rs. 50,000 on 1<sup>st</sup> April, 2005. The freight and carriage of Rs. 2,000 is spent to bring the asset to the factory and Rs. 3,000 is incurred on installing the equipment to make it possible for the intended use. The market price of machinery on 31<sup>st</sup> April, 2006 is Rs. 60,000 and the accountant of the company wants to disclose the machinery at Rs. 60,000 in financial statements. However, the auditor emphasizes that the machinery should be valued at Rs. 55,000 (50,000+2,000+3,000) according to historical cost concept.

**d) Example:**

Mr. A purchased a machinery costing Rs. 1,00,000 on 1st October, 2005. Transportation and installation charges were incurred amounting Rs. 10,000 and Rs. 4,000 respectively. Dismantling charges of the old machine in place of which new machine was purchased amounted Rs.10,000. Market value of the machine was estimated at Rs. 1,20,000 on 31st March, 2006. While finalizing the annual accounts. A values the machinery at Rs. 1,20,000 in his books. So cost concept was violated by A.

**e) Example:**

Any expenses such as Tea, break fast etc is incurred at the time of Travelling should be debited to Travelling expenses account and not to the sundry expenses account as per cost attach concept.



9) **Periodic matching of cost and revenue concept** – This concept is based on accounting period concept. Making profit is the most important objective that keeps proprietor engaged in the business activities. It is necessary to match revenues of that period with the expenses of that period. Profit earned by the business during a period can be measured only when the revenue earned by the business during period can be compared with the expenditure incurred to earn that revenue. The question when payment was made/received is irrelevant. Therefore as per this concept, adjustments are made for all outstanding expenses, prepaid expenses, income receivable and income received in advance.

a) **Example:** Mohan purchased goods for Rs. 15,00,000 and sold 4/5<sup>th</sup> of the goods amounting Rs. 18,00,000 and paid expenses amounting Rs. 2,70,000 during the year, 2005. He paid Rs. 5,000 for an electricity bill of Dec, 2004 and advance salaries amounting Rs. 15,000 was paid for the month of Jan. 2006. He counted net profit as Rs. 3,50,000. The profit calculated by him is correct according to matching concept.

b) **Example:** The determination of expenses for an accounting period is based on the principle of Matching

10) **Verifiable objective evidence concept** – According to this concept all accounting transactions should be evidenced and support by objective documents. These documents include invoices, contracts, correspondence, vouchers, bills pass book, cheque books etc. such supporting documents provide the basis for making accounting entries and for verification by the auditors later on. This concept also has its limitations. For example, it is difficult to verify internal allocation of costs to accounting periods.

**Conventions of Accounting** – Accounting conventions refer to customs. Traditions, usages or practices followed by accountants as a guide in the preparation of financial statements. They are adopted to make the financial statements more clear and meaningful. Following are some of the accounting conventions followed

1) **Convention of Disclosure** – This means that the accounts must be honestly prepared, and they must disclose all material information. The accounting reports should disclose full and fair information to the proprietors, creditors, investors and others. This convention is especially significant in case of big business like Joint Stock Company where there is divorce between the owners and the managers. Therefore, The Indian companies Act 1956 not only requires that the accounts of the company, but it has also prescribed the contents and forms of profit and loss account and Balance sheet.

However, it does not mean that all information of any kind is to be included in accounting statements. The term disclosure only implies that there must be a sufficient disclosure of information's which is of material interest to proprietors, present and potential creditors and investors. Disclosure concept gives priority to substance over legal form of a transaction.

- 2) **Convention of materiality** – The accountant should attach importance to material details and ignore insignificant details. If this is not done accounts will be overburdened with much minute details .as per the American accounting association an item should be regarded as material, if there is a reason to believe that knowledge of it would influence the decision of informed investor. Therefore, keeping convention of materiality in view, unimportant items are either left out or merged with other items. Some items are shown as foot notes like contingent liabilities, market value of investment etc. however as item may be material for one purpose but immaterial for another or material for one year but immaterial for another year.

a) **Example:** The cost of a small calculator is accounted as an expense and not shown as an asset in a financial statement of a business entity due to Materiality concept.

b) **Example:** omission of Paise and showing the round figures in financial statements is based on materiality.

- 3) **Convention of consistency** – The comparison of one accounting period with the other is possible when the convention of consistency is followed. It means accounting from one accounting period to another. For example, a company may adopt straight line method, written down value method or any other method of providing depreciation on fixed assets. But it is expected that the company follows a particular method of depreciation consistently. Similarly, if stock is valued at cost or market price whichever is less, this principle should be followed every year. Any change from one method to another would lead to inconsistency. However, consistency does not mean non-flexibility. A change in accounting policy is justified to comply with accounting standard, to ensure more appropriate presentation of the financial statement of the enterprise and to comply with the law.

a) **Example:** The accounting policies once adopted are not changed unless there is an urgent need for such change is based on Consistency.

b) **Example:** Change in the method of depreciation should be done only if it is required by some statute and change would result in appropriate presentation of financial statement.

- 4) **Convention of conservatism**- It refers to the policy of playing safe' A per this convention all prospective losses are taken in to consideration but not all prospective profits. In other words anticipate no profits but provide for all possible losses. However this convention is being criticized on the ground that it goes not only against the convention of full disclosure but also against the concept of matching costs and revenues. It encourages creation of secret reserves by making excess provision for depreciation, bad and doubtful debts etc. the income statement shows a lower net income and the Balance sheet overstates the liabilities and understates the assets. The convention of conservatism should be applied cautiously so that the results reported are not distorted. Some degree of conservatism is inevitable where objective data is not available.

**a) Example:** A businessman purchased goods for Rs. 25,00,000 and sold 70% of such goods during the accounting year ended 31<sup>st</sup> March, 2005. The market value of the remaining goods was Rs. 5,00,000. He valued the closing stock at Rs. 5,00,000 and not at Rs. 7,50,000 as per concept of conservatism.

**b) Example:** A businessman purchased goods for Rs. 25,00,000 and sold 80% of such goods during the accounting year ended 31<sup>st</sup> March, 2005. The market value of the remaining goods was Rs. 4,00,000. He valued the closing stock at cost. He violated the concept of conservatism.

**Following are the other examples of application of conservatism**

- i. Making provision for doubtful debts and discount on debtors.
- ii. Not providing for discount on creditors.
- iii. Valuing stock in trade at cost or market price whichever is less.
- iv. Creating provision against fluctuation in the price of investments.
- v. Showing joint life policy at the surrender value and not at the paid-up amount.
- vi. Amortization of intangible assets like goodwill which has indefinite life.

**Fundamental accounting Assumption**

- a) Going concern
- b) Consistency
- c) Accrual

If nothing has been written about the fundamental accounting assumption in the financial statements then it is assumed that they have already been followed in their preparation of financial statements. However if any of the above mentioned fundamental accounting assumption is not followed then this fact should be specifically disclosed.



## SECTION II

### BOOK KEEPING AND ACCOUNTANCY

#### 1.0 Meaning of Book Keeping:

Book-keeping means an art of keeping or maintaining or recording business transactions in a scientific and systematic manner. R.N. Carter states, "Book-keeping is a science and an art of correctly recording in the books of accounts all those business transactions that result in transfer of money or money's worth."

Indian version of book keeping is known as "Deshi-nama" in various parts of our country.

Book keeping is a process in which various business transactions are, classified and systematically recorded in a set of books. It has basic rules, style and format for drafting, recording and maintaining the business transactions. Thus, book keeping is an art as well as science, of systematically recording business transactions on the basis of well-defined rules and principles in the books of accounts which calls for application of human skills, knowledge, training and experience.

#### 1.1 Features:

Key features of Book-Keeping are :

- It is an art of recording business transactions scientifically.
- There must be a documentary support for each and every transaction.
- The system of recording should be universal.
- The recording is made of monetary transactions only. It means the transaction must involve money or money's worth. Non-monetary transactions cannot be recorded.
- Recording of transactions is made in a given set of books only.
- Recording is prepared for a specific period and presented for future references.

#### 1.2 Objectives of Book Keeping:

- To maintain the permanent records of the business transactions for various purposes,
- To ascertain profit earned or loss sustained in the business,
- To know the financial position of the business, capital invested into the business, assets accumulated and acquired and liabilities owed etc.

- To know the exact amount due from debtors and the exact amount payable to creditors.
- To know the exact amount of taxes due to the Government and to do tax planning for, the business ventures.
- To detect and prevent errors and fraud committed by others in the business.
- To provide valuable business information to various groups of users.
- To take important decisions on important business matter.
- To know progress made by business and to measure efficiency of business.

### 1.3 Importance of Book-keeping:

Book-keeping is important to every business concern for the purpose of effective control over the business. The information supplied by the accounts department helps the management in decision-making. The information made available by the accounting system is of great importance not only to the owners but also to others connected directly or indirectly with the business.

Following explain the importance of Book-Keeping:

- **Facilitates Planning:** Proprietors have to plan their business operations for years to come. Book-keeping generates valuable information about production, sales, expenses and incomes which helps planning.
- **Decision-making:** Management has to take valuable decisions about business. Book-Keeping makes available necessary information which facilitates decision making.
- **Controlling:** Management can control business operations with the help of various types of budgets. Book-Keeping and Accounting helps the management in this regard also.
- **Aid to Memory:** Human memory has certain limitations. A businessman cannot remember all the business transactions. Book-Keeping helps the businessman in retrieving required information. Due to Book-Keeping, it is not necessary to remember all the transactions.
- **Comparative Study:** Proper record helps a businessman to compare one year's performance with that of the other year. Comparative study reveals the loopholes, which enables a businessman to take proper corrective action.
- **Helpful in getting discharge:** In case of insolvency, a proprietor can get discharge from the court on the basis of record of business transactions,

- **Evidence in litigation:** The court as evidence accepts Systematic record in case any dispute arises. The court can decide the matter on the basis of records only.
- **Sale of business:** In case the business is sold out, the purchase consideration can be decided on the basis of the accounts maintained.
- **Settlement of tax liability:** Business is subject to many taxes viz. Income tax, sales tax, property tax etc. Proper record of transactions would enable a businessman to fix up the amount of his tax liability and discharge it.
- **Helpful in getting loans:** A businessman may require loans from banks for financing his expansion scheme. Properly kept accounts can convince the banks about financial soundness of business.
- **Protection against theft and dishonesty:** A businessman can protect himself against theft and dishonesty of employees by keeping books of accounts in a systematic manner. He can exercise greater control on his finance through systematic recording only.

#### 1.4 The Utility of Book Keeping:

Utility means usefulness. Book-keeping is most useful since it provides correct and valuable information on financial matters of the business.

- **Businessman or Owner:** The businessman or owner who invests his money and assets into his business must know profitability, financial stability and solvency of his business concern at any given point of time. This can be ascertained only from the books of accounts. It would not be possible for the owner to carry out his business without systematic records of the business transactions. He can take business decisions more realistically on the basis of information provided by the books of accounts.
- **Comparative study:** By comparing the financial statements of past years with current years and with the financial statements of similar other firms' management or owner of the business can judge whether the business is making progress or not and accordingly introduce changes in the business to increase profitability.
- **Management:** In the case of joint stock company & co-operative society there is division of ownership and management. Ownership remains with the shareholders and management looks after the business activities. It is therefore necessary for the management to provide financial information from time to time to shareholders. From the accounting records manager can provide timely information to different parties to gain their confidence.

The manager can take proper decision of various activities carried out by the business based on the information supplied by the accountants. By studying different financial statements, he can judge efficiency of the business and project the future of the business. In other words, it helps the management in planning, controlling, decision making and managing the overall business.

- **Creditors & Lenders:** Book keeping has great utility to creditors. The creditors get valuable and correct information from the different financial statements published by the business concern. On the basis of such information they can decide the credit worthiness of the concern.
- **Investors:** The investors like shareholders, debenture holders, creditors, partners or any prospective investors can take decision by studying the books of accounts whether to invest into the business concern or not.
- **Trade Union:** Accounts provide valuable information to employees, trade unions of the respective business concern about the its business dealings.
- **Government:** Government authorities collect taxes like Sales tax and Income tax and revenue collecting departments can accurately impose and collect taxes from the business on the basis of information provided by the books of accounts.

## 2.0 Meaning of Accountancy

Accounting is the broader concept than book keeping. Accountancy which includes book keeping is an entire process of classifying, summarizing and interpreting business transactions.

Kolher defines “Accountancy refers to the entire body of the theory and process of accounting”

### 2.1 Basis of Accounting:

- A. Cash Basis Accounting** - is the basis of accounting wherein only cash transactions are recorded. i.e. income is accounted when cash is actually received and expense is recorded when cash is actually paid.
- B. Accrual Basis Accounting** – is the basis of accounting wherein cash as well as credit transactions are recorded. Income is recorded when it is earned and expenses are recorded when it becomes payable. The basic difference in Accrual basis of accounting is that the income and expenses are accounted for at the point of accrual i.e. earned or incurred irrespective of whether such income or expense is received or paid.

## 2.2 Branches of Accounting

There are mainly three major branches of Accounting

- Financial Accounting
- Cost Accounting
- Management Accounting

## 2.3 Difference between Book Keeping and Accountancy

No.	Book Keeping	Accountancy
1.	It is mainly related to identifying, measuring, and recording, financial transactions	It is the process of summarizing, interpreting, and communicating financial transactions which were classified in the ledger account
2.	Management can't take a decision based on the data provided by bookkeeping	Depending on the data provided by the accountants, the management can take critical business decisions
3.	Its objective is to keep the records of all financial transactions proper and systematic	Its objective is to gauge the financial situation and further communicate the information to the relevant authorities
4.	Financial statements are not prepared as a part of this process	Financial statements are prepared during the accounting process
5.	It doesn't require any special skill sets	It requires special skills due to its analytical and complex nature
6.	The process of book-keeping does not require any analysis	Accounting uses book-keeping information to analyze and interpret the data and then compiles it into reports
7.	Basically there are two types of bookkeeping - Single entry and double entry bookkeeping	There are two types of accounting Cash basis accounting and Accrual basis accounting. The accounting department does preparations of a company's budgets and plans loan proposals



### 3.0 Some Key Terms and Definitions

#### 1. Business:

Any activity carried out by a person with a motive to earn profit is called Business.

#### 2. Goods:

Goods are Commodities, which are bought or sold by a businessman for the purpose of business; or Goods are Commodities in which a trader deals. For a particular Commodity to be known as Goods it should satisfy following two conditions:

- a) It should be purchased for the purpose of selling, and
- b) It should be his regular business.

Accounting term for goods in different situation:

**(i) PURCHASES:**

When goods are bought it is known as purchases

**(ii) SALES:**

When goods are sold it is known as sales.

**(iii) SALES RETURN:**

If sold goods are returned by the customer it is known as sales Return or Return Inwards.

**(iv) PURCHASE RETURN:**

If goods purchased are returned to supplier it is known as purchase Return or Return onwards.

### 3. Transactions:

A Transaction is an exchange of goods or things or services on cash or credit term (Basis).

For example:

- i) Purchase of T.V. on Cash.
- ii) Doctor's fees paid in Cash.
- iii) Lawyer's fees adjusted against tuition fees.
- iv) Purchase of Motor Cycle on Credit.

#### Transaction can be of two types:

1) **Barter Transaction:** When goods are exchange for goods it is called as Barter Transaction. In this type of transaction money is not used as a medium of exchange. As value of the transaction cannot be ascertained in terms of money, this type of transaction cannot be recorded in the books of accounts.

2) **Monetary Transaction:** When goods are exchanged for money or money's worth it is called as Monetary Transaction.

Monetary Transactions are further grouped on the basis of mode of payment. They are:

- ❖ **Cash Transaction:** Cash transaction is an immediate exchange of goods or assets or services for cash. In Cash transaction relation between parties comes to an end immediately.
- ❖ **Credit Transaction:** Credit transaction is an exchange of goods, services or things on credit basis. In this type of transaction goods, things or services are received / given now but payment is to be made / received in future. In credit transaction, the exchange takes place at different times and relation between parties will continue in future.

#### 4. Assets:

Properties owned by a person and used in Business to earn profit is called as assets. e.g. Cash & Bank Balance, Machinery, Furniture, Motor Vehicles etc. Assets can be (a) Fixed Assets (b) Current Assets (c) Tangible Assets (d) Intangible Assets

- **Fixed Assets** are those assets, which are held in the business for a long period of time, and they are generally used for manufacturing goods and services. For instance, Land & Building, Plant & Machineries, Motor Vehicles etc. are fixed assets of enterprise.
- **Current Assets** are held in the business for a very short period and they are used for maintaining liquidity of business. For instance, cash in hand, bank balance, stock of goods in hand, amount receivable from debtors etc. are current assets of the business enterprises.
- **Tangible Assets** are those, which can be seen and be touched and felt.
- **Intangible Assets** are those assets, which cannot be seen, touched and felt, but can be sold and converted into cash. Use of tangible assets enables its owner to earn income in the form of royalty. For instance, goodwill, copyrights, patents, trademarks, etc. are called intangible assets.

#### 5. Liabilities:

It is the amount owed/payable by a Businessman to other persons like suppliers of materials, Bank or other parties from whom he has borrowed money for business purpose. Liabilities arise because the Businessman is not able to make immediate payment for goods purchased or services taken or money borrowed. Example of Liabilities is Bank Loan, Creditors, Unpaid expenses etc.

Liabilities are classified as short-term liabilities and Long-term liabilities.

- ❖ **Short-term liabilities** are those obligations or debts, which are to be paid by business within a period of one year. For instance, Bank Overdraft, sundry creditors, bills payable etc. are called short-term liabilities as they are to be paid generally within a year.
- ❖ **Long-term liabilities** are those obligations or debts which are payable by a business after one year. For instance, capital, bank loan, debentures, loan taken financial institution like LIC, GIC, FCI, ICICI, etc. are called long term liabilities as they are to be paid by business after one year.

**6. Debtor:**

A debtor is a person to whom another person has sold goods on credit.

**OR**

He is a person to whom another person has given a loan.

In other words, a debtor is a person who has to pay some amount to another person or who owes (has to pay) something to another person.

**OR**

A debtor is a person from whom we have to receive some amount.

For Examples:

- (a) If we sell goods to A on credit or give a loan to him, he will be our debtor, since he owes (has to pay) amount to us.
- (b) If Mr. Clinton sells goods to George Bush than George Bush is known as Debtor of Mr. Clinton.

**7. Creditor:**

A Creditor is a person who has sold goods to another person on Credit.

**OR**

He is a person who has given a loan to another person.

In other words, a creditor is a person who has to receive some amount from another person

**OR**

He is a person to whom one has to pay something.

**OR**

A Creditor is a person to whom we have to pay some amount.

For example:

- a) If we buy goods of Rs. 1,000 from Mr. Kapil Dev he will be called our Creditor, because we have to pay Rs. 1,000 to him.

b) If Mr. Clinton sells goods to George Bush then Mr. Clinton is known as Creditor of George Bush.

**8. Capital:**

Capital is the total amount invested in the business by the owner. It is the amount, which belongs to the owner himself. The Capital of a business is the amount receivable by the owner from the business.

**OR**

It is the amount payable by the business to the owner. Capital is a liability of the business. In the accounting Sense Capital is the Excess of Assets Over Liabilities.

The Equation will be: **Capital = Assets - Liabilities**

For example: If the assets in a business amount is Rs. 70,000 and the Liabilities amount is Rs. 20,000 then Capital of businessman will be Rs. 50,000. The owner has to receive the amount from the business. Capital may be invested in Cash or Kind.

**9. Drawings:**

It is the amount withdrawn by a proprietor from business for his personal use. It can be in cash or kind i.e. goods. Thus word 'drawings' is just opposite to word 'capital' in meaning. Drawings refer to total amount of cash and goods withdrawn by proprietor from the business from time to time for self-use or family use. Drawings are always adjusted with capital.

**10. Solvent:**

A person is said to be Solvent when he is able to pay off all his Liabilities. In other words, a person is said to be Solvent when his assets are equal to or more than his Liabilities.

**11. Insolvent:**

A person is said to be insolvent when he is unable to pay off all his Liabilities. In other words, a person is said to be insolvent when his Liabilities are more than his Assets.

**12. Revenue / Income:**

Revenue is the amount received or receivable when the firm sells its goods or products. For example: If a businessman sells goods of Rs. 5,000 on Cash and Rs. 10,000 on Credit then the total revenue of the business is Rs. 15,000.

Income: It is the amount received or receivable in return of Services rendered.

Example: Amount received by way of Rent, Commission, Interest etc.

So professionals like Doctors, Lawyers etc. earn an Income and not revenue.

**13. Expenses:**

It is the amount spent on manufacturing goods or for selling of goods and for rendering services. Therefore, expenses can be classified into:

- i) Expenses on purchase of goods or manufacturing of goods.  
Examples: Wages, Power & Fuel, Carriage Inward, Purchase of Raw Material.
- ii) Expenses on services received by the business.  
Examples: Salaries, Printing & Stationery, Advertisement etc.

**14. Profit:**

Profit is the excess of revenue or income over expenses during a particular period. In terms of equation it can be written as: Profit = Revenue or Income – Expenses

**15. Loss:**

Loss is the excess of expenses over revenue or income, during a particular period. In terms of equation: Loss = Expenses - Revenue or Income

**16. Bad Debts:**

Debts, which are not recoverable, are known as Bad Debts. Bad Debt is a loss which is incurred by the business on account of non-collection of the debt from debtors. It is treated as bad debt when all hopes or chances of recovery of debt are lost.

**17. Journal:**

It is a Book in which daily transactions of the Business are recorded in a chronological order It is also called as book of original entry.

**18. Entry:**

When the transaction is recorded in the Journal it is known as entry. It forms the basis for writing the Books of Accounts.

### 19. On Account:

When the amount is received or paid in part then it is said that payment is made or received on account.

### 20. Discount:

An allowance or benefits, which is given by the seller to buyer or by creditor to debtor, is known as discount. Thus it is the Reduction allowed by seller to buyer. Discount is of two types viz. Trade discount and cash Discount.

TRADE DISCOUNT (T.D)	CASH DISCOUNT (C.D)
1. T.D. is allowed at the time of purchase/sale of goods in bulk/large quantities.	1. C.D. is allowed on prompt payment.
2. T.D. is allowed for cash as well as credit of transactions buying / selling of goods.	2. C.D. is allowed only for cash transaction .
3. % of T.D. is applied on GROSS PRICE (original price of goods) (G.P.) (List price) (Catalogue price)	3. % of C.D. is applied on NET PRICE (N.P.)
4. List Price                    X (-) T/ Discount <u>X</u> Net Price <u>X</u>	4. Net Price                        X (-) C/Discount <u>X</u> Cash Recd./ paid <u>X</u>
5. T.D. is never recorded in the books of accounts	5. C.D. is recorded in the books of accounts.
6. Entry will be passed only at Net Price Goods/Purchase A/c Dr.        X To Cash party A/c                X (At net price)	6. (i) For purchase Goods/Purchase A/c Dr.        X To Cash party A/c                X To Discount Received A/c    X (ii) For Sale Cash A/c Dr.                        X Discounts Allowed A/c Dr. X To Goods /Sales A/c            X

#### **4.0 Double Entry System**

Double Entry System of book-keeping denotes that every business transaction has two-fold effect. There cannot be a business transaction unless it has an effect on at least two accounts or two parties. Whenever a businessman gives something, he gets something else in return of that. In other words, one account receives the benefit and the other account gives the benefit.

The amount of benefit received by one account is equal to the amount of benefit given by the other party. This enables us to record the two effects of any business transaction. Thus, recording this dual aspect of business transactions in the books of accounts is known as Double Entry System of Book Keeping.

##### **4.1 Key Principles of Double Entry System:**

- Every business transaction has two aspects.
- These two aspects involve two accounts
- One account is the receiver of the benefit and the Other account is the giver of the benefit.
- If one account is debited the other account has to be credited with equal amount

There are three steps in recording any financial transaction:

- (1) Deciding as to what accounts are affected.
- (2) Deciding whether to debit or to credit the account.
- (3) Deciding on the amounts to be debited or credited.

##### **4.2 Advantages of Double Entry Book Keeping system:**

- By recording double aspects of each transaction in the books of accounts, it ensures an arithmetical accuracy of accounts.
- This system is helpful to detect, prevent and reduce the frauds.
- If at all any mistake occurs, it can be detected and rectified.
- Exact amount due to us from customers and other parties, and exact amount payable to creditors by us can be known easily from the records maintained as per this system.
- This accounting system keeps complete, accurate and perfect records of business transactions.



- This accounting system is suitable for all types of the business organisation i.e. small scale, medium scale and large scale, public and private business organisation etc.
- This accounting system is helpful to prepare trial balance and final accounts, of the business at the end of the accounting year.
- With the help of this system income statements of current year can be compared with the income statements of previous years and on the basis of that comparison businessman gets information about the variations in incomes and expenses. To control expenses, businessman can adopt different measures.

#### 4.3 Golden Rules of Double Entry Book Keeping System

<b>Rule 1:</b>	<b>Debit what comes in.</b>	<b>Credit what goes out.</b>
<b>Rule 2:</b>	<b>Debit the receiver.</b>	<b>Credit the giver.</b>
<b>Rule 3:</b>	<b>Debit all expenses or losses.</b>	<b>Credit all income or gains.</b>

#### 4.4 Account:

An account is a list of business transactions falling under same description for a given period of time. A systematic and summarised record of business transactions with respect to person, property, loss, gain, income, expense is known as account. Account is generally prepared for one complete year. The word Account in abbreviation can be written as A/c. Accounts are prepared and maintained in the Ledger. Separate Ledger sheet or page is used for each account.

#### 4.5 Classification of Accounts:

Accounts are classified into two main groups as (1) Personal Account and (2) Impersonal Account,

##### (1) Personal Account:

Account of person or account relating to person with which business keeps dealings is called Personal A/c. Therefore, account of an individual, partnership firm, company, club, institution, local authority, association, State Government and Central government with which business keeps dealings is called personal account.

From viewpoint of law persons are classified as (a) natural or living persons and (b) legal or artificial persons. Legal person does not have life, body and soul, but law recognizes it, as a person because all business transactions are done by it in its own name. For instance Bank of India's A/c. is a personal account as Bank of India is a financial institution, which deals in money. It is a legal person. Under the title legal person following institutions and legal bodies are included viz. partnership firm, joint stock company, association, clubs, legal, medical, financial, educational and charitable institutions, Gram Panchayat, District body, State Government, Central Government etc are included. Account of debtor, Account of creditor, Bank A/c, College's A/c, Hospital's A/c, Club's A/c, Partnership firm A/c are called Personal A/c.

**(2) Impersonal Account:**

All accounts other than personal accounts are known as impersonal accounts. In other words, all accounts, which are not personal accounts, are grouped under impersonal account. For instance, Cash A/c, Rent A/c, Wages A/c, furniture A/c are impersonal accounts. Impersonal accounts are classified as (a) Real A/c and (b) Nominal A/c.

**(a) Real Account:** An account of property, or any thing owned and possessed by business is called Real Account. In other words, Real A/c. is that account which relates to assets, objects etc. of the business. For example, Cash A/c, Furniture A/c, Land and Building A/c, Goods A/c, Goodwill A/c, Plant and Machinery A/c are called Real A/c as they relate to Property of the business.

**(b) Nominal Account:** An account relating to business expense, income, gain and loss are called Nominal account. In other words, an account of business expense, business income, business loss or business gain is called Nominal A/c. For instance, Rent A/c. is a Nominal A/c, as rent is an expense if it is paid by business and it is an Income if it is received by business.

Table showing Classification of accounts into Personal Accounts, Real Accounts and Nominal Accounts is given below:

Personal Accounts	Real Accounts	Nominal Accounts
1. Capital A/c	1. Stock of goods A/c	1. Bad debts A/c
2. Bank of Baroda's A/c	2. Cash A/c	2. Interest A/c
3. Mr. Kamlakar's A/c	3. Goods A/c	3. Discount A/c
4. D.G.T. Junior college's A/c	4. Building A/c	4. Loss of stock by fire A/c
5. X.Y.Z. Partnership Firm's A/c	5. Goodwill A/c	5. Printing & Stationery A/c
6. Jay's A/c	6. Investment A/c	6. Salaries A/c
7. Loan A/c	7. Tools A/c	7. Income Tax A/c
8. Debtor's A/c	8. Loose Tools A/c	8. Carriage Inward A/c
9. Creditor's A/c	9. Copy right A/c	9. Carriage Outward A/c
10. Loan from Vijay's A/c	10. Patent A/c	10. Repairs to Machinery A/c
11. M/s. Sunita Textiles A/c	11. Shares A/c	11. Octroi A/c
12. Proprietor's Wife Loan A/c	12. Livestock A/c	12. Taxes A/c
13. Bombay Municipalities A/c	13. Premises A/c	13. Audit Fee A/c
14. Co-operative Stores A/c	14. Leasehold Building A/c	14. Interest on debentures A/c
15. Cricket Club of India's A/c	15. Freehold Property A/c	15. Gas and Light A/c
16. Mahendra & Mahendra Co.'s A/c	16. State Govt. Security A/c	16. Trade Expenses A/c
17. Outstanding Wages A/c	17. Debentures A/c	17. Royalty A/c
18. Prepaid Insurance A/c	18. Stock of Stationery A/c	18. Bank Commission A/c
19. Rent Receivable A/c	19. Bills Receivable A/c	19. Bank charges A/c
20. Unexpired Insurance A/c	20. Motor vehicle A/c	20. Packing Charges A/c
21. Outstanding interest A/c	21. Furniture & Fixtures A/c	21. Brokerage A/c
22. Interest receivable A/c	22. Plant & Machinery A/c	22. Upkeep of Machinery A/c
23. Employees Provident Fund A/c		23. Railway freight A/c
		24. Sales Tax A/c
		25. Publicity A/c
		26. Profit on sale of furniture A/c

### Analysis of Transactions

Transaction	Two A/cs Involved	Types of Accounts	How each aspect is affected	Rule Applicable	Accounts to be debited	Accounts to be credited
STEP I	STEP II	STEP III	STEP IV	STEP V	STEP VI	STEP VII
1. Commenced business with Rs. 15,000/-	Cash	Real	Cash comes in	Debit What comes In	Cash A/c	
	Capital	Personal	Proprietor is the giver	Credit the giver		Capital A/c
2. Purchased goods for cash Rs.1,000/-	Goods	Real	Goods comes in	Debit what comes In	Goods A/c	
	Cash	Real	Cash goes out	Credit what goes out		Cash A/c
3. Sold goods to Pallavi Rs.1,500/-	Pallavi	Personal	Pallavi is the receiver	Debit the receiver	Pallavi's A/c	
	Goods	Real	Goods go out	Credit what goes out		Goods A/c
4. Sold goods for cash Rs.2.000/-	Cash	Real	Cash comes in	Debit what comes in	Cash A/c	
	Goods	Real	Goods go out	Credit what goes out		Goods A/c
5. Paid office rent Rs.200/-	Rent	Nominal	Rent is an expense	Debit expenses	Rent A/c	
	Cash	Real	Cash goes out	Credit what goes out		Cash A/c
6. Paid cash to Dhanashri Rs.500/-	Dhanashri	Personal	Dhanashri receives cash	Debit the receiver	Dhanashri's A/c	
	Cash	Real	Cash goes out	Credit what goes out		Cash A/c

7. Received Commission Rs. 100/-	Cash	Real	Cash comes in	Debit what comes In	Cash A/c	
	Commission	Nominal	Commission is Income	Credit income		Commission A/c
8. Returned goods by Ram	Goods	Real	Goods come in	Debit what comes In	Goods A/c	
	Ram	Personal	Ram is the giver	Credit the giver		Ram A/c
9. Goods withdrawn for personal use	Drawings	Personal	Proprietor receives benefit	Debit the receiver	Proprietors Drawings A/c	
	Goods	Real	Goods go out	Credit what goes out		Goods A/c
10. Purchased Machinery for cash Rs.10000	Machinery	Real	Machinery comes in	Debit what comes in	Machinery A/c	
	Cash	Real	Cash goes out	Credit what goes out		Cash A/c
11. Paid for Stationery	Cash	Real	Cash goes out	Credit what goes out		Cash A/c
	Stationery	Nominal	Stationery is an expense	Debit expenses	Stationery A/c	
12. Borrowed from Bindu	Cash	Real	Cash comes in	Debit what comes In	Cash A/c	
	Bindu	Personal	Bindu giver of benefit	Credit the giver		Bindu's Loan A/c
13. Paid Salary	Salary	Nominal	Salary an expense	Debit expenses	Salary A/c	
	Cash	Real	Cash goes out	Credit what goes out		Cash A/c

#### **4.6 Definition of Journal**

Journal means a 'daily record'. According to a Dictionary for Accountant written by Elic L. Kohler, "A 'Journal' is the book of original entry in which are recorded transactions not provided for in specialised journals". A Journal is a book of "Original entry" or "primary entry". It is a book for daily record. First of all, the business transactions are recorded in the "Journal" and subsequently they are posted in the ledger. In modern times, a journal is divided into various books known as "Subsidiary Books". To study "Book-keeping" one must learn first how to journalise the transactions. To journalise the transactions means to record the two fold effects of a transaction in terms of debit and credit. This has to be done by observing the rules of debit and credit.

#### **4.7 Features of a Journal:**

- Books prime original or first entry.
- Records transactions in a systematic manner.
- Analyses the transactions into their debits and credits.
- A gateway to the ledger.

#### **4.8 Utility of a Journal:**

A journal is needed for the following reasons:

- It contains a record of various transactions that takes place every day.
- It provides a complete record of transaction as both the aspects of the transactions are recorded at one place.
- Since narration of a transaction is written in the Journal, there is no need to give an explanation in the ledger.
- It facilitates cross checking of transactions.
- Since transactions are recorded in the Journal, there is no need to post the transactions to the ledger immediately.
- From the legal point of view also a Journal becomes necessary. Courts recognize the journal as evidence in approving or disapproving claims.
- It helps to locate and prevent errors.

#### 4.9 A Specimen Form of Journal:

##### In the Journal of M/s. ....

Date	Particulars	L.F.	Debit Rs.	Credit Rs.
200__	_____ A/c .....Dr. To _____ A/c  (Being _____) (Narration)		_____	_____

#### Explanation of the form of Journal:

**1. Date Column:** In this column the date of the transaction is written. Generally, this column is divided into two parts namely for writing the month and the date of the transaction.

**2. Particulars Column:** The "Particulars Column" is the most important column. Before the details are written in this column the book-keeper decides as to what accounts are affected and which account is to be debited and which account is to be credited. The account to be debited is written on the first line just near the date column. On the same line the word "Dr" is written against the account to be debited. After that, on the second line the account to be credited is written. The name of this account should be preceded by the word "To" and while writing on the second line a little space should be left from the date column. It must be noted that the word "Cr" need not be written against the account to be credited, as it is clear that if the account on the first line is shown debited the corresponding account on the next line stands credited. On the third line a brief description of the transaction is written which is known as "narration".

**3. Ledger Folio:** While recording the transactions nothing has to be written in this column. The journal entries are required to be posted to the debit and credit of accounts in the ledger. At that time the page number of the ledger on which the two accounts appear are entered in this column.

**4. Debit Amount Column:** In this column the amount of transaction is written against the word "Dr" in particulars column on that line.

**5. Credit Amount Column:** In this column the amount of transaction is written against the name of the account credited on that line.

6. In the particulars column an explanation or narration is to be given below the credit item. Such a narration should be written in between the date line and the folio line. It should not cross these two lines on either side.
7. A thin line should be drawn between each transaction across the page from the date column to the folio column immediately below the journal entry. Some space should be left after each such line so as to distinguish one entry from another.
8. At the end of each page of a journal the debit and credit amount columns are totaled up and the total of the debit and credit amount columns must be equal as the amount debited and amount credited are equal for every transaction. These totals are carried forward to the next page.
9. In case the journal runs over several pages the first page is totaled and the totals are carried over to the next page at the top as "Totals brought forward". This is repeated for subsequent pages.
10. The amount of debit column must agree with the amount of credit column.
11. Totals of amount column are never posted in the ledger.

### **5.1 Ledger:**

Ledger is a book of accounts in which businessman keeps individual records of persons, properties, expenses, incomes, gains and losses. It is the end point of entries made in the journal, or subsidiary books. Ledger may be in the form of a bound register or cards or separate sheets may be attached and maintained in a loose-leaf binder. For every person with whom business keeps dealings, a separate account is prepared in the ledger; Similarly, separate account is maintained in the ledger for each kind of assets, expenses, losses and gains. As and when business transactions occur, they are first recorded in journal and subsequently those recorded entries from journal are transferred and posted to respective account in Ledger. Each ledger account is totaled at the end of the accounting period. This book contains many pages and each page is called a folio. The relationship between the business and a particular account on given date can be ascertained only from the ledger. For instance, if businessman wants to know on a particular date the amount due from a certain customer or debtor, it can be known easily only from ledger, various transactions pertaining to different dates of a particular account may be spread over in the journal on various pages but in the ledger they are found on one page.



## 5.2 A Specimen of Ledger:

Dr.				NAME OF THE ACCOUNT				Cr.			
Date	Particulars	J/F	Amount	Date	Particulars	J/F	Amount				

### Explanation of the form of Journal:

Each page of ledger is serially numbered. Each ledger account has two main side's viz. left hand side and right hand side. Left hand side of ledger account is called debit side and Right hand side of ledger account is called credit side. Each side has four sub columns viz. Date, Particulars, J.F. and Amount.

### Steps to be taken for preparation of the Ledger Account:

- (1) At the top of ledger, in the middle, name of account should be written.
- (2) Date of transaction should be written in date column in the same order as we record in journal.
- (3) In particulars column on debit side of ledger account name of account credited is written and in particulars column on credit side of ledger account name of account debited is written. For instance, following journal entries are posted in cash account as given below:

1997

July 1	Cash A/c.	Dr.	15,000			
	To Sales A/c				15,000	

July 5	Purchase A/c.	Dr.	10,000			
	To Cash A/c				10,000	

Dr.				Cash A/c				Cr.			
Date	Particulars	J.F.	Amount	Date	Particulars	J.F.	Amount				
01/07/1997	To Sales A/c		15,000	05/07/1997	By Purchase A/c		10,000				

- (4) Opening balance of ledger account should be shown as balance (b/d). Real account like Cash A/c., Furniture A/c., Goods a/c. Machinery A/c. etc. always shows debit balance and liabilities like Capital A/c., Sundry Creditor's A/c. Bank Loan A/c., etc. always shows credit balance.

### 5.3 Balancing of Ledger Account:

Balancing of ledger account means finding difference between heavier total, and lighter total of ledger account and recording that difference on lighter total side. At the end of the accounting year all accounts operated in the ledger are totaled and balanced. Steps required for balancing of ledger account are given below:

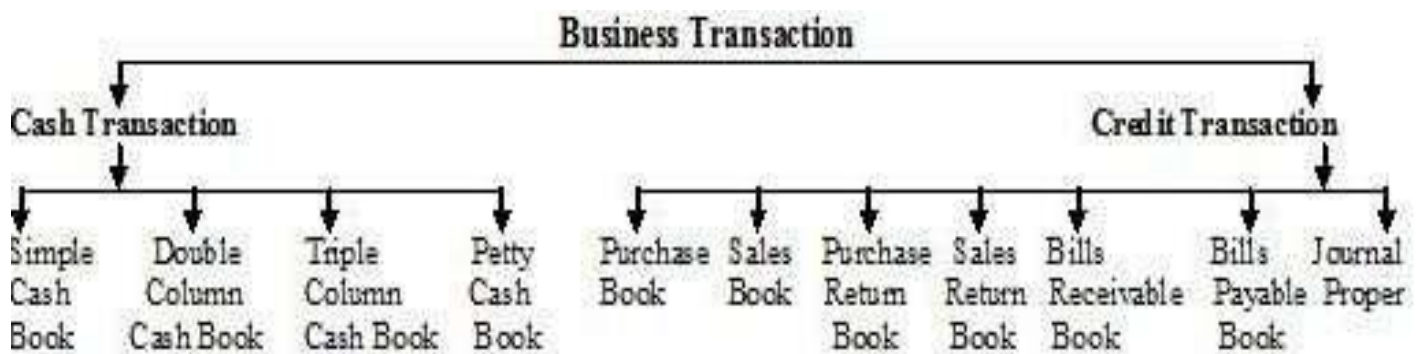
- Look at the Ledger A/c and mentally decide which side is more.
- Take total of that side first.
- Write the same total on opposite side on the same line.
- One line before total and two lines after total.
- If total of debit side of ledger account is heavier than total of credit side of that account, the balance is called debit balance and is written on credit side (i.e. on the side where total is lighter) as "By Balance (C/d.)".
- If total of credit side of ledger account is heavier than total of debit side of that account, the balance is called credit balance and is written on debit side (i.e. on the side where total is lighter) as "To Balance (C/d)."
- Now carry forward the total to the next month on the opposite side either as "To Balance b/d" or "By Balance b/d".

### 6.0 Subsidiary Books

Journal is a main account book in which all types of day-to-day business transactions are recorded systematically in chronological order. Journal is useful for traders whose business is small and limited in size. Journal is not useful to those traders whose business is large in size and who carries on unlimited business transactions every day. A single journal for entire large-scale business will be bulky and difficult to operate and handle. Similarly, many clerks cannot simultaneously do office work based on information written in the journal. It was felt that if all transactions are recorded in one journal, it will be time consuming to obtain necessary information. To avoid these difficulties journal is sub divided into number of parts.

Each of that sub part of journal is called subsidiary book. In other words, subsidiary book is a divided part of journal, meant for recording specific types of business transactions. These subsidiary books are: (1) Purchase Books. (2) Sales Book. (3) Purchase Return Book, (4) Sales Return Book. (5) Cash Book, (6) Bill Receivable Book, (7) Bills Payable Book, (8) Journal Proper.

**Classification of Business Transactions and Location in Book of Accounts:**



**6.1 Purchase Book:**

This is a subsidiary book in which only credit purchases of goods are recorded and is known as purchase book. It is used to record credit purchase of goods in which trader regularly deals. In this book cash purchases of goods and assets are not recorded. Similarly purchase of asset on credit is also not recorded in this book. Purchase book is written on the basis of Inward invoice i.e. a statement received from the supplier. Trade discount is never recorded. Trade discount is calculated and deducted from invoice price and net price is recorded in purchase book. If a bookseller purchases books on credit, it will be recorded in this purchase book. Purchase of furniture by bookseller on credit will not be recorded in his purchase book. At the end of each month purchase book is totaled and this total shows the total amount of goods purchased on credit.

**Specimen of Purchase book is given below:**

Date	Name of the Suppliers	Inward Invoice	L.F.	Amount (Rs.)

**Explanation of Columns:**

- (a) Date: This column is meant for recording date of credit purchase of goods.
- (b) Particulars: In this column name of suppliers from whom goods are purchased on credit is recorded. Along with name of supplier his address and description of goods is also written in this column.
- (c) Inward Invoice No.: Statement received from supplier along with goods purchased is called inward invoice. In this column number of inward invoice is mentioned.
- (d) L.F- No.: In this column page number of ledger on which supplier's account is prepared is recorded for ready reference.
- (e) Amount: This column shows net amount payable to suppliers.

**Proforma of Invoice:( for Purchase & Sales Book)**

<b>INVOICE</b>			
Telegrams: "Golden"		Golden Watch Makers	
Telephone: 1001		Aurangpura,	
No. 1600		Aurangabad,	
Name: <u>M/s. Ram Bros. Watch Co., Nagpur.</u>		1st March, 2004	
<b>Quantity</b>	<b>Particulars</b>	<b>Rate</b>	<b>Amount</b>
			<b>Rs.</b>
10	Gents' Watches (Standard)	500	5,000
10	Ladies' Watches (Gentle)	400	4,000
05	Super Watches	800	4,000
			13,000
	<b>Less: Trade Discount @</b>	10%	1,300
			11,700
E. & O.E.		For Golden Watch Makers	
		Sd/-	
		XYZ	

**6.3 Sales Book:**

A subsidiary book in which only credit sales of goods are recorded, is known as sales book. This book is meant for recording credit sales of goods in which trader regularly deals. In this book sale of goods as well as assets on cash basis are not recorded. Similarly, sale of assets on credit is also not recorded in this book. This book is written on the basis of outward invoice. Trade discount never appears in this book Trade discount is simply calculated and deducted from invoice price. If a grocer sells different types of grains to its customers on credit it will be recorded in the sales book of the grocer. Cash sales made by the grocer will not be recorded in his sales book. Sales book is also known as day book. At the end of each month sales book is totaled and this total shows total amount of goods sold on credit.

**Specimen of Sales book is given below:**

Date	Name of the Customers	Outward Invoice	L.F.	Amount (Rs.)

**Explanation of Columns:**

1. Date: The date on which the sales took place is entered.
2. Particulars: Name of the customer is written, but Address of customer need not be given.
3. Outward Invoice No.: The serial number of the invoice is entered.
4. L.F.: The page number of the ledger on which the customer's account appears is shown.
5. Amount: The net amount of the sale is recorded (amount arrived at after deducting the trade discount from the gross value of the sales.)

**6.4 Purchase Return Book:**

A subsidiary book in which, return of goods purchased on credit is recorded, is known as Purchase return book. Purchase return book is also known as return outward book or debit notebook. This book is used by trader for recording the returns of goods purchased on credit. Trader may return goods to supplier on one of the following reasons. Viz. (a) defective goods, (h) damaged goods, (c) delayed goods, (d) inferior goods, (e) goods which are not as per design, Color or sample sent (f) excess goods received etc. This book is written on the basis of debit note. Purchase return book is totaled at the end of each month. This total shows value of goods returned to suppliers.

**Specimen of Purchase Return book is given below:**

Date	Name of the Suppliers	Debit Note No.	L.F.	Amount (Rs.)

### 6.5 Debit Note:

A Debit Note is sent to the supplier when the goods purchased from him are returned. A Debit Note is a statement sent by the buyer to the supplier stating the full details of the good returned. It is sent along with the goods. It intimates the supplier that his account has been debited by the value of the goods returned to him. Many a time goods are received correctly as per the invoice but the invoice is overcharged. Therefore, the invoice shows a larger amount than what it should be. In such a case, the buyer does not return the goods but sends a debit note to the supplier of the excess value charged. On receiving the debit note the supplier also sends a credit note to us for the excess value charged. Debit Notes and Credit Notes are in a bound book. The original copy of Debit Note is sent to the supplier to whom the goods are returned and the carbon copy is kept for reference in the office.

#### Specimen of Debit Note

<b>UNIVERSAL TRADING CO.</b>		
<b>Marine Lines. Bombay</b>		
Debit Note No:	Swadeshi Mills. Bombay Account	Dated: 10-2-2005
We have to advise you that your account has been debited on account of.		
Invoice No. Date	Particulars	Amount Rs.
21-1-2005	Being the difference of 100 meters Terry cot Cloth at the rate of Rs. 30 but charged at the rate of Rs. 35 in the invoice.	500.00
		500.00
		Sd/- Purchase Manager

### 6.6 Sales Return Book:

A subsidiary book in which transactions relating to return of goods sold on credit, are recorded, is called sales return book. This book is used by trader for recording the goods returned by customers, which were purchased by them on credit. They may return goods sold to customers on credit, on one of the following reasons, viz. (a) defective quality goods, (b) damaged goods, (c) delayed goods, (d) inferior quality goods, (e) goods not in accordance with sample, specification, color, design, (f) over supply of goods, etc.

Sales return book is written on the basis of credit note. This book is also called as credit note book or return inward book. At the end of each month sales return book is totaled.

**Specimen of Sales Return book is given below:**

Date	Name of the Customers	Credit Note No.	L.F. No.	Amount (Rs.)

**6.7 Credit Note:**

A Credit Note is sent to the customers when we receive goods returned from them. It gives the full details of the goods returned by the customers. Credit Notes are generally printed in red ink. Transactions are recorded in this book on the basis of Credit Notes.

**Specimen of Credit Note**

<b>M/S CHOTILAL &amp; CO.</b>		
<b>Fort, Bombay - 32</b>		
Credit Note No.		Date : 01-03-2005
M/s Ramlal Sons. Pune.		
We have to advise you that your account has been credited as under:		
		<b>Rs.</b>
By Return:	10 Chairs returned on account of damage in transit at Rs. 50 per chair	500
		For Chotilal & Co. Rajan Manager

**6.8 Difference between a Debit Note and a Credit Note:**

- A Debit Note is an intimation sent to the party stating that the debit is given to its account. A Credit Note is an intimation to the party to whom it is sent stating that the credit is given to it.



- A Debit Note can be sent by the seller to the buyer to adjust the under debit or under-charge in the original invoice. It can also be sent by the buyer to the seller to adjust the excess debit given in the original invoice or to evidence the purchase returns. On the other hand, a Credit Note is sent by the seller to the buyer to adjust the excess debit given in the original invoice or to evidence the sales returns. It can also be sent by the buyer to the seller to adjust the under-credit given in the original invoice.

## **7.0 Cash Book:**

The Cash Book is a Book of original entry. All the cash transactions are recorded in the cash book. Even credit transactions result in cash. Cash is either received or paid. This indicates that there is a need to maintain a separate book to record all such cash transactions. When the cash transactions are recorded in the cash book, it serves both purposes of being a book of original entry as well as a ledger. Since the cash book enables the trader to find out the daily cash and bank balance, it serves the purpose of cash account. Therefore, there is no need to open a separate Cash Account in the ledger. Similarly, writing in the cash book saves a lot of time and labour by enabling recording of cash and Bank transactions without passing journal entries. In any business firm, cash and bank transactions constitute a major portion of the entries and therefore, the cash book is very useful and results in economy of time and labour.

Cash book achieves three purposes:

1. Recording all transactions pertaining to cash.
2. Ascertainment of the balance of cash on hand and bank balance.
3. Verification of correctness of cash and bank balance.

## **7.1 Types of Cash Book:**

Cash Book is classified under the following heads:

- (I) Simple or single column Cash Book.
- (II) Cash book with cash and discount columns or double columns cash book.
- (III) Cash book with Cash, Discount and Bank columns or Three columns Cash Book.
- (IV) Petty Cash Book or Multi Columns Cash Book.

Above types of cash books are discussed in detail as follows:

**(I) Single Column Cash Book:**

This cashbook is also called simple cashbook. It has two sides viz. receipt side and payment side. The debit side of cashbook is meant for recording all receipts and credit side of cashbook is meant for recording all payments. This book is written on the basis of cash receipts and cash vouchers. The cashbook is balanced from time to time and balance is carried forward. The cashbook always shows a debit balance. In this book discount and bank transactions are not recorded.

**Specimen of Simple Cash Book:**

Dr.					Cr.				
Cash Book									
Date	Receipt	R.No.	L. F.	Amount Rs.	Date	Payment	V.No.	L. F.	Amount Rs.

**Double Columns Cash Book:**

This cashbook is also called cashbook with cash and discount columns. In this Book along with cash transactions, discount received and allowed also recorded. A businessman who receives cash discount from his suppliers or creditors and allows cash discount to his customers or debtors maintains double columns Cashbook. In this book one additional column for discount is provided on both sides of the Cashbook along with the cash column. Cash discount allowed is a loss and therefore it is to be recorded on the debit side of the Cashbook. Cash discount received is a gain and it is to be recorded on the credit side of the Cashbook.

**Specimen of Double Column Cash Book:**

Dr.						Cr.					
Cash Book											
Date	Receipt	R.No.	L. F.	Discount Rs.	Cash Rs.	Date	Payment	V.No.	L.F.	Discount Rs.	Cash Rs.

Discount is a benefit or allowance, in money term given by seller to buyer or by creditor to debtor with a view of increasing sales or recovering the amount due. Discount is of two types viz. (a) Trade discount and (b) Cash discount. Trade discount is an allowance or concession in money term given by seller to buyer with an objective of increasing sales turnover.

Cash discount is recorded in the book of accounts. When cash is received, discount is allowed and debited in the cashbook. Similarly, when cash is paid, discount is earned and credited in the cashbook.

**(II) Three Columns Cashbook:**

This cashbook also called as cash book with cash, Bank and discount columns. Businessman, who does business transactions through Bank, records those banking transactions along with cash and discounts transactions in triple columns cashbook. Banking transactions like receipts and deposit of cheques, issue of cheques, deposit and withdrawal of cash from bank etc. are recorded in Triple columns cashbook. By maintaining triple columns cash book, businessman gets information of inflow and outflow of cash and details of banking transactions. Exact position of cash in hand and balance of cash at bank can be ascertained quickly by referring triple columns cashbook. Triple columns cashbook is useful for businessman to take quick decisions on business matters.

**Specimen of Three Columns Cashbook:**

Dr.						Cash Book						Cr.	
Date	Receipt	R. No.	L.F.	Disc. Rs.	Cash Rs.	Bank Rs.	Date	Payment	V. No.	L.F.	Disc. Rs.	Cash Rs.	Bank Rs.

**7.2 Sources of Writing the Cashbook:**

**(A) RECEIPT VOUCHERS:**

It is a document showing an official and authentic acknowledgement of the fact that cash or cheque is received from the payer. Typical Contents of Receipt are -

- (a) Name and address of the Concern which has received the Cash/Cheque
- (b) Serial No. of receipt will be written
- (c) Date of the receipt will be written
- (d) The name of party from whom money is received.
- (e) Amount received in words.
- (f) Whether amount is received by cash/cheque/draft. Delete the word not applicable. If cheque/draft received, then write cheque no. and date.
- (g) Whether amount is received in full/part/advance and write the purpose, delete the words not applicable.
- (h) Write the bill no. and date.
- (i) Write the amount received in figures.

- (j) If amount is above Rs. 500 affix the revenue stamp and the person authorised will put his/her sign.

**Specimen**

<b>RECEIPT</b>	
No.: _____(b)_____	(a) SBCC ENTERPRISES Mumbai – 400 004
Date: _____(c)_____	
Received with thanks from _____(d)_____	
the sum of Rupees _____(e)_____	
(f) _____ by Cash \ Cheque \ D.D.	
No. _____(f)_____ dated _____(f)_____ in part \ full \ advance payment on account of	
_____ (g) _____ our Bill no. _____(h)_____ dated _____.	
Rs. _____(i)_____	(j) <b>Revenue Stamp</b>
Receipt subject to realisation of cheque	
	(Signature)

**(B) PAYMENT VOUCHER**

It is a document giving details of cash/cheque paid to a person by a businessman. Typical contents of Payment Voucher:

- (a) Write the name and address of the Company making payment.
- (b) The Serial no. and date of payment voucher.
- (c) The amount paid in figures
- (e) The name of party to whom amount is paid.
- (f) The name of a/c. to be debited.
- (g) The details of transactions along with amount.
- (h) The amount in words will be recorded.
- (i) The person preparing and the manager authorising voucher will sign.
- (j) Write the mode of payment and delete the words not applicable. Also write the name of Bank, cheque no. and date if payment is made by cheque.
- (k) If payment of Rs. 500/- or above then affix revenue stamp and take signature of the persons receiving payment.

**Specimen**

<div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;"> <b>DEBIT VOUCHER</b> </div>	<p>(a) SBCC ENTERPRISES Mumbai – 400 004</p>	<p>No.: _____ (b) _____</p> <p>Date: _____ (c) _____</p> <p>Rs. _____ (d) _____</p>
<p>Paid to: _____ (e) _____</p> <p>Debit: _____ (f) _____</p>		
<b>Particulars</b>	<b>Rs.</b>	
<p>(g)</p> <p>Rupees (h)</p> <p style="text-align: right;">Total</p>	<p>(g)</p>	
<p>Authorised by _____ (i) _____    Prepared by _____ (i) _____</p> <p>Paid Cash / Cheque drawn on _____ (j) _____</p> <p>Cheque No. _____ (j) _____ dated _____ (j) _____</p>		<div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;"> <b>Revenue Stamp</b> </div> <p>(Sign of receiver)</p>

### 7.3 Accounting Treatment of Banking Transactions in a Cash Book:

1. **A Cheque is received but not deposited in the Bank:** Every cheque received; so long as it is not paid into the Bank should be treated as cash and should be recorded in the cash column.
2. **A Cheque is received and deposited in the bank on the same day:** In this case, the amount of such a cheque should be entered on the receipt side of the Cash Book in the Bank column as 'To XYZ'.
3. **A Cheque received on the previous day deposited into Bank:** In this respect, a contra entry should be passed on the day on which the cheque is deposited in the Bank. It will appear in the Cash Book on the Receipt Side as 'To Cash' in Bank column and on payment side as "By Bank" in Cash column.
4. **Received a Crossed Cheque:** The amount of Crossed cheque received should be entered in the Cash Book on the receipt side as 'To XYZ' in Bank column.
5. **Payment by issuing a Cheque:** Whenever payments are made by cheque they should appear in the Cash Book on the payment side as "Party's Account or Expenditure Account" in bank column".
6. **Endorsement of Cheque:** A businessman can endorse the cheque in favour of the creditor in settlement of his account. In this case, it will appear in the Cash Book on the payment side as "By XYZ" (Creditor) in cash column or Bank column.

Whether it should be entered in the cash column or the Bank column depends upon the nature of the cheques. The simplest method is to see the original entry of that cheque. If it is originally entered in the Cash Column on the receipt side, then after endorsement it should be entered on the - payment side of Cash Book in the cash column. If it is originally entered in the "Bank Column" on endorsement, then it should be entered on the payment of the cash book in the Bank Column.

- 7. Dishonour of Cheque:** A cheque received from the customer or cheque Issued to the creditors may be dishonored owing to certain reasons. Dishonour means refusal of payment by the Bank, Cheques may be dishonored on the following grounds:
- If it is defaced.
  - If the signature on the cheque does not agree with the specimen signature.
  - If the amount in words does not agree with the amount in figure.
  - If the funds to the credit of the Drawer are insufficient.
  - If a period of six months has expired from the date of drawing the cheque.
- 8. Direct Deposit by Customers:** If the amount due from customer directly deposited by him in our Bank account, on receiving the advice it will be entered in the Cash Book on the receipt side, as, "To Customer's Account" (the amount will be entered in the Bank Column).
- 9. Collection of Interest on Investment by the Bank:** A Bank collects interest on our Investment or allows interest on our deposit. The credit the entry of such a collection is made in the passbook by the Bank. On receiving advice or the Pass Book from the bank, it will be entered on the receipt side of the Cash Book as "To interest on investment". (The amount will be entered in Bank Column).
- 10. Payments made by the Bank under our Standing Instructions:** As per our standing instruction, a Bank makes payment on our behalf, on account of insurance premium, Interest on loan taken; call money on shares, etc. On making such payments, the Bank passes a debit entry in the Pass Book. After receiving the advice or Pass Book, it is entered on the payment side of the Cash Book as "By Insurance Premium or By Interest or By calls on shares" as the case may be (The amount will be entered in the bank column).
- 11. Bank charges and Bank commission:** A Bank charges some amount for the services rendered to the customers. The Bank makes a debit entry in the Pass Book. On receiving the Pass Book or intimation, it is entered on the payment side of the Cash Book as "By Bank charges or by Commission" (The amount will be entered in the Bank column).

## 12. Transfers:

- **Transfer of an amount from a Savings Account in the Bank to a Current Account:** Bank columns appearing on both the sides of a Cash Book indicate a Bank Current Account. If the amount is transferred from a Savings Account to Current Account It will be entered on the receipt side of the Cash Book as "To Capital A/c" (The amount will be entered in the bank column).
- **Transfer of an amount from a Current Account to a Savings Account:** In this case, the entry will appear on the payment side of the cash book as "By Drawings A/c" (the amount will be entered in the bank column).

**Note: Savings A/c being a personal A/c, it will be recorded either as Capital or Drawings.**

**13. Contra Entries:** Contra entries mean such entries that are made on both the sides of the cash book. When cash or a cheque is paid into the bank the cash balance in the office will be reduced and the bank balance will be increased. In such a case the Bank account is to be debited and the cash account is to be credited. Since, in three columns Cash Book, both Cash and Bank accounts are included the amount will be written in a bank column on the receipt side and also in the cash column on the payment side of the Cash Book.

The transactions affecting the Cash Account and Bank Account (either Cash Account or Bank Account debited or credited) are recorded on both the sides of the Cash Book. As the Triple Column Cash Book consists of Cash Account and Bank Account, recording them on both the sides of the Cash Book completes Ledger posting of such transactions. Entries passed to record such transactions in the Triple Column Cash Book are regarded as contra entries. Letter "C" is written in the "L.F." column of the Cash Book in order to identify such entries.

**Contra entries are passed in the following three cases:**

- **Cash deposited in Bank Account:** When an amount is deposited in the Bank, it is entered in the Cash Book on the receipt side as "To Cash", (amount in bank column) on the payment side it appears as "By Bank." (Amount in cash column),



- **Cash withdrawals:** A transaction pertaining to withdrawal of cash the Bank appears on both the sides of the Cash Book. On the receipt side it appears as "To Bank" (amount in cash column) on the payment side, it is entered as "By cash" (amount in Bank column).
- **If a cheque received on the earlier day is deposited in the Bank:** Cheque may be received from the customer and entered in the cash column on the receipt side of the Cash Book. It may be deposited in the Bank after 4 or 5 days. On the date of deposit, a contra entry is passed. It is entered on the receipt side of the Cash Book as "To Cash" (amount in Bank column). It is entered on the payment side of the Cash Book as "By Bank", (amount in cash column).

## 8.0 Petty Cash Book:

With faster development in banking sectors most of the businessmen carry on their day-to-day business activities through bank. Mostly bank cheques are used for payments and receipts of higher amount. But generally cheque is not used for payments and receipts of small or minor amount, which are inevitable in the business. For instance, cheque is not used for payment of taxi fare, coolie charges, sweeping charges, postage etc and receipt of sale proceeds of old newspapers etc. In big business house or in industry to manage and pay minor expenses in cash a separate clerk or cashier is appointed. The cashier or clerk, who manages, look after and makes payment of petty i.e. minor expenses in the organisation is called petty cashier. An account book in which petty cashier records payments of petty expenses and receipts is called petty cash book. In other words, petty cash book is a separate account book in which businessman keeps records of daily transactions which are of minor in nature and payments and receipts of which are made in cash only. Head cashier gives petty cashier lump sum amount of cash in the beginning of every month and he is permitted to spend that amount on various minor expenses and also permitted to receive minor receipts in a period of a month. At the end of month petty cashier is required to return the balance amount to head cashier. This procedure is followed every month.

### 8.1 Types of Petty Cash Book:

Petty cash book is classified into the following categories viz. (a) Simple petty cash book, (b) Columnar petty cash book, (c) Petty cash book kept on imprest system.

Above types of petty cash book are discussed below in detail.

**(a) Simple Petty Cash Book:**

Simple petty cash book is just similar to simple or single column cash book. It is meant to record receipts and payments made in cash. This cash book has two main sides viz. receipts side and payments side. In this cash book columns like date and particulars are common for both receipt side and payment side. This cash book is not extensively used in business field.

**(b) Columnar Petty Cash Book:**

As name indicates, this petty cash book has many sub columns on payment side to record minor expenses individually. This cash book has two main sides viz. receipts side and payment side. In comparison to receipt side, payments side is much long. Payment side of this cash book has many sub-columns which are not fixed in number.

On payment side of this cash book one sub column is provided for one similar nature of expenditures. In short payment side has columns as many as expenditures on which business spend money. In addition to these columns, at the end two more columns are provided for L.F. No. and ledger account. In ledger account column, entries of personal account and real account are posted. This cash book is more popular and extensively used in the business field.

**Specimen of columnar petty cash book is given below:**

Receipt	Date	Particulars	V. No.	Total	Payments						
					Postage	Telephone	Advt.	Stationery	L. F.	Ledger A/c	

**(c) Petty Cash Book Kept on Imprest System:**

In many business houses Imprest system is more popular. In this system, in the beginning of every month head cashier gives to petty cashier that much amount of cash or cheque which is equivalent to amount, spent in the last month and makes opening cash in hand with petty cashier equal in the beginning of every month. In other words, in imprest system, a definite amount of cash is given to petty cashier at the beginning of a certain period. This amount is known as imprest money.

The petty cashier is then allowed to spend money on various petty expenses and when he has spent substantial amount of his imprest amount he gets reimbursement of the amount he has spent from the head cashier. Thus he again has the same amount of imprest cash. The reimbursement may be made on a weekly, fortnightly or monthly basis, depending on the frequency of small payments.

This system renders the following advantages:

- (a) No excess cash is issued to petty cashier than actually required.
- (b) Petty cashier will not have excess or idle cash.
- (c) Misuse of cash is avoided as far as possible.
- (d) Records of petty expenses can be easily checked and compared.

## **9.0 Trial Balance:**

To reiterate, we have seen in the earlier sections how journal entries are passed in the journal. Similarly, the transactions can be recorded in Subsidiary Books. After recording the transactions either in the Journal or in the subsidiary Books they are posted to the Ledger and accounts are prepared and balanced. These books are written on the basis of the Double Entry System of book keeping. The fundamental principle of this system is that for every debit there is a corresponding credit. In any particular transaction, if one or more accounts are debited for some amount the other account or accounts are credited with the same amount. It follows therefore, that the amount for which one or more accounts is debited, for a similar amount the other account or accounts will be credited. As such the total of all debits and credits must be equal.

### **9.1 Key Features of a Trial Balance:**

Analysis of the above definitions brings out the following features of a Trial Balance:

1. It is a list of debit and credit balances which are extracted from various ledger accounts.
2. It is a statement of debit and credit balances.
3. The purpose is to establish arithmetical accuracy of the transactions recorded in the books of accounts.
4. It does not prove accounting accuracy, which can be determined by audit.
5. It is not an account. It is only a statement of account.
6. It is not a part of the process of accounts.

7. It is usually prepared at the end of the year but it can also be prepared any time as and when required. e.g. half yearly, quarterly or monthly.
8. It serves as a link between books of accounts and the Profit and Loss Account and Balance Sheet.

### 9.2 Preparation of a Trial Balance:

All the accounts with their debit and credit balances are listed serially. The cash and bank balances as shown by the Cash Book are also included in a Trial Balance. This becomes necessary because a separate Cash Account is not maintained in the ledger. Bank columns appearing on both the sides of Cash Book represent the Bank Account in the ledger. Closing stock of goods at the end of the year is not included in the Trial Balance. After all the accounts are included in the Trial Balance, the total of the two sides is made and it is equal.

#### Forms of Trial Balance:

Trial Balance as on 31<sup>st</sup> March, .....



**9.3 Example of a Trial Balance:** From the following balances extracted from the books of accounts of ABC Traders as on 31<sup>st</sup> March, 2017:

	Rs.		Rs.
Capital	1,50,000	Goodwill	1,00,000
Sundry Debtors	35,000	Office Expenses	10,000
Sundry Creditors	42,000	Outstanding Expenses	15,000
Machinery	21,000	Interest Received	3,200
Furniture	19,000	Cash Balance	1,800
Sales	2,00,000	Opening Stock	1,07,400
Purchases	1,16,000 (as on 1-4-2017)		

**Trial Balance of ABC Traders as on 31<sup>st</sup> March, 2017**

Sr. No.	Name of Account	L.F.	Debit Rs.	Credit Rs.
1.	Capital			1,50,000
2.	Purchase		1,16,000	
3.	Sales			2,00,000
4.	Goodwill		1,00,000	
5.	Machinery		21,000	
6.	Furniture		19,000	
7.	Sundry Debtors		35,000	
8.	Sundry Creditors			42,000
9.	Office Expenses		10,000	
10.	Interest Received			3,200
11.	Outstanding Expenses			15,000
12.	Opening Stock		1,07,400	
13.	Cash Balance		1,800	
			4,10,200	4,10,200

## **SECTION III**

### **FINAL ACCOUNTS**

#### **PART A – FINAL ACCOUNTS OF A SOLE PROPRIETOR**

Final accounts are the group of three different accounts viz. Trading Account, Profit and Loss Account and Balance Sheet. The group of these three accounts is called final accounts because it gives final results of the business carried out in the accounting year. Final accounts, generally, refer to two important accounting statements prepared by any business unit at the end of the financial year and those accounting statements are (i) Income statements and (ii) statement of financial position. Income statement includes trading account and profit and loss account. Whereas, statement of financial position includes Balance Sheet. Preparation of trading account and profit and loss account gives result of business operations done in the entire financial year. Balance sheet shows the financial position of assets and liabilities of the business as on particular date.

#### **10.1 Objectives of Final Accounts:**

- (a) To ascertain gross profit or gross loss and net profit or net loss as a result of business done in the accounting year.
- (b) To check arithmetical accuracy of the business and to detect fraud.
- (c) To know the standing financial position of the business i.e. total assets owned by the business and total liabilities payable by the business.
- (d) To know how much tax is payable to the government on the profits and assets, if taxable.

#### **10.2 Trading Account:**

Trading account is a part of final accounts, which is prepared on the basis of direct expenses, and direct incomes of business to ascertain gross result of the business, done in the accounting year. Preparation of trading account is the first step in preparation of final accounts. Trading account is prepared by considering only direct expenses and direct incomes of the business. Expenses and incomes which have direct connection with production are called direct expenses and direct incomes, e.g. power and fuel, cost of raw materials, wages etc. are called direct expenses, and sales proceeds are called direct incomes. Thus, trading account shows gross result of trading or business activities carried out in the particular accounting year.

The basic objective of the trading account is to ascertain the gross profit earned or the loss suffered as a result of manufacturing goods or services or buying and selling of goods.

**Specimen Form of Trading Account:**

**Name of Proprietor .....**

**Dr. Trading Account for the year ended 31<sup>st</sup> .....20... Cr.**

Particulars	Amount	Particulars	Amount
To Opening Stock	----	By Sales	----
To Purchases	---	Less: Returns	----
Less: Returns	---	By Goods lost by Fire or Theft	----
To Carriage Inward	----	By Drawings (Goods taken over)	----
To Wages	----	By Advertisement (goods distributed as free sample)	----
To Freight	----	By Closing Stock	----
To Power & Fuel	----	By Gross Loss C/d	----
To Royalties	----		
To Octroi	----		
To Custom Duty	----		
To Factory Lighting	----		
To Factory Rent	----		
To Mfg. Expenses	----		
To Gross Profit C/d	----		
	----		----

### 10.3 Profit and Loss Account:

Profit and Loss account is a part of final accounts, which is prepared on the basis of indirect expenses, and indirect incomes of the business to ascertain net result of the business, done in the accounting year. On completion of trading account and profit & loss account are prepared by considering only indirect expenses and indirect incomes of the business. Expenses and incomes, which have no direct relation with production and whose absence do not affect production, are called indirect expenses and indirect incomes, e.g. salaries, interest, rent, cost of stationery etc. Indirect expenses are recorded on debit side of profit and loss account and indirect incomes are shown on credit side of profit and loss account. Indirect expenses of business are classified as (i) Office expenses (they are also called administrative expenses.) (ii) Selling expenses and (iii) Distribution expenses. Indirect incomes and gains include discount received; Commission earned, interest received, rent received etc

#### Specimen form of Profit and loss Account

Dr.	Profit & Loss Account for the year ended 31 <sup>st</sup> .....20...		Cr.
Particulars	Amount Rs.	Particulars	Amount Rs.
To Salaries	----	By Gross Profit B/d	----
To Rent	----	By Rent Received	----
To Printing & Stationery	----	By Interest Received	----
To General Expenses	----	By Commission Earned	----
To Sundry Expenses	----	By Discount Earned	----
To Depreciation	----	By Miscellaneous Receipts	----
To Postage & Telegram	----	By Income from Investment	----
To Telephone Expenses	----	By Excess reserve for bad debt	----
To Travelling Expenses	----	By Net Loss C/d	----
To Conveyance	----		
To Advertisement	----		
To Interest on loan taken	----		
To Interest on Capital	----		
To Bad debt	----		
Add: Further Bad Debt	----		
Add: New Reserve	----		
Less: Old Reserve	----		
To Repairs	----		
To Bank Charges	----		
To Legal Charges	----		



To Loss on sales of Assets	----		
To Audit Fees	----		
To Discount Allowed	----		
To Commission Allowed	----		
To Carriage Outward	----		
To Insurance	----		
To Net Profit C/d	----		
	----		----

#### 10.4 Balance Sheet:

Accounting statement, which shows financial position of all assets and liabilities of the business as on date, is called Balance Sheet. It is not an account but a positional statement showing financial position of a business concern as on date. On the left-hand side of this statement liabilities of various types are systematically recorded and on the right-hand side of this statement all types of business assets are shown systematically. Business liabilities include short liabilities like sundry creditors, bank overdraft, bills payable outstanding expenses etc. and long-term liabilities like Bank loan, capital, loan etc. Business assets are classified as fixed assets, tangible assets, intangible assets, current or circulating assets and fictitious assets.

Specimen from of Balance sheet is shown below:

Balance Sheet as at 31<sup>st</sup> ..... 20....

Liabilities	Amount Rs.	Assets	Amount Rs.
Capital	----	Land & Building	----
Less: Drawings	----	Plant & Machinery	----
	----	Furniture & Fixture	----
Add: Interest on Capital	----	Motor car	----
	----	Investment	----
Less: Interest on Drawings	----	Goodwill	----
	----	Patents	----
Add: Net Profit	----	Loose Tools	----
Loan Taken	----	Bills Receivable	----
Bank Loan	----	Sundry Debtors	----
Sundry Creditors	----	Closing Stock	----
Bank Overdraft	----	Prepaid Expenses	----
Bills Payable	----	Income Receivable	----
Expenses Outstanding	----	Cash in Hand	----
Income received in advance	----	Cash at Bank	----
	----	Loans Given	----
	----		----

### 10.5 Adjustments:

Additional business information provided after completion of trial balance for preparation of final accounts are known as adjustments. To get clear view and real results of business done in the trading year, some other business information which do not find place in the trial balance are required to be considered, while preparing final accounts. These adjustment items are required to be given proper effects in the final accounts. For every adjustment item, double effects are given in the final accounts, e.g. outstanding wages are first added to wages at debit side of trading account and secondly outstanding wages are shown separately at liability side of balance sheet.

**Final Accounts: Adjustments at a glance:**

<b>Adjustment</b>	<b>How to make it in Profit &amp; Loss Account</b>	<b>How to make it in Balance Sheet</b>
1. Outstanding Expenses or Unpaid Expenses	Add to expenses concerned on debit side.	Show on liability side separately.
2. Outstanding Income / Income Due but not Received / income Receivable / income Earned but not Received.	Add to income concerned on credit side.	Show on asset side separately.
3. Prepaid Expenses/Expenses Paid in Advance / Unexpired Expenses.	Deduct from expenses concerned on debit side.	Show on asset side separately.
4. Income Received in Advance	Deduct from Income concerned on the credit side.	Show on liability side separately.
5. Depreciation.	Show on the debit side separately.	Deduct from asset concerned on asset side.
6. Reserve for Doubtful Debts.	a) If New R.D.D. + Bad Debts > Old R.D.D. : Then on Debit Side: Bad Debts + New R.D.D. – Old R.D.D. b) If Old R.D.D. > New R.D.D. + Bad Debts: Then on Credit Side: Old RD.D. - New RD.D. – Bad Debts.	Deduct only New RD.D. from debtors on asset side.
7. Reserve for Discount on Debtors.	a) If New Reserve + Discount > Old Reserve: Then on Debit Side: New Reserve + Discount – Old Reserve. b) If Old Reserve > New Reserve + Discount: Then on Credit Side: Old Reserve - New Reserve - Discount.	Deduct from debtors on asset side only the amount of New Reserve for discount.

8. Reserve for Discount on Creditors.	a) If New Reserve + Discount Received > Old Reserve: Then on Credit Side: New Reserve + Discount Received - Old Reserve. b) If Old Reserve > New Reserve + Discount Received: Then on Debit Side: Old Reserve - Discount Received - New Reserve.	Deduct from creditors on liability side only the amount of New Reserve.
9. Write off further Bad Debts.	Add to Bad Debts on debit side.	Deduct from debtors on asset Side.
10. Goods distributed as free samples.	Show on credit side of Trading Account	Show on debit side of Profit Loss Account
11. Loss of goods by fire (Goods not insured)	Show on credit side of Trading Account	Show on debit side of Profit Loss Account as loss by fire.
12. Loss of goods by fire and Insurance Company admitted the claim	Show on credit side of Trading Account by full value as "goods lost by fire". Show on asset side separately as "Insurance Co. A/c" or "Insurance Claim".	Show on debit side of Profit and Loss Account only the difference below value of goods destroyed and claim admitted as "Loss by Fire".
13. Wages paid for installation of machinery debited to Wages Account.	Deduct from wages on debit side of Trading Account.	Add to Machinery on asset side.
14. Goods withdrawn by proprietor for personal use.	Show on credit side of Trading Account.	Add to the drawings.
15. Goods given as charity	Show on credit side of Trading Account.	Debit Profit & Loss A/c (If considered business expenses) Deduct from Capital A/c (If considered personal expenses)
16. Goods used for office purposes	Show on credit side of Trading Account.	Debit to Profit & Loss A/c as office expenses.
17. Goods used for making an asset	Show on credit side of Trading Account.	Add to Asset A/c

18. Goods Purchased included in closing stock but not recorded in the Purchase Book.	Add to Purchases	Add to creditors
--	------------------	------------------

**10.6 Example of a Final Account:** The trial balance of M/s. ABC as on 31<sup>st</sup> December 1998 is given below:

**Trial Balance as on 31<sup>st</sup> December 1988**

Debit Balances	Rs.	Credit Balances	Rs.
Drawings	750	Capitals	25,000
Building	20,000	Sales	75,500
Plant & Machinery	6,000	Purchase Returns	1,000
Cash at Bank	550	Sundry Creditors	12,600
Purchases	47,500	Discount Earned	50
Sales Return	1,500	Reserve for Bad Debts	750
Carriage Inward	350	Outstanding Salaries	100
Opening stock	11,000	6 % loan Taken on 01/10/88	11,000
Wages	6,000		
Sundry Debtors	17,600		
Salaries	2,500		
Postage & Telegram	200		
Rent & Insurance	400		
Bad Debt	250		
Discount	100		
Trade Expenses	300		
Furniture	5,000		
Commission	500		
Prepaid Insurance	300		
Printing & Stationery	700		
Cash in Hand	2,000		
Patents	2,500		
	1,26,000		1,26,000

**Adjustments:**

- (I) Stock as on 31st December 1988 was valued at Rs. 15,000.
- (II) Outstanding wages Rs. 600 and outstanding rent Rs. 700.
- (III) Provide 10% depreciation on Plant & Machinery and 5% depreciation of Furniture.
- (IV) 5% interest allowed on capital.
- (V) Goods worth Rs. 250/- withdrawn by the proprietor for self-use.

- (VI) Goods worth Rs. 5,000/- destroyed by fire and insurance company admitted a claim for Rs. 4,200/-
- (VII) Provide 5% RD.D. at Sundry Debtors.

Preparation of a Trading Account, Profit & Loss Account for the year ended 31<sup>st</sup> December.1988 and the Balance Sheet as on that date.

**In the books of M/s. ABC Traders.**

**Dr. Trading and Profit & Loss Account for the year ended 31st December. 1978 Cr.**

Particulars	Rs.	Rs.	Particulars	Rs.	Rs.
To Opening stock		11,000	Sales	75,500	
To Purchases	47,500		Less: Return Inwards	1,500	74,000
Less: Return Outward	1000	46,500	Goods Lost by Fire		5,000
To Wages	6,000		Goods withdrawn		250
Add: O/s wages	600	6,600	Closing Stock		15,000
To Carriage inwards		350			
To Gross Profit C/d		29,800			
		94,250			94,250
To Salaries		2,500	By Gross Profit b/d		29,800
To Postage & Telephone		200	By Discount A/c		50
To Rent & Insurance	400				
Add: Outstanding Rent	700	1,100			
To Depreciation					
P&M	600				
Furniture	250	850			
To Bad Debt	250				
Add; Further Bad debts	---				
Add: New Reserve	880				
	1,130				
Less: Old Reserve	750	380			
To Interest on Loan		165			
To Interest on Capital		1,250			
To Discount		100			
To Trade Expenses		300			
To Commission		500			
To Printing & Stationery		700			
To Loss by Fire		800			
To Net Profit C/d		21,005			
		29,850			29,850

**Balance Sheet as at 31<sup>st</sup> December. 1988**

<b>Liabilities</b>	<b>Rs.</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>	<b>Rs.</b>
Capital	25,000		Sundry Debtors	17,600	
Less: Drawing	750		Less: New Reserve	880	16,720
	24,250		Cash at bank		550
Less: Drawings (goods)	250		Plant & Machinery	6,000	
	24,000		Less: Depreciation	600	5,400
Add: Interest (5%)	1,250		Land & Building		20,000
	25,250		Furniture	5,000	
Add: Net Profit	21,005	46,255	Less: Depreciation	250	4,750
Sundry Creditors		12,600	Closing Stock		15,000
Outstanding Salaries		100	Patents		2,500
Outstanding Wages		600	Insurance Claim Receivable		4,200
Outstanding Rent		700	Prepaid Insurance		300
Loans	11,000		Cash in Hand		2,000
Add: Interest on Loan	165	11,165			
		71,420			71,420

**Working Notes:** (1) Interest on Loan =  $11,000 \times \frac{3}{12} \times \frac{6}{100} = 165$

(2) Interest on Capital =  $25,000 \times \frac{5}{100} = 1,250$

**PART B - Capital and Revenue Expenditure**

**12.0 Capital and Revenue Expenditure - Meaning**

**12.1 Capital expenditure:** it is the expenditure resulting in:

- (i) the acquisition of an asset;
- (ii) an increase in the earning capacity of a business;
- (iii) an advantage or a benefit of an enduring or permanent nature.

The purpose of capital expenditure is to create a new infrastructure/ asset with a view to improve future profitability. This is done either (a) positively by increasing earning capacity; or (b) negatively by some structural changes thereby decreasing working expenditure.

It is not absolutely essential that some new asset must come into existence as a result of capital expenditure. If a cinema theatre is renovated to provide additional seating capacity, then expenditure on such renovation is a capital expenditure, because, it increases the earning capacity of the business. Similarly, if a petrol engine of a motorcar were converted into diesel engine, the expenditure involved would be of capital nature, as it would result in a decrease in working expenditure of the business in future.

**Following are examples of capital expenditure:**

- (1) Expenditure for purchase or acquisition of fixed assets like land, buildings, plant, machinery, furniture, fixtures, goodwill, patent, trademarks, copyrights, leasehold rights, vehicles, etc.
- (2) Expenditure incurred in connection with or incidental to the purchase or installation of a fixed asset e.g., legal charges, stamp duty for the purchase of land and building or copyrights, expenses incurred for installation of plant and machinery, expenses incurred for bringing the fixed asset into the factory like freight, customs duty, or octroi duty on purchase of machinery, furniture and building materials.
- (3) Expenditure for extending or improving a fixed asset e.g., amount spent on increasing the seating capacity of a hotel, cinema auditorium or amount spent in converting petrol engine into diesel engine or amount spent in converting coal-fired furnace into electric furnace, etc.

Thus, a capital expenditure is that expenditure, which results to a benefit not only in the current accounting year, but also the future years. It is therefore necessary to carry forward such expenditure for allocation / amortization over all those years in which benefits are expected to accrue. Thus, the cost of fixed asset is written off by way of depreciation over the period of its use.

**12.2 Revenue Expenditure:** It is the expenditure incurred

- (i) for the actual running of business;
- (ii) in maintaining adequately all the fixed assets;
- (iii) in an accounting period and is:
  - (a) matched against the income of that accounting period and
  - (b) not carried forward to the subsequent accounting year.



Revenue expenditure is necessary for the maintenance of the earning capacity (including the upkeep of fixed assets), and all other normal expenses incurred in sale and purchase of goods and services, office administration, etc.

**Examples of revenue expenditure:**

- (1) All items of expenditure whose benefit expires within the same year of expenditure e.g., printing and stationery, travelling expenses, rent, salaries and wages. These are the administration and such other expenses incurred in the normal course of the business like office expenses, sales expenses, interest, audit fees etc.
- (2) Cost of purchase of goods for conversion into final product for resale e.g., purchase of raw materials, packing materials and also such conversion charges as are necessary to produce the saleable product.
- (3) Expenditure incurred in maintaining the fixed assets of the business, e.g., repairs and maintenance of machinery, furniture, building.
- (4) Depreciation on fixed assets.

**12.3 Deferred Revenue Expenditure:**

There are certain expenses, which are primarily revenue in nature but the benefit from which is not exhausted during the year in which it is incurred. Such expenses are called "Deferred Revenue Expenditures." The term refers to those revenue expenses the writing off, of which is deferred to more than one year. Such expenses are carried forward and written off over the period during which the business is likely to benefit from the same.

Revenue expenditure written off over more than one year can be of two different categories:

- (1) (a) Those expenses which are wholly paid in advance and for which the services/benefits are to be received in future. e.g., prepaid insurance, prepaid rent, advance salaries.
- (b) Those expenses the benefit of which is partly received during the year under consideration and partly in subsequent year(s) e.g., expenditure incurred in an advertising campaign for introducing a new product. A part of this expenditure will be charged against profit of the year and the balance will be carried forward (and shown in the balance sheet), for write off in subsequent years.

- (2) Expenses, which are incurred very rarely. Such expenses are not incurred in the normal routine carrying on of the business. Illustrations of such expenses are developmental expenditure like market survey, expenses on experiments, expenses on issue of shares and debentures, discount on issue of shares or debentures. Proper accounting necessitates that; these are not treated as expenses for the year in which they are incurred, but spread over a number of years. Such expenses are the real "deferred revenue expenses." These expenses do not create any asset or infrastructure. Hence they are not "capital expenditure." Simultaneously they are not normal day-to-day expenses of the year, which can be absorbed against the revenue of one year.

Revenue expenditure constitutes a charge against profits; it is therefore debited to Trading and Profit and Loss account. On the other hand, capital expenditure is not a charge against profits. It is an asset not meant for resale. It is shown on the assets side of the balance sheet.

#### **12.4 Capital and Revenue Receipts:**

Any receipt on capital account is a capital receipt and any receipt on revenue account is a revenue receipt. A capital receipt is disclosed in the balance sheet while a revenue receipt appears in the trading and profit and loss account.

Thus, any receipt in the ordinary course of the business, which is a regular source of income of the company, is a revenue receipt. Sale of goods, receipt of interest and dividend income, rents received, commission and discounts earned are all examples of revenue receipts. Receipts like loans from banks and friends, capital contributed by a partner, a lottery prize, and sale of old assets are the examples of capital receipts.

However, here also, at times the distinction is very thin. Facts and circumstances of each case will decide the issue. A sale of machinery will be a capital receipt for a manufacturing company using that machine as a fixed asset, but, will be a revenue receipt for a machinery dealer.

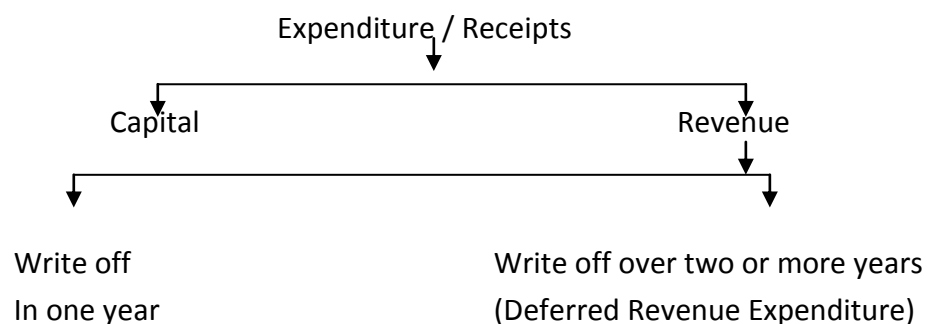
### 12.5 Distinction between "Capital" and "Revenue"

The distinction between "Capital" and "Revenue" is of vital importance in accounting. It directly affects the correctness of the amount of profit or loss made by the firm during a given period. It also affects the truthfulness of the financial position of the firm on any given date. The distinction between Capital and Revenue is connected with the matching of costs with revenues. This concept requires matching the expenses incurred for a period, with revenue earned for the same period. The process involves two steps: (1) Ascertain the revenue earned for a given accounting period and (2) Determine expenses incurred to earn that revenue.

The distinction between Capital and Revenue is relevant for both the steps. Certain receipts are not income. For example, sale proceeds of obsolete plant and machinery, or capital received from the partner. These are receipts but not income for a given period. Hence such receipts are not credited to profit and loss account. They are capital receipts.

Similarly, there are certain payments, which do not represent expense for the year e.g., purchase of land and building or repayment of loan taken from the bank. Hence such payments are not to be debited to profit and loss account. They are capital expenditures.

The distinction between capital and revenue becomes relevant in the preparation of final accounts viz. profit and loss account and balance sheet. All items appearing in the trial balance are taken either to trading and profit and loss account or balance sheet. All revenue expenditures and receipts are taken to the trading and profit and loss account, while all capital expenditures and receipts are taken to the balance sheet. Each item of expenditure and receipt must therefore, be placed in the appropriate financial statement. The distinction can be depicted with the help of a chart:



**12.6 A Specimen bifurcating following items as Capital, revenue or deferred revenue with reasons:**

- (1) Cost incurred in replacing worn out but costly spare parts of a machine.
- (2) Cost of acquisition of copyrights.
- (3) Cost of designing a new product, which ultimately could not come up for commercial production,
- (4) Heavy current repairs to the roof of the factory building.
- (5) Cost of alteration to a cinema theatre in accordance with municipal law,
- (6) Replacement of a wooden roof with a guarantee of 20 years.
- (7) Replacement of worn out tyre of delivery van.
- (8) Repainting of the building.
- (9) Replacement of wooden platform for machinery with a concrete one,
- (10) Replacement of an open truck body with a closed refrigerated body,
- (11) Replacement of petrol engine of the car with the diesel engine.
- (12) Planting of rose bushes outside the managing director's office.
- (13) Amount received from insurance company for loss of stock.
- (14) Loss due to change in exchange rate for purchase of materials.
- (15) Additions to factory building.
- (16) Repairs to plant.
- (17) Heavy advertising expenses.
- (18) Renewal of factory licenses.
- (19) Premium given for lease.
- (20) Costs in relation to mortgage.
- (21) Commission on issue of debentures.
- (22) Cost of pulling down an old factory preparatory to constructing a new one
- (23) Amount received as claim from insurance company, on a fire destroying one machine.
- (24) Profit on sale of investments.
- (25) Contribution paid to state government/municipal corporation / gram panchayat for road development in surrounding area.
- (26) Rs.10,000 spent on renovation and overhauling machinery, which resulted in extension of the life of the plant.
- (27) Carriage inwards and freight for bringing the furniture from the dealer.
- (28) White washing of factory building.
- (29) Heavy legal expenses incurred by a publisher in a defamation suit.
- (30) Cost of market research of a new product.
- (31) Interest paid on money borrowed for purchasing plant and machinery.

- (32) A sum of Rs. 2,500 previously written off as bad debts now recovered; this year.
- (33) Legal expenses incurred in an action for infringement of trademark.
- (34) Expenditure incurred for an additional exit to the theatre under the order of a local authority.
- (35) Purchased a second-hand typewriter for Rs. 5,000 and spent Rs. 3,000 on repairs to make it ready for use.
- (36) Compensation received from local authority for compulsory acquisition of land.
- (37) Expenditure incurred for equipping the theatre with sitting accommodation and electrical fittings.
- (38) Expenditure on uniforms for the staff.
- (39) Cost of stores consumed in manufacturing machinery for installation in own factory.
- (40) Rs.25,000 spent for replacing the electric motor of machinery. The motor was destroyed by fire.
- (41) Claim received from an insurance company for suspension of business activity due to fire.
- (42) Compensation of Rs. 95,000 paid for termination of services of three workers who were disturbing the industrial peace in the factory.
- (43) Rs.1,00,000 received by tenant for surrendering his tenancy right in favour of the builder who has purchased the premises.
- (44) Amount of Rs. 25,000 spent for dismantling (at old factory), removing and reinstallation (at new factory).
- (45) Purchase of loose tools costing Rs. 1,500 expected to last only for eight months approximately.
- (46) Cost of raincoats and umbrellas for employees who are given the same every two years.
- (47) Expenditure incurred on two engineers for training on a new machine in Japan. Expenditure includes their lodging, boarding, travelling, and training expenses.
- (48) Wage paid for construction of building extension.
- (49) Import duty on raw materials purchased and imported from Germany.
- (50) Cost of replacement of defective part of the machinery.
- (51) Expenditure incurred in preparing a project report.
- (52) Expenditure for training employees for better running of machinery.
- (53) Expenditure incurred for repairing cinema screen.
- (54) Legal and other expenses incurred in connection with the issue of share capital.
- (55) Amount paid for purchase of goodwill of a similar business.
- (56) Amount received from a relative staying abroad.
- (57) Old items of machinery disposed off at a loss.

- (58) Travelling expenses of a director for going to USA to find possibilities of export of company's products.
- (59) Stock transferred from one factory to another one where there is shortage.
- (60) Travelling expenses of a director for going to Germany to purchase a new machine.

**Solution:**

Sr. No.	Item	Nature of Expenditure / Receipt	Reason
1.	Cost of replacing costly spare parts of a machine	Revenue	For maintenance of an asset
2.	Cost of acquisition of copyrights	Capital	New asset acquired
3.	Cost of designing a new product which did not come up for production	Deferred revenue	Amount spent on developing a product. (Basically, it is a capital loss/expenditure)
4.	Heavy current repairs to roof of factory building	Revenue	For maintenance of an asset
5.	Cost of alteration of cinema theatre in accordance with municipal law	Revenue	Normal day-to-day business expenditure
6.	Replacement of wooden roof with 20 years guarantee	Revenue	Maintenance expenditure
7.	Replacement of worn out tyre of delivery van	Revenue	Maintenance expenditure
8.	Repainting of building	Revenue	Normal recurring expenditure
9.	Replacement of wooden platform for machinery with concrete	Capital	Increases life of the asset
10.	Replacement of open truck body with a closed refrigerated body	Capital	Increases earning capacity of the asset
11.	Replacement of petrol engine of the car with diesel engine	Capital	Increases earning capacity of the car by reducing cost of operation
12.	Planting rose bushes outside director's office	Revenue	Normal business
13.	Amount received from insurance company for loss of stock	Revenue	Proceeds on compensation for loss of stock is revenue receipt
14.	Loss due to change in exchange rate for purchase of materials	Revenue	Normal business expenditure
15.	Additions to factory building	Capital	Purchase of an asset
16.	Repairs to plant	Revenue	For maintenance of an asset
17.	Heavy advertising expenses	Deferred revenue	Spent for a new product and the benefit will last over some years

18.	Renewal of factory licenses	Revenue	Recurring expenditure
19.	Premium given for lease	Capital	Expenditure incidental to purchase of an asset
20.	Costs in relation to mortgage	Revenue	Normal business expenditure
21.	Commission on issue of debentures	Deferred Revenue	Benefit will last over some years
22.	Cost of pulling down an old factory for building a new one.	Revenue	Does not result in any new asset
23.	Claim received from insurance co. on fire destroying one machine	Capital	It is in connection with destruction of a capital asset
24.	Profit on sale of investments	Revenue	Sales realisation over and above the cost is revenue receipt
25.	Contribution for road development	Revenue	Does not result in any asset for the company and is social responsibility of the company
26.	Amount spent on renovation and overhauling a machinery which resulted in extension of the life of the plant	Capital	Increases life of the asset
27.	Carriage inwards/ freight for brining furniture	Capital	Expenditure in connection with purchase of an asset
28.	White washing of factory building	Revenue	Normal business expenditure
29.	Heavy legal expenses incurred by publisher in a defamation suit	Revenue	Normal business expenditure for a publisher
30.	Cost of market research of a new product	Deferred revenue	Benefit will last for a number of years
31.	Interest paid on money borrowed for purchase of machinery	Capital up to the date of installation of machinery and thereafter revenue	Expenditure incidental to purchase of asset



32.	Amount previously written off as bad	Revenue	Normal business receipts
33.	Legal expenses for infringement of trademark	Revenue	Expenditure for maintenance of an asset
34.	Amount for additional exit to the theatre	Revenue	Normal business expenditure
35.	(a) Purchase of second- hand typewriter (b) Amount spent on repairs of typewriters	Capital Capital	Purchase of an asset Expenditure incidental to purchase of asset to bring it in running condition
36.	Compensation from local authority for acquisition of land	Capital	Receipt in connection with sale of a fixed asset
37.	Expenditure for equipping a theatre with sitting accommodation and electrical fittings	Capital	Increases earning capacity of the asset i.e. theatre
38.	Amount spent on uniforms	Revenue	Recurring expenditure for the staff
39.	Cost of stores consumed in manufacturing machinery for installation in own factory	Capital	Expenditure incidental to acquisition of an asset
40.	Amount spent on replacing electric motor of machinery destroyed by fire	Revenue	For maintenance of an asset
41.	Claim received from an insurance company for suspension of business activity due to fire	Revenue	Receipt for suspension of revenue activities
42.	Compensation paid for termination of services of workers disturbing peace in the factory	Revenue	Normal business expenditure
43.	Amount received by tenant for surrendering tenancy right	Capital	Receipt for sale of capital asset
44.	Amount spent for removing and reinstallation of machinery	Revenue	Expenditure does not increase life of asset
45.	Purchase of loose tools expected to last 8 months	Revenue	Normal running expenditure
46.	Cost of raincoats and umbrellas for employees	Revenue	Recurring business expenditure
47.	Training of two engineers on a new machine in Japan	Capital	Expenditure incidental to acquisition of an asset
48.	Wages for building extension	Capital	Expenditure incidental to acquisition of an asset
49.	Import duty on raw materials imported from Germany	Revenue	Normal business expenditure
50.	Cost of replacement of defective part of machinery	Revenue	For maintenance of an asset

51.	Expenditure in preparing project report	Capital / Deferred Revenue	Capital if project is ultimately implemented otherwise deferred revenue
52.	Training expenses for employees for better running of machinery	Revenue	Normal business expenditure
53.	Expenses for repair of cinema screen	Revenue	For maintenance of an asset
54.	Legal and other expenses in connection with issue of share capital	(Deferred) Revenue expenditure	Benefit of expenditure to last for a few years
55.	Goodwill of another business acquired	Capital	Brings into existence a new asset
56.	Gift received from a relative	Capital	It is not a normal receipt
57.	Loss on sale of machinery	Capital	Loss is because of sale of a fixed asset
58.	Travelling expenses of director abroad for exploring export possibilities	Revenue expenditure	Normal business (even if export ultimately does not take place)
59.	Cost of transferring stock from one factory to another	Revenue	Normal business expenditure
60.	Travelling expenses of director abroad for purchase of machinery	Capital	Expenditure incidental to purchase of an asset.

## **PART C –NPO**

### **FINAL ACCOUNTS AND BALANCE SHEET OF NON-PROFIT SEEKING CONCERNS**

Certain concerns like Clubs, Charitable Institutions, Medical Association, Societies, etc. do not intend to earn profit. They render service to the society or to their members. Their members do not get any share of profit or dividend. These concerns are known as non-profit concerns as their transactions are service-based but not profit-based.

Their annual accounts are regularly prepared to convey their financial affairs to their members or others like (govt. etc.) for seeking financial grants. If the size of the concern is small, the accounting records are usually kept under single entry system. Complete double entry system is followed only in big concerns. In any case they all prepare — (A) Receipts & Payments Account for a financial period; (B) Income & Expenditure Account for a financial period and (C) Balance Sheet at the end of the financial period.

#### **A. Receipts & Payments Account**

1. It is an Account which contains all Cash and Bank transactions made by a non-profit organization during a particular financial period.
2. It starts with the opening balances of Cash and Bank. All Cash Receipts both capital & revenue during the period are debited to it.
3. All Cash Payments both capital & revenue during the period are credited to this Account. It ends with the closing Cash and Bank Balances.
4. While recording the Cash and Bank transactions all entries are made on Cash Basis.
5. It is a summary of Cash Book.
6. It follows Real Account

**PERFORMA RECEIPTS & PAYMENT ACCOUNT**

In the books of .....

**Receipts & Payments Account For the year ended**

Receipts	Amount Rs.	Amount Rs	Payments	Amount Rs.	Amount Rs.
To balance b/d			By Sundry Payments		
Cash in hand		XXX	(Both Capital and Revenue)		XXX
Cash at bank		XXX			
To sundry Receipts (Both Capital and Revenue)		XXX	By Balance C/d Cash in hand Cash at bank		XXX XXX
		XXX			XXX

**B. Income & Expenditure Account**

1. It follows Nominal Account.
2. All expenses of revenue nature for the particular period are debited to this Account on accrual basis.
3. Similarly all revenue incomes related to the particular period are credited to this Account on accrual basis.
4. All Capital incomes and Expenditures are excluded.
5. Only current year's incomes and expenses are recorded. Amounts related to other periods are deducted. Amounts outstanding for the current year are added.
6. Profit on Sale of Asset is credited. Loss on Sale of Asset is debited. Annual Depreciation on Assets is also debited.
7. If income is more than expenditure, it is called a Surplus, and is added with C General Fund etc. in the Balance Sheet.
8. If expenditure is more than income, it is a deficit, and is deducted from Capital or Fund etc. in the Balance Sheet.

**PROFORMA INCOME & EXPENDITURE ACCOUNT**

In the books of .....

Income & expenditure Account for the year ended,,,,,.

Dr.

Cr.

Expenditure	Amount Rs.	Amount Rs	Income	Amount Rs.	Amount Rs.
To Revenue Expenditure		XXX	By Revenue Income		XXX
To Surplus (Excess of Income over Expenditure)			By Deficit (Excess of Expenditure over Income)		
		XXX			XXX

**C. Balance Sheet**

The Balance Sheet is prepared in the similar way as followed in a Trading concern shall of the assets and liabilities may be made in order of liquidity or in order of nence.

Calculation of opening capital Fund: (If not mentioned)

Opening Capital Fund = Opening Assets - Opening Liabilities,

Distinction between Receipts and Payment Account and Income & Expenditure Account

	Receipts & Payment Account	Income & Expenditure Account
1	It is a summarized Cash Book	It closely resembles the Profit & Loss Account of a Trading Concern
2	Receipts are debited, and Payment are Credited	Incomes are credited, and Expenditures are debited
3	Transactions are recorded on cash basis	Transactions are recorded on Accrual basis.
4	Amounts related to previous period or future period may remain included. Outstanding amount for included. Outstanding amount for current year is excluded	Transactions are recorded on accrual basis. All amounts not related to the current period are excluded. Outstanding amounts of current period are added.
5	It records both Capital and Revenue transactions.	It records of Revenue transactions only.
6	It serves the purpose of a Real Account	It serves the purpose of a Nominal Account

7	It starts with opening Cash and Bank Balances and ends with closing Cash and Bank Balances.	1 It does not record such balances, rather its final balance shows a surplus or a deficit for the period
8	It does not record notional loss or non-cash expenses like bad debts, depreciation etc.	It considers all such expenses for matching against revenues
9	Its closing balance is carried forward to the same account of the next accounting period.	Its closing balance is transferred to Capital Fund, or General Fund or Accumulated Fund in the same period's Balance Sheet.
10	It helps to prepare an income & ire A/c.	It helps to prepare a Balance Sheet

### Some Important Considerations

#### 1. Capital Fund:

It is also called "General Fund" or "Accumulated Fund," It is actually the Capital of a non-profit concern. It may be found out as the excess of assets over liabilities. Usually "Surplus" or "Deficit" during a period is added with or deducted from it. A portion of Capitalized incomes like donations may be added with it.

#### 2. Special Fund:

It may be created out of special donation or subscription or out of a proportion of the "Surplus". For example club may have "Building Fund". It may be used meeting some specific expenses or for acquiring an assets. It any income is derived out of investment made against this fund or if any profit or loss occurs due to sale of such investment, such income or profit or loss is transferred to this fund.

### Other Treatments:

#### (a) If the Special Fund is used to meet an expense

Special Fund A/c      Dr.  
                                     To Bank A/c (amt. of expense)

The balance of the Fund is shown as a liability. If the balance is transferred to Capital Fund, the entry will be—

Special Fund A/c      Dr.  
                                     To Capital Fund A/c (Balance of Special Fund)

#### (b) If the Special Fund is used to purchase an asset

Asset A/c                      Dr.  
                                     To Bank A/c (Cost of the asset) Special Fund A/c      Dr.  
                                     To Capital Fund A/c (Special Fund closed)

### 3. Donations

- (a) Donation received for a particular purpose should be credited to Special Fund.  
For example, Donation received for Building should be credited to Building Fund A/c.
- (b) For other donations received the by-laws or rules of the concern should be followed.
- (c) If there is no such rule, donations received of non-recurring nature should be credited to Capital Fund. Recurring donations received should be credited to Income & Expenditure Account.
- (d) Donation paid by the concern should be debited to Income & Expenditure Account.

**4. Legacy received:** It is to be directly added with Capital Fund after deduction of tax, (if any). It is a kind of donation received according to the will made by a deceased person.

### 5. Entrance Fees or Admission Fees

- (a) The rules or by-laws of the concern should be followed.
- (b) If there is no such rule, Admission or Entrance Fees paid once by members for acquiring membership should be added with Capital Fund.
- (c) If such fees are of small amounts covering the expenses of admission only, the fees may be credited to Income & Expenditure Account.

### 6. Subscriptions

- (a) Annual subscriptions are credited to Income & Expenditure Account on accrual basis.
- (b) Life membership subscription is usually credited to a separate account shown as a liability. Annual Subscription apportioned out of that is credited to Income & Expenditure Account and deducted from the liability. Thus the balance is carried forward till the contribution by a member is fully exhausted. If any member dies before hand, the balance of his life Membership contribution is transferred to Capital Fund or General Fund.

#### Illustration:

**Special Points: (a) Preparation of Income & Expenditure Account and calculation of Closing Capital Fund; (b) Loss on Sale of Asset; (c) Donation to a Specific Fund.**

The following is the Receipts and Payments Account of a Club for the year ended 31st December, 2007

**Receipts:** Cash in hand (1.1.07) Rs. 1,000; Cash at Bank (1.1.07) Rs. 4,000; Donation for Building Rs. 10,000; Sale of Furniture (Balance on 1.1.07 Rs. 100) Rs. 80; Sale of Newspapers Rs. 200; Subscriptions Rs. 20,000.

**Payments:** Sports Materials Rs. 2,500; Salaries Rs. 3,250; Furniture Rs.1,600; Newspapers Rs.500; Building Fund Investment Rs. 10,000; Tournament Expenses Rs. 11,000; Postage Rs. 200; Cash in hand (closing balance) Rs. 1,030;Cash at Bank (Closing Balance) Rs. 5,200.

The following adjustments are to be made

- (i) Of the Subscriptions collected Rs. 2,000 was outstanding for 2006;
- (ii) on 1.1.07 Stock of Raw Materials was Rs. 500 and 31.12.07 it was Rs.700.

**Prepare the Income and Expenditure Account for the year ended 31st December, 2007 and show the Capital Fund of the Club as on that date.**

## **PART D - COMPANY FINAL ACCOUNTS**

### **(i) Schedule VI of Companies Act :**

Schedule VI to the Companies Act, 1956 provides the manner in which every company registered under the Act shall prepare its Balance Sheet, Statement of Profit and Loss and notes thereto. The Revised Schedule VI is applicable for the financial year commencing on or after April 1, 2011.

The Revised Schedule VI prescribes only the vertical format for presentation of Financial Statements. Thus, a company does not have an option to use horizontal format for the presentation of Financial Statements.

The Structure of Revised Schedule VI is as under:

- I. General Instructions
- II. Part I - Form of Balance Sheet
- III. General Instructions for Preparation of Balance Sheet
- IV. Part II - Form of Statement of Profit and Loss
- V. General Instructions for Preparation of Statement of Profit and Loss.

### **(ii) Shareholder's Funds**

Shareholder's Funds consists of;

#### **A. Share Capital: It should include**

- a. The Authorized Capital with the number and amount of shares;
- b. The number of shares issued and subscribed and whether they are fully paid or not fully paid;
- c. Face value per share;
- d. The different classes of shares and their rights and restrictions.
- e. A reconciliation of the number of shares outstanding at the beginning and at the end of the period;



- f. Separate particulars for a period of five years following the year in which the shares have been allotted/bought back, in respect of:
- Aggregate number and class of shares allotted as fully paid up pursuant to contract(s) without payment being received in cash.
  - Aggregate number and class of shares allotted as fully paid up by way of bonus shares.
  - Aggregate number and class of shares bought back.

**B. Reserves and Surplus:** It shall be classified as:

- a. Capital Reserves;
- b. Capital Redemption Reserves;
- c. Securities Premium Reserve;
- d. Debenture Redemption Reserve;
- e. Revaluation Reserve;
- f. Other Reserves;
- g. Surplus i.e. balance in Statement of Profit & Loss disclosing allocations and appropriations such as dividend paid, bonus shares and transfer to/from reserves.
- h. Debit balance of Statement of Profit and Loss shall be shown as a negative figure under the head 'Surplus' Similarly, the balance of 'Reserves and Surplus', after adjusting negative balance of surplus, if any, shall be shown under the head 'Reserves and Surplus' even if the resulting figure is in the negative.

**(iii) Non Current Liabilities :**

**Ans.** Non current Liabilities includes:

**A. Long-term Borrowings :**

- a. Bonds/debentures.
- b. Term loans  
from banks  
from other parties.
- c. Deposits.
- e. Loans and advances from related parties.
- f. Long-term maturities of finance lease obligations
- g. Other loans and advances (specify nature).

Borrowings shall be classified as secured and unsecured. The type and nature of security shall be specified. If the loans have been guaranteed by directors, it should be mentioned against the loan. Also the terms of repayment of loans should be mentioned. If the company is in default about repayment of loan then the period and amount of default, with break-up of principal and interest shall be specified separately.

- B. Deferred Tax Liabilities:** If the company has to pay either the Central Govt. or the State Govt for any taxes in the future the details of the liabilities along with the period should be mentioned.
- C. Other Long-term Liabilities :** Other Long-term Liabilities shall be classified as:
  - a. Trade payables
  - b. Others.
- D. Long-term Provisions:** The amounts shall be classified as:
  - a. Provision for employee benefits.
  - b. Others.

**(iv) Current Liabilities:**

Current Liabilities consists of,

- A. Short-term Borrowings:**
  - a. Loans repayable on demand
    - from banks.
    - from other parties.
  - b. Loans and advances from subsidiaries/holding company/associates/business ventures.
  - c. Deposits.
  - d. Other loans and advances.

Borrowings shall be classified as secured and unsecured. The type and nature of security shall be specified. If the loans have been guaranteed by directors, it should be mentioned against the loan. Also the terms of repayment of loans should be mentioned. If the company is in default about repayment of loan then the period and amount of default, with break-up of principal and interest shall be specified separately.

- B. Trade Payables :**They consist of Creditors, Bills Payable and outstanding expenses

**C. Other Current Liabilities :**The amounts shall be classified as:

- a. Current maturities of long-term debt;
- b. Current maturities of finance lease obligations;
- c. Income received in Advance;
- d. Interest accrued but not due on borrowings;
- e. Interest accrued and due on borrowings;
- f. Unpaid Dividends;
- g. Other payables.

**D. Short-term Provisions : The amounts shall be classified as:**

- a. Provision for employee benefits.
- b. Others.

**(v) Non Current Assets :**

It includes

**A. Tangible Assets:**

- a. Land.
- b. Buildings.
- c. Plant and Equipment.
- d. Furniture and Fixtures.
- e. Vehicles.
- f. Office equipment.
- g. Others .

**B. Intangible Assets:**

- a. Goodwill.
- b. Brands/trademarks.
- c. Computer software.
- d. Copyrights, and patents and other intellectual property rights, services and operating rights.
- e. License and franchise.
- f. Others

Details for both Tangible and Intangible Assets should be given, the Gross as well as Net Amount of the Assets , additions and Deductions during the year. The amount of depreciation charged in the current year and the amount of depreciation adjusted on sale of assets.

**C. Non-current Investments:** These are Long Term Investments

- a. Investments in Equity Instruments;
- b. Investments in Preference shares;
- c. Investments in Government or trust securities;
- d. Investments in units, debentures or bonds;
- e. Investments in Mutual Funds;
- f. Investments in partnership firm;

The following information should be given

- a. The amount of quoted investments and market value;
- b. The amount of unquoted investments;
- c. The provision for decrease in value of investments;
- d. The amount of partly paid-up investments.

**D. Long-term Loans and Advances:**

Long-term loans and advances shall be classified as:

- a. Capital Advances;
- b. Security Deposits;
- c. Loans and Advances to related parties ;
- d. Other Loans and Advances.

The above shall also be separately sub-classified as:

- a. Secured, considered good;
- b. Unsecured, considered good;
- c. Doubtful.

**E. Other Non-current Assets :**Other non-current assets shall be classified as:

- (i) Long-term Trade Receivables;
- (ii) Others .

**(vi) Current Assets:**

Current Assets consists of

**A. Current Investments:** These are called as short term investments

- a. Investments in Equity Instruments;
- b. Investments in Preference shares;
- c. Investments in Government or trust securities;
- d. Investments in units, debentures or bonds;
- e. Investments in Mutual Funds;
- f. Investments in partnership firm;

The following information should be given

- a. The amount of quoted investments and market value;
- b. The amount of unquoted investments;
- c. The provision for decrease in value of investments;
- d. The amount of partly paid-up investments.
- e. The basis of valuation of individual investments.

**B. Inventories:**

- a. Raw material;
    - b. Work-in-progress;
    - c. Finished goods;
    - d. Stock-in-trade;
    - e. Stores and spares;
    - f. Loose tools;
    - g. Goods In Transit
- Mode of valuation should be stated.

**C. Trade Receivables:**

Under this heading we record entries for debtors and bills receivable. If the amount of Trade Receivables is outstanding for a period exceeding six months they should be separately stated. Trade receivables should also be segregated as

- a. Secured, considered good;
- b. Unsecured, considered good;
- c. Doubtful.

If the Debts are due by directors or other officers of the company or debts due by firms or private companies respectively in which any director is a partner or a director or a member should be separately stated.

**D. Cash and Cash Equivalents:**

- a. Balances with banks;
- b. Cheques, drafts on hand;
- c. Cash on hand;

If the company has Bank Fixed Deposits having a maturity of more than 12 months it should be disclosed separately.

**E. Short-term Loans and Advances:**

- a. Loans and Advances to related parties (giving details thereof);
- b. Others .

**F. Other Current Assets :** This is an all-inclusive heading, which incorporates current assets that do not fit into any other assets categories.

**(vii) Contingencies and Commitments:**

Contingencies and Commitments consists of

(i) **Contingent liabilities:**

- a. Claims against the company not acknowledged as debt;
- b. Guarantees;
- c. Other money for which the company is contingently liable

(ii) **Commitments :**

- a. Estimated amount of contracts remaining to be executed on capital account and not provided for;
- b. Uncalled liability on shares and other investments partly paid;
- c. Other commitments .

(iii) Arrears of fixed cumulative dividends on Preference Shares shall also be disclosed separately.

**(viii) Accounting Standard 1:**

- 1) Accounting policies refers to specific accounting principles and the method of applying those principles adopted by the enterprises in preparation and presentation of the financial statements.
- 2) At the time of preparation of financial statements i.e. Balance sheet, profit and loss account, there are many areas, which have more than one method of accounting treatment such as:

**Methods of depreciation, conversion or translation of foreign currency item, valuation of inventories, valuation of investments, treatment of retirement benefits etc.**

There are many other areas where more than one method can be followed in preparation of Balance sheet and profit and loss account. What methods have been followed must be disclosed as accounting policies. Hence, accounting policies contain the information about the method adopted in preparation of financial statements. Statement of accounting policies are a part of financial statements.

- 3) For proper and better understanding of financial statement it is required that all the significant accounting policies followed in preparation of financial statements should be disclosed because assets and liabilities in the balance sheet and profit and loss account are significantly affected by the accounting policies followed. All significant accounting policies should be disclosed at one place because it would be helpful to the reader of financial statement.

#### 4) **Selection of accounting policies**

The basic objective of selection of accounting policies is that the financial statements should be prepared on the basis of such accounting policies, which exhibits true and fair view of the state of affairs of the Balance sheet and profit and loss account.

Major points which are considered for the purpose of selection and application of accounting policies are:

- a) **Prudence** – Generally maker of financial statement has to face uncertainties at the time of preparation of financial statement. These uncertainties may be regarding collection of receivables, number of warranty claims that may occur. Prudence means making of estimates, which are required under conditions of uncertainty.
- b) **Substance over form** – It means that transaction should be accounted for in accordance with the actual happening and economic reality of the transaction and not by its legal form. Like in hire purchase if the assets are purchased on hire purchase by hire purchaser, the assets and are shown in the books of hire purchaser inspite of the fact that the hire purchaser is not the legal owner of the assets purchased. Under the hire purchase agreement, the purchaser becomes the owner only on the payment of last installment. Therefore, the legal form of the transaction is ignored and the transaction is accounted as per its substance.
- c) **Materiality** – Financial statement should disclose all the items and facts which are sufficient enough to influence the decisions of the reader/user of financial statements.

#### 5) **Changes in accounting policies**

A change in accounting policies should be made in the following conditions:

- a) When it is required for compliance of statute.
- b) For compliance of accounting standard and
- c) For better presentation of financial statements.

If there is any change in accounting policies in preparation of financial statement from one period to subsequent period and such change affects the state of affairs of the balance sheet and profit and loss account of current period or the financial statement of later period, then such change must be disclosed in financial statement. The amount, by which the financial statement is affected should be disclosed to the extent ascertainable.

## 6) **Fundamental accounting assumption**

The institute of chartered accountants of India issued accounting standard (AS1) disclosure of accounting policies which states that there are three fundamental accounting assumptions:-

- i. Going concern
- ii. Consistency
- iii. Accrual

The institute issued the frame work for the preparation and presentation of financial statements in year 2000 which defines the underlying assumptions as follows:-

### **Going concern –**

The financial statements are normally prepared on the assumption that an enterprise is a going concern and will continue in operation for the near future. Hence it is assumed that the enterprise has neither the intention nor the need to liquidate or curtail materially the scale of its operations, if such an intention or need exists, the financial statements may have to be prepared on a different basis and if so the basis used is disclosed.

### **Consistency -**

In order to achieve comparability of the financial statements of an enterprise through time, the accounting policies are followed consistently from one period to another; a change in an accounting policy is made only in certain exceptional circumstances.

### **Accrual**

In order to meet their objectives, financial statements are prepared on the accrual basis of accounting. Under this basis the effects of transactions and other events are recognized when they occur (and not as cash or cash equivalent is received or paid) and they are recorded in accounting records and reported in financial statements of the periods to which they relate. Financial statements prepared on the accrual basis inform users not only of the past events involving the payment and receipt of cash but also of obligation to pay cash in the future and of resources that represent cash to be received in the future. Hence, they provide the type of information about past transactions and other events that is most useful to users in making economic decisions.

If nothing has been written about the fundamental accounting assumptions in financial statements, it is assumed that fundamental accounting assumption has been followed in preparation of financial statement.

If any fundamental accounting assumption is not followed in the financial statements, then this fact should be disclosed in the financial statement.



- 7) **Notes to accounts** - Notes to accounts are integral part of financial statement. Notes to accounts are the explanation of the management about the items in the financial statements (profit and loss account and the balance sheet). The management gives more explanation and information about the items profit and loss account and balance sheet and any other items by way of notes to accounts.

**Balance Sheet as on .....**  
**Final Accounts Format**

Particular	Sch. No.	Current Year	Previous Year
<b>I] EQUITY AND LIABILITIES</b>			
<b>A. SHAREHOLDERS FUND</b>			
1. Share Capital	1	xx	
2. Reserves & surplus	2	xx	
3. Money received against share warrant		xx	
B. Application of Money received, pending allotment		xx	
<b>C. NON CURRENT LIABILITIES</b>			
1. Long term borrowings	3	xx	
2. Deferred Tax Liability (Net)		xx	
3. Other long term Liabilities	4	xx	
4. Long term provision	5	xx	
<b>D. CURRENT LIABILITIES</b>			
1. Short term borrowings	6	xx	
2. Trade payable	7	xx	
3. Other current liabilities	8	xx	
4. Short term provision	9	xx	
<b>TOTAL</b>		<b>xxx</b>	
<b>II] ASSETS</b>			
<b>A. NON CURRENT ASSETS</b>			
1. Fixed Assets			
a. Tangible Assets	10	xx	
b. Intangible Assets	11	xx	
c. Capital WIP		xx	
d. Intangible assets under development		xx	
<b>2. NON CURRENT INVESTMENT</b>	<b>12</b>	<b>xx</b>	
3. Deferred Tax assets (Net)		xx	
4. Long term loans & advances	13	xx	
5. Other non current assets	14	xx	
<b>B. CURRENT ASSETS</b>			
1. Current Investment	15	xx	
2. inventories	16	xx	
3. Trade Receivable	17	xx	
4. Short term loans & advances	18	xx	
5. Cash & Bank Equivalent	19	xx	

6. Other current Assets	20	xx	
<b>TOTAL</b>		<b>xxx</b>	
* Contingent Liabilities	21	xx	

<b>SCH. 1</b>	
Authorised Share Capital	xx
Issued, subscribed, paid up _____ equity shares of Rs. ____ each, Rs. _____ called up	xx
_____ % of preference shares of Rs. _____ each, Rs. _____ called up	xx
<b>Less:</b> calls in arrears	(xx)
<b>Add:</b> share forfeiture	xx
	xx
<b>NOTE: 1</b>	
Out of the above state how many shares were issued for consideration other than cash.	
<b>NOTE: 2</b>	
State out of the above how many shares were issued as bonus shares	
<b>SCH. 2</b>	
<b>Reserves and Surplus</b>	
Capital Reserves	xx
Capital Redemption Reserves	xx
Security premium	xx
Reserve Fund	xx
General Reserve	xx
Revaluation Reserve	xx
Profit and Loss A/c 'Cr' balance	xx
	xxx
<b>SCH. 3</b>	
<b>Long Term Borrowings</b>	
Debentures / Bonds,	xx
Loan taken from financial institutions	xx
Mortgage Loan	xx
Loan from commercial Banks	xx
In accrued and due on the above	xx
<b>NOTE: 1</b>	
State what kind of an assets has been given as security. Also state the period of redemption And rate of redemption.	
<b>SCH. 4</b>	
<b>Other Long Term Liabilities</b>	
Public deposits	xx
Fixed deposits accepted from people	xx
Loan from directors	xx
Intercompany Loans	xx
	xx

<b>SCH. 5</b>	
<b>Long Term Provisions</b>	
Employee Benefits	XX
Staff Provided Fund	XX
	XX
<b>SCH. 6</b>	
<b>Short Term Borrowings</b>	
Bank Overdrafts	XX
Cash / Credit	XX
Short term loans	XX
Treasury Bills	XX
	XX
<b>SCH. 7</b>	
<b>Trade Payable</b>	
Trade Creditors	XX
Bills Payable	XX
	XX
<b>SCH. 8</b>	
<b>Other Current Liabilities</b>	
Outstanding Expenses	XX
Income received in advance	XX
Any short term liability	XX
Interest accrued but not due	XX
	XX
<b>SCH. 9</b>	
<b>Short Term Provisions</b>	
Proposed dividend	XX
Provision for tax	XX
Workmen compensation fund	XX
	XX
<b>SCH. 11</b>	
<b>Intangible Assets</b>	
Goodwill	XX
Copyrights	XX
Patents	XX
Trademarks	XX
	XX
<b>SCH. 12</b>	
<b>Non Current Investment</b>	
Trade Investment	XX
Long term investment	XX
Investments in Govt. Securities	XX
Investment in Subsidiary	XX
	XX
<b>NOTE: 3</b>	
Investment will always be valued at cost price, if market price or face value are given there are to be shown as Information.	

<b>SCH. 13</b>	
<b>Long Term Loans and Advances</b>	
Security Deposits	XX
Loan given to subsidiary company	XX
	XX
<b>SCH. 14</b>	
<b>Other Non Current Assets</b>	
Preliminary Expenses	XX
Underwriting commission	XX
Formation Expenses	XX
Share issue Expenses	XX
Discount on issue of shares & debentures	XX
	XX
<b>NOTE:</b>	
The above amount are to the extend not written off	
<b>SCH. 15</b>	
<b>Current Investment</b>	
Short term investment	XX
Marketable investment	XX
	XX
<b>SCH. 16</b>	
<b>Inventories</b>	
Stock of Raw Material	XX
Stock of WIP	XX
Stock of Finished Goods	XX
Stock of loose tools	XX
	XX
<b>SCH. 17</b>	
<b>Trade Receivable</b>	
Debtors	XX
	XX
<b>NOTE:</b>	
State out of the above debtors how many are due for a period exceeding 6 months and how many are doubtful	
<b>SCH. 18</b>	
<b>Short Term Loans and Advances</b>	
Prepaid Expenses	XX
Bills Receivable	XX
Advance Tax	XX
Advance to Suppliers	XX
	XX
<b>NOTE:</b>	
According to the disclosure between advance tax and provisions for tax any one is to be shown. Hence we will let of whichever is greater.	

<b>SCH. 19</b>		
<b>Cash Bank Equivalents</b>		
Cash in Hand		XX
Cash at Bank		XX
		XX
<b>SCH. 20</b>		
<b>Other Current Assets</b>		
Income Receivable		XX
Stock of stationary		XX
Other Assets		XX
		XX
<b>SCH. 21</b>		
<b>Contingent Liabilities</b>		
Court case pending		XX
Arrears of preference dividend		XX
Any amount payable on occurring of an event		XX
Any amount payable on party paid up invt.		XX
		XX

**SCH. 10. Tangible Assets**

Particular	Gross Block		Prov. For Dep <sup>n</sup> .				Net Block	
	Op. Bal.	C/S Bal.	Op. Bal.	On Sale	C. yr. Dep.	Closing Bal.	Op. WDV	Cl. WDV
	(1)	(2)	(3)	(4)	(5)	6=(3-4+5)	(7)=(1)-(3)	(8)=(2)-6
Land & Bldg. Furn. & Fixt. Plt & Mach. Com & Equip.								
	xxx	Xxx	xxx	xxx	xxx	xxx	xxx	xxx

This will be shown in income statement

This will be in balance sheet



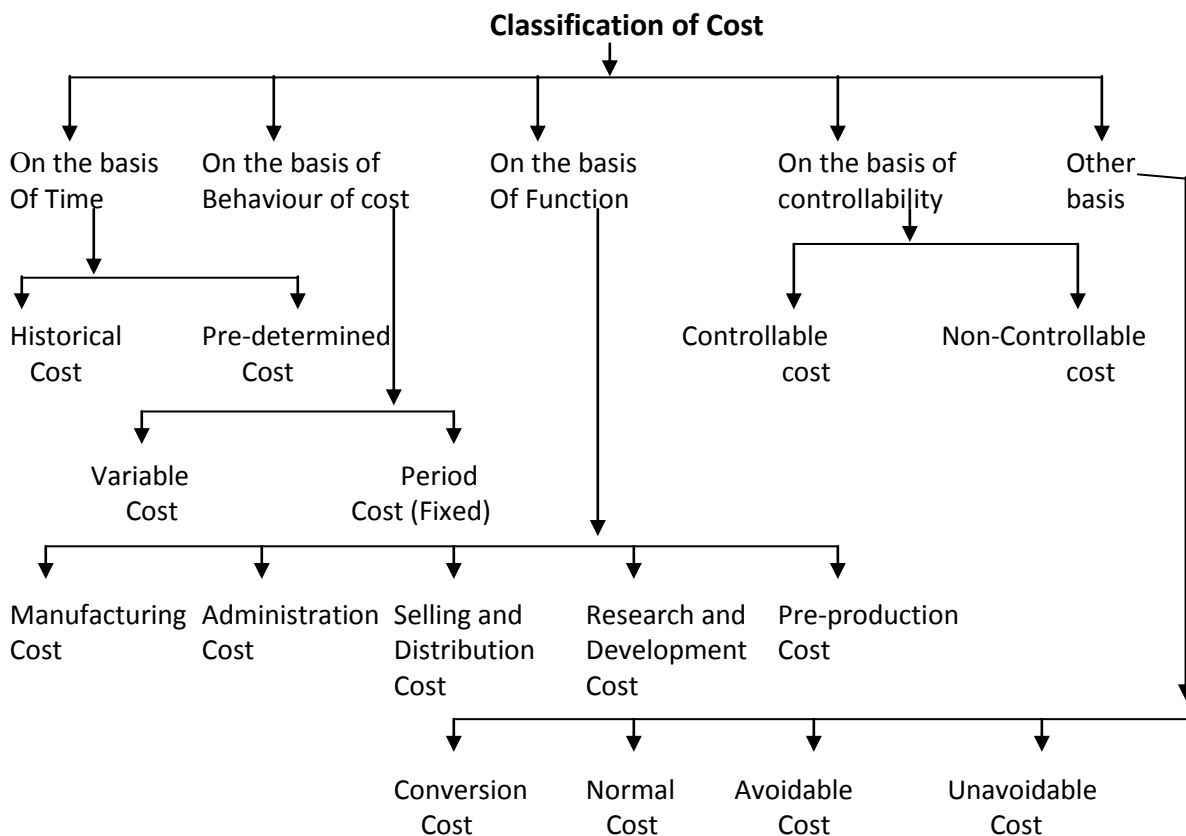
## SECTION IV COSTING

### 16.0 Meaning of Cost

'Cost' is the amount of expenditure incurred on a given thing. Cost has been defined as the amount measured in money or cash expended or other property transferred, capital stock issued, services performed or a liability incurred in consideration of goods or services received or to be received. By cost, we mean the actual cost i.e. historical cost. ICWA (UK) defines cost as the amount of expenditure (actual or notional) incurred on, or attributable to a specified thing or activity.

### 16.1 Classification of Cost

Cost classification is the process of grouping costs according to their common features. Costs are to be classified in such a manner that they are identified with cost center or cost unit. The following chart shows the classification of cost:

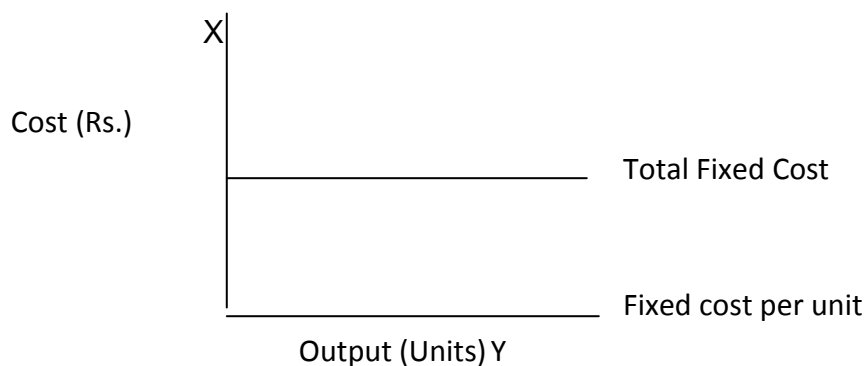


## 16.2 On the basis of behaviour of cost:

Behavior means change in cost due to change in output. On the basis of behavior cost is classified into the following categories:

### 16.3 Fixed Cost

It is that portion of the total cost, which remains constant irrespective of output up to the capacity limit. It is called as a period cost as it is concerned with period. It depends upon the passage of time. It is also referred to as non-variable cost or stand by cost or capacity cost or "period" cost. It tends to be unaffected by variations in output. These costs provide conditions for production rather than costs of production. They are created by contractual obligations and managerial decisions. Rent of premises, taxes and insurance, staff salaries constitute fixed cost. It is shown in the diagram given below:

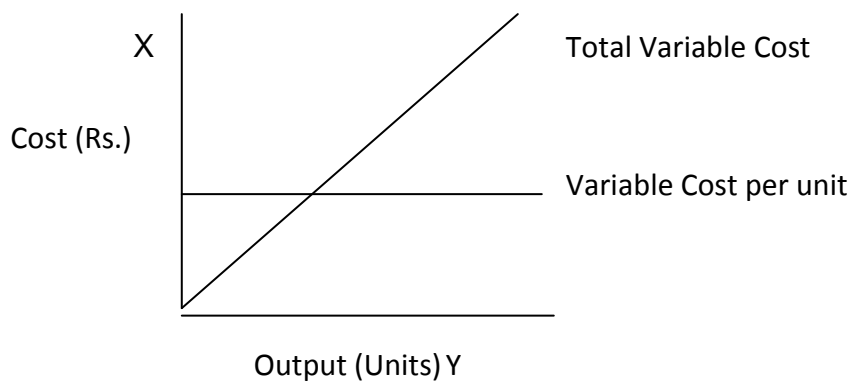


Key characteristics of fixed cost are as follows:

1. Large in value.
2. Indivisible cannot be broken in small penny pocket.
3. Irreversible, fixed cost decisions require greater thought.
4. Influence variable costs and working capital.
5. Higher Break-Even point if fixed cost is larger.
6. Image value, large fixed cost has high image value.
7. Indirect cost.
8. Lesser degree of controllability.

#### 16.4 Variable Cost

This cost varies according to the output. In other words, it is a cost, which changes according to the changes in output. It tends to vary in direct proportion to output. If the output is decreased, variable cost also will decrease. It is concerned with output or product. Therefore, it is called as a "product" cost. If the output is doubled, variable cost will also be doubled. For example, Variable Cost, direct material, direct labour, direct expenses and variable overheads. It is shown in the diagram below:



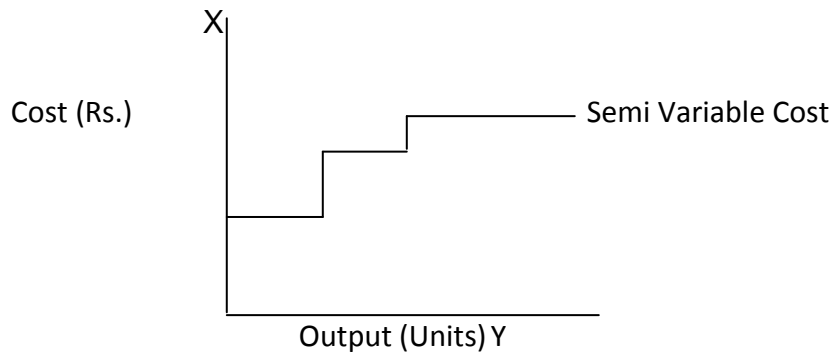
#### Characteristics of Variable Cost:

1. Total cost changes in direct proportion to change in total output.
2. Variable cost per unit remains constant.
3. It is quite divisible.
4. Per unit variable cost is smaller value.
5. It is identifiable with the individual cost unit.
6. Functional managers can exercise control over variable cost.

#### 16.5 Semi-variable Cost

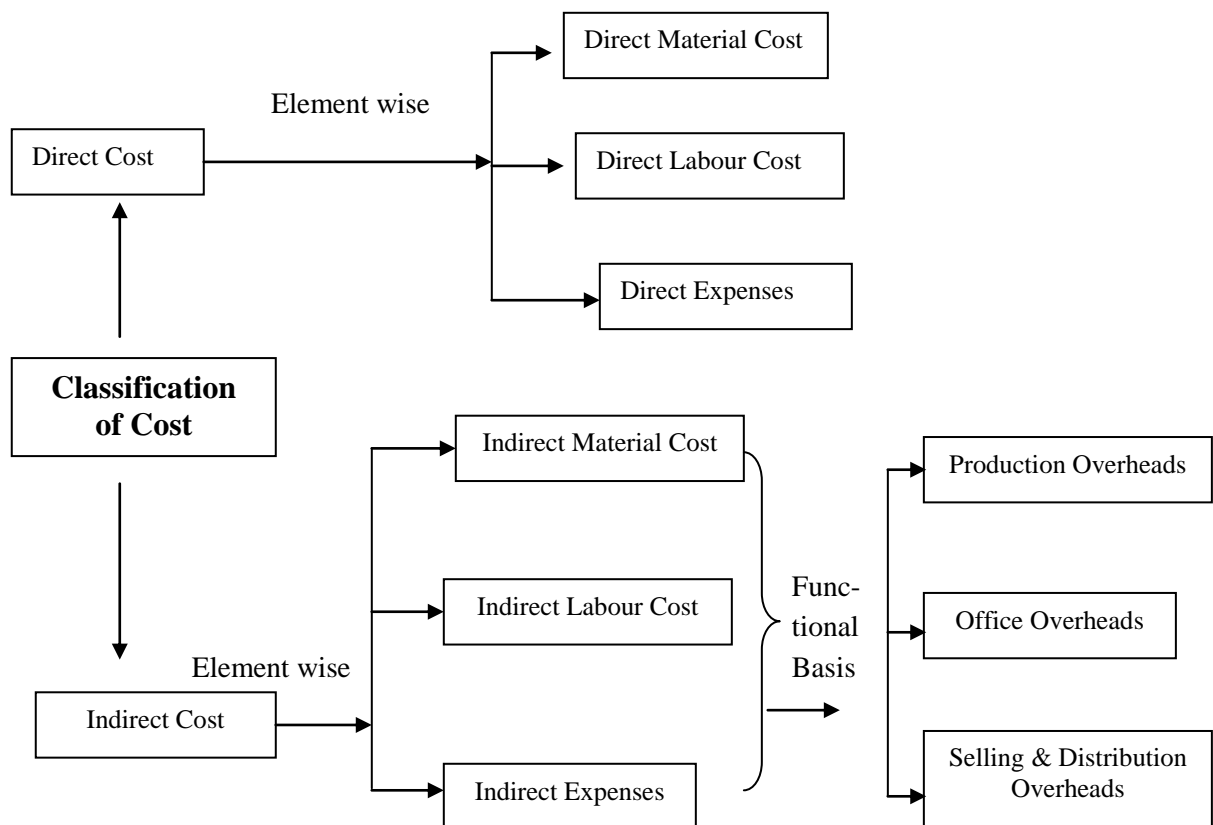
This is also referred to as semi-fixed or partly variable cost. It remains constant up to a certain level and registers change afterwards. These costs vary in some degree with volume but not in direct or same proportion. Such costs are fixed only in relation to specified constant conditions. For example, repairs and maintenance of machinery, telephone charges, maintenance of building, supervision, professional tax etc. It is shown in the diagram given below:





### 16.6 On the basis of elements of cost

Elements means nature of Items. A cost is composed of three elements: material, labour and expenses. Each of these three elements can be direct and indirect.



## 16.7 Direct cost

It is the cost, which is directly chargeable to the product manufactured. It is easily identifiable. Direct cost consists of three elements, which are as follows:

### Direct Material

It is the cost of basic raw material used for manufacturing a product. It becomes a part of the product. No finished product can be manufactured without basic raw materials. It is easily identifiable and chargeable to the product. For example, leather in leather wares, pulp in paper, steel in steel furniture, sugarcane for sugar etc. What is raw material for one manufacturer might be finished product for another. Direct material includes the following:

1. All materials specially purchased for production or the process.
2. All components purchased for production or the process.
3. Material transferred from one cost center to another or one process to another.
4. Primary packing materials, wrappings, cardboard boxes etc. necessary for preservation or protection of product.

Some of the Items like nails or thread in the store are part of finished product. They are not treated as direct materials in view of negligible cost.

### Direct Labour or Direct Wages

It is the amount of wages paid to those workers who are engaged on the manufacturing line for conversion of raw materials into finished goods. The amount of wages can be easily identified and directly charged to the product. These workers directly handle raw materials, wipe and finished goods on the production line. Wages paid to workers operating lathes, drilling, cutting machines etc. are direct wages. Direct wages are also known as productive labour, process labour or prime cost labour.

Direct wages include the payment made to the following group of workers:

1. Labour engaged on the actual production of the product.
2. Labour engaged in aiding the operations viz. Supervisor, Foreman, Shop clerks and worker on internal transport.
3. Inspectors, Analysts needed for such production.

### **Direct Expenses or Chargeable Expenses**

It is the amount of expenses, which is directly chargeable to the product manufactured, or which may be allocated to product directly. It can be easily identified with the product. For example, hire charges of a special machine used for manufacturing a product, cost of designing the product, cost of patterns, architects fees/surveyors fees, or job cost of experimental work carried out specially for a job etc, cost of special drawings, cost of special layout designs, patents, patterns, cost of models, surveyors fees, Excise duty. Royalty on production cost of rectifying defective work, license fees for a product. Utility of such expenses is exhausted on completion of the job.

### **16.8 Indirect Cost**

It is that portion of the total cost, which cannot be identified and charged direct to the product. It has to be allocated, apportioned and absorbed over the units manufactured on a suitable basis. It consists of the following three elements:

#### ***Indirect Material***

It is the cost of material other than direct material, which cannot be charged to the product directly. It cannot be treated as part of the product. It is also known as expenses materials. It is the material which cannot be allocated to the product but which can be apportioned to the cost units. Examples are as follows:

1. Lubricants, cotton waste, Grease, Oil, stationery etc.
2. Small tools for general use.
3. Some minor Items such as thread in dressmaking, cost of nails in shoe making etc.

#### ***Indirect Labour***

It is the amount of wages paid to those workers who are not engaged on the manufacturing line, for example, wages of workers in administration department, watch and ward department, sales department, general supervision.

#### ***Indirect Expenses***

It is the amount of expenses, which is not chargeable to the product directly. It is the cost of giving service to the production department. It includes factory expenses, administrative expenses, selling and distribution expenses etc.

Internet based firms need to treat customer as a primary cost objective in differentiating between direct and indirect costs. In other words, in accumulating and allocating costs, Internet based firms need to adopt a customer focus.

### **16.9 Overheads or On Cost or Burden or Supplementary Cost**

Aggregate of indirect cost is referred to as overheads. It arises as a result of overall operation of a business. According to Weldon overhead means "the cost of indirect material, indirect labour and such other expenses including services as cannot conveniently be charged direct to specific cost units. It includes all manufacturing and non-manufacturing supplies and services. These costs cannot be associated with a particular product. The principal feature of overheads is the lack of direct traceability to individual product. It remains relatively constant from period to period. The amount of overheads is not directly chargeable i.e. it has to be properly allocated, apportioned and absorbed on some equitable basis.

### **16.10 Classification of Overheads:**

1. **Factory Overheads:** It is the aggregate of all the factory expenses incurred in connection with manufacture of a product. These are incurred in connection with running of factory. It includes the items of expenses viz., factory salary, work manager's salary, factory repairs, rent of factory premises, factory lighting, lubricants, factory power, drawing office salary, haulage (cost of internal transport), depreciation of plant and machinery, unproductive wages, estimation expenses, royalties, loose tools w/off, material handling charges, time office salaries, counting house salaries, etc.
2. **Administrative Overheads or Office Overheads:** It is the aggregate of all the expenses as regards administration. It is the cost of office service or decision-making. It consists of the following expenses: staff salaries, Printing and stationery, postage and telegram, telephone charges, rent of office premises, office Conveyance, printing and stationery and repairs and depreciation of office premises and furniture etc.
2. **Selling and Distribution Overheads:** It is the aggregate of all the expenses Incurred in connection with sales and distribution of finished product and services. It is the cost of sales and distribution services. Selling expenses are such expenses, which are incurred in, acquiring and retaining customers.

It includes the following expenses: (a) Advertisement (b) Show room expenses (c) Travelling expenses (d) Commission to agents. (e) Salaries of Sales office (f) Cost of catalogues (g) Discount allowed (h) Bad debts written off (i) Commission on sales (j) Rent of Sales Room (k) Samples and Free gifts (l) After sales service expenses (m) Expenses on demonstration and technical advice to prospective customers (n) Free repairs and servicing expenses (o) Expenses on market research (p) fancy packing and demonstration. Distribution expenses include all those expenses, which are incurred in connection with making the goods available to customers. These expenses include the following: (a) Packing charges (b) Loading charges (c) Carriage on sales (d) Rent of warehouse (e) Insurance and lighting of warehouse (f) Insurance of delivery van (g) Expenses on delivery van (h) Salaries of Godown keeper, drivers and packing staff.

### **17.0 Marginal Costing:**

We have studied in the earlier unit that cost can be classified into two groups viz. fixed cost and variable cost. Variable cost varies with the changes in the volume of output or level of activity. As against this, fixed cost relates to time and does not vary with the changes in the level of activity. Because of inclusion of fixed cost in determination of total cost of a product, the cost per unit or process varies from period to period according to the volume. This has given rise to the concept of marginal costing. Marginal costing is concerned with determination of product cost which consists of direct material, direct labour, direct expenses and variable overheads. It should be kept in mind that variable costs per unit are fixed and fixed costs per unit are variable with changes in the level of output. In United Kingdom, variable costing is generally known as marginal costing. Marginal costing is also known as direct costing, contributory costing and incremental costing.

The ICMA has defined marginal cost “as the amount at any given volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit.” From the analysis of this definition it is clear that increase / decrease in one unit of output increases / reduces the total cost from the existing level to the new level. This increase / decrease in variable cost from existing level to the new level is called as marginal cost.

Suppose the cost of producing 100 units is Rs. 200. If 101 units are manufactured the cost goes up by Rs. 2 and becomes Rs. 202. If 99 units are manufactured, the cost is reduced by Rs. 2 i.e. to Rs. 198. With the increase or decrease in the volume the cost is increased or decreased by Rs. 2 respectively. Thus Rs. 2 will be called as the marginal cost.

Marginal costing means “the ascertainment of marginal costs and of the effect on profit of changes in volume or type of output by differentiating between fixed and variable costs”.

Marginal costing is not a method of costing. It is a technique of controlling by bringing out relationship between profit and volume.

### 17.1 Key Features of Marginal Costing:

- The elements of cost are differentiated between fixed costs and variable costs.
- Only the variable or marginal cost is considered while calculating product costs.
- Stock of finished products and work-in-progress are valued at variable cost.
- Contribution is the difference between sales and marginal cost.
- Fixed costs do not find place in the product cost.
- Prices are based on marginal cost plus contribution.
- It is a technique of cost recording and cost reporting.
- Profitability of various products is determined in terms of marginal contribution.
- Presentation of data is oriented to highlight the total contribution and contribution from each product.

### 17.2 Advantages of Marginal Costing:

- **Constant in Nature:** Marginal cost remains the same per unit of output whether there is increase or decrease in production.
- **Realistic:** It is realistic as fixed cost is eliminated. Inventory is valued at marginal cost. Therefore, it is more realistic and uniform. No fictitious profit arises.
- **Simplified Overhead Treatment:** There is no complication of over-absorption and under-absorption of overheads.
- **Facilitates Control:** Classification of cost as fixed and variable helps to have greater control over costs.
- **Meaningful Reporting:** The reporting made on management is more meaningful as the reports are based on sales figures rather than production. Comparison of efficiency can be done in a better way.

- **Relative Profitability:** In case a number of products are manufactured, marginal costing helps management in the determination of relative profitability of each product.
- **Aid to Profit Planning:** The technique of marginal costing helps management in profit planning. The management can plan the volume of sales for earning a required profit.
- **Break-even Point:** It can be determined only on the basis of marginal costing.
- **Pricing Decisions:** These decisions can be based on contribution levels of individual products.
- **Responsibility Accounting:** It becomes more effective when based on marginal costing. Managers can identify their responsibilities clearly.

### 17.3 Limitations of Marginal Costing:

- **Analysis of Overheads:** In marginal costing, costs are to be classified into fixed and variable costs. Considerable difficulties are experienced in analyzing overheads into fixed and variable categories. Therefore, segregation of costs into fixed and variable is rather difficult and cannot be done with precision.
- **Greater emphasis on Sales:** Marginal costing technique lays greater emphasis on sales rather than production. In fact, efficiency of business is to be judged by considering both sales and production.
- **Difficulty in Application:** Marginal costing is not applicable in those concerns where large stocks have to be carried by way of work-in-progress.
- **Improper basis for fixation of selling price:** In marginal costing selling price is fixed on the basis of contribution alone which is not proper.
- **Less effective in Capital Intensive Industry:** Marginal costing technique is less effective in capital intensive industry where fixed costs are more.
- **Lack of standard for control:** Marginal costing does not provide any standard for control purpose. In fact, budgetary control and standard costing are more effective tools in controlling costs.
- **Elimination of Fixed Cost:** In marginal costing technique fixed costs are not included in the value of finished goods and work-in-progress. Since fixed costs are incurred, these should also form part of the costs of the product. Elimination of fixed costs from finished stock and work-in-progress results into the understating of the stocks. The understating of the stocks affects the profit and loss account and the balance sheet, which leads to deflation of profit.

- **Incomplete Information:** Marginal cost does not give complete information. For example, increase in production and sales may be due to so many factors such as extensive use of machinery, expansion of resources and by automation. The exact cause is not disclosed by marginal costing.
- **Useful only for short term assessment:** Marginal costing is useful for short-term assessment of profitability. However, long-term assessment of profit can be correctly determined on full costs basis only.
- **Not acceptable for tax:** Income tax authorities do not recognize marginal costing for inventory valuation.

#### 17.4 Contribution:

Contribution is the excess of selling price over variable costs. It is known as contribution because it contributes towards recovery of the fixed costs and profits. Contribution is a pool of amount from which total fixed costs will be deducted to arrive at the profit or loss. By equation the concept of contribution can be stated as follows:

$$C = S - V$$

C = Contribution

S = Sales

V = Variable Cost

#### 17.5 Profit / Volume Ratio:

This is popularly known as P/V Ratio. It expresses the relationship between contribution and sales. It is expressed in percentage. P/V ratio is given by the formula:

$$P/V \text{ ratio} = \frac{S - V}{S} \times 100 = \frac{C}{S} \times 100$$

Where C = Contribution, (being the difference between sales and variable costs)

S = Sales

V = Variable Costs

P/V ratio can be determined by expressing change in profit or loss in relation to change in sales. P/V ratio indicates the relative profitability of different products, processes and departments.



If information about two periods is given, P/V ratio is calculated as follows:

$$\text{P/V Ratio} = \frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$$

### 17.6 Break Even Point [BEP]:

Break-even point means the point of no profit and loss. BEP is the volume of output or sales at which the total cost is exactly equal to the revenue. Below the BEP, the concerns make losses, at the BEP, the concern makes neither profit nor loss, above the BEP, the concerns earns profits. BEP is calculated in terms of either units or value. Thus,

$$\text{BEP (in Units)} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$$

$$\text{BEP (in Rs.)} = \frac{\text{Fixed cost}}{\text{PV Ratio}} = \frac{F}{\text{PVR}}$$

### 17.7 Margin of Safety [MS]:

Margin of Safety is the difference between the Actual Sales and the Sales at the Break-even Point. Thus,

$$\text{Margin of Safety (Rs.)} = \text{Actual sales} - \text{BEP (Rs.)}$$

$$\text{Margin of Safety (Units)} = \text{Actual sales (units)} - \text{BEP (units)}$$

Larger MS indicates stronger business. Such business can continue to earn profits, even if the sales decrease (i.e. in recession).

### 17.8 Marginal Cost Statement

There is no fixed format for marginal cost statement. However, the information will be recorded as follows.

	Sales	XX	
(-)	Variable Cost	XX	
	Contribution	XX	
(-)	Fixed Cost	XX	
Profit / Loss	XX		



## SECTION V

### DEPRECIATION

Fixed assets like machines, vehicles, furniture etc. can be used in the business for many years. However, as time goes by these assets lose their value due to constant use, wear and tear etc. When an asset becomes totally useless after some years, its value will be nil. Depreciation means the decrease in value of a fixed asset over the years. The reduction in the value of assets is a loss for the business. Such loss must be recorded in the books by passing an entry for depreciation at the year-end. Depreciation is debited to the profit and loss account every year so as to show the correct profits. Depreciation is also deducted from the book value of the assets so that the balance sheet shows the correct value of the assets. Depreciation is charged in such a way that by the time the asset becomes useless, its total cost is written off in the books.

#### 15.1 Key Features of Depreciation:

The above discussion brings out the following features of depreciation:

- **Decrease in Value:** Depreciation is a decrease in the value of a fixed asset. A fixed asset is an asset (a) which is expected to be used during more than one accounting period; (b) which has a limited useful life; and (c) which is held by a concern as a source of earning income and not for the purpose of sale.
- **Permanent Decrease:** Such decrease in value is not temporary; it is permanent in nature. Once the value of an asset decreases, it will not go up in future.
- **Gradual Decrease:** The decrease is gradual; it is not sudden. The value decreases slowly over a long period of time. The value falls step by step over many years of the useful life of the asset.
- **Reasons of Decrease:** The decrease in value is caused mainly by the use of the asset. But there may be other reasons such as passing of time, new inventions etc., which reduce the value of the asset.

#### 15.2 Causes of Depreciation:

- **Wear and Tear due to Use:** The value of asset falls due to use. When a machine is used, there is wear and tear of its parts. An old machine gives less output.

- **Efflux of Time:** Even if an asset is not used, its value falls over a period of time. So, depreciation is charged even on an idle machine. Some assets like lease, patents have a fixed life. A lease for 6 years has nil value at the end of the 6th year. The total cost of such lease is written off over 6 years (i.e.  $1/6$  every year). Such writing off is known as amortization.
- **Obsolescence:** As asset may become outdated (obsolete) due to new inventions or new technology (e.g. computers). The old asset is scrapped and written off as depreciation.
- **Damage:** An asset, which is damaged by accident, fire, flood etc., loses its value and it will be scrapped. The loss of value is written off as depreciation.
- **Exhaustion:** A mine contains a limited quantity of minerals. The value of a mine as the minerals is taken out over a period of time. When all the minerals are taken out of the mine the value of mine will be zero. In this case the depreciation arises due to exhaustion or depletion.

### 15.3 Why to Account for Depreciation:

- **Correct Amount of Profits:** Let us take an example to see why depreciation must be charged every year to arrive at the correct amount of profits. Suppose, Mr. A purchases a machine worth Rs. 20,000 having a useful life of 10 years. His total profits for next 10 years come to Rs. 50,000 at the rate of Rs. 5,000 per year. It is clear that his net profits for 10 years are Rs. 50,000 - Rs. 20,000 = Rs. 30,000 after deducting cost of the machine. Mr. A should write off the cost of machine over 10 years. He can charge proportionate cost of machine Rs. 2,000 ( $\text{Rs. } 20,000 / 10$ ) as depreciation every year. Thus, his profit and loss A/c will show a net profit of Rs. 3,000 ( $5,000 - 2,000$ ) every year. If he does not charge depreciation every year, he will show profits of Rs. 5,000 every year for 10 years. In the last year the machine will become useless. Mr. A will have to write off the entire cost of Rs. 20,000 and show it as a loss in the profit and loss A/c of the last year. Instead of showing a big loss in the last year, it is better to charge depreciation and show smaller profits every year.
- **Match Revenue with Cost:** If a machine is used to earn income for 10 years, the cost of machine must also be written off over its useful life of 10 years. Depreciation is the proportionate cost of using the machine during a year for earning income in that year.

- **Replacement of Assets:** In the above example, Mr. A will have to buy a new machine at the end of the 10<sup>th</sup> year. If he has charged depreciation of say Rs. 2,000 every year, he will have Rs. 20,000 after 10 years to buy a new machine. This is because depreciation is a non-cash expense. When depreciation of Rs. 2,000 is debited to the profit & loss A/c, it does not mean that cash of Rs. 2,000 is actually spent. The cash remains in the business and is accumulated over the years. The accumulated cash can be used to buy a new asset.
- **Correct Value of Asset:** In the above example, if depreciation is not recorded, Mr. A's Balance Sheet will show the value of the machine at Rs. 20,000 for all 10 years. This is not correct. As time goes by, the machine must be shown at a lower and lower value in the balance sheet. The book value of the machine must be reduced every year by charging depreciation, so that in the last year the book value becomes zero.
- **Comply with Law:** Under the Companies Act, 1956 a limited company must charge depreciation before it can declare dividends.

### 15.5 Methods of Depreciation:

There are two main methods, of charging depreciation: (1) Straight Line Method and (2) Written Down Value Method. The yearly amount of depreciation may be different under each method. But finally, under both methods, the total net cost will be written off over the useful life of the asset. Computation of the yearly depreciation is known as the 'allocation of depreciation'.

#### **Straight Line Method (SLM) :**

Straight Line method is also known as Fixed Installment method. In this method, the yearly depreciation is equal to the Net Cost of asset divided by the No. of Years of its useful life. The amount of depreciation remains the same every year. Thus, if the net cost of the assets is Rs. 48,000 and the useful life is 10 years. The yearly depreciation will be  $\text{Rs.}48,000 / 10 = \text{Rs.}4,800$ . Rs.4,800 will be charged as depreciation to the profit and loss account every year for 10 years. Since the amount of depreciation is like a fixed installment, this is known as fixed installment method.

Under this method, depreciation is charged as a fixed percentage on the original cost every year. Thus, in the above example, we can charge depreciation @ 10% of the original cost of Rs. 48,000 every year.

Depreciation is computed under the straight-line method by the following formula:

$$\text{Total Cost} - \text{Scrap Value} / \text{No. of Years of Useful life} \quad \text{OR} \quad [C - S] / [Y]$$

Thus, if an asset is purchased for Rs. 50,000; installation expenses of Rs. 10,000 are incurred; its expected life is 5 years; and its expected scrap value in the end is Rs. 5,000, depreciation under this method is  $50,000 + 10,000 - 5,000 = 55,000 / 5 \text{ years} = \text{Rs. } 11,000$ . Thus, depreciation can be charged @ 20% per year (p.a.) on the cost of Rs. 55,000. This fixed percentage is equal to  $100 / \text{No. of Years} (100 / 5 = 20\%)$ .

Total Cost (C) means invoice cost of asset plus incidental expenses such as freight, cartage, installation expenses, wages paid for erection etc. till the asset is actually put to use for the first time.

Scrap Value (S) means the money expected or actually received at the end of the useful life of the asset on sale as scrap etc.

No. of Years of Useful Life (Y) means the number of years the asset is expected to be used in the business. Technical experts such as engineers fix this period.

### **Written Down Value (WDV) Method**

Written Down Value method is also known as Reducing Balance Method or Diminishing Balance method. In this method, the yearly depreciation is not a fixed amount. The rate of depreciation is fixed in the beginning. In the Straight Line method, this rate is applied to the original cost in all years. However, under the Written Down method, the rate is applied to the written down value. Thus suppose the net cost of a new asset is Rs. 48,000 and depreciation is charged @ 10% on the written down value. In the first year, the depreciation is  $\text{Rs. } 48,000 \times 10\% = \text{Rs. } 4,800$ . The written down value is  $\text{Rs. } 48,000 - \text{Rs. } 4,800 = \text{Rs. } 43,200$ . Next year, depreciation will be  $\text{Rs. } 43,200 \times 10\% = \text{Rs. } 4,320$ . The yearly depreciation will thus go on decreasing. This is because the depreciation is charged not on original cost, but on the written down value. Under this method, depreciation is charged as a fixed percentage on the written down value every year.

Depreciation is computed under the written down value (wdv) method by the following formula:

$$\% \text{ of Depreciation} \times \text{Opening WDV}$$

Thus, if an asset is purchased on 1-1-2000 for Rs. 50,000; installation expenses of Rs. 10,000 are incurred; and the rate of depreciation is 10%, yearly depreciation under this method is:

Depreciation for 2000:

$$\begin{aligned} &= \% \text{ of Depreciation} \times \text{Opening WDV} \\ &= 10\% \times \text{Rs. } 60,000 = \text{Rs. } 6,000. \end{aligned}$$

Written Down Value On 31-12-2000/1-1-2001:

$$\begin{aligned} &= \text{Opening WDV} - \text{Depreciation} \\ &= \text{Rs. } 60,000 - \text{Rs. } 6,000 = \text{Rs. } 54,000. \end{aligned}$$

Depreciation for 2001:

$$\begin{aligned} &= \% \text{ of Depreciation} \times \text{Opening WDV} \\ &= 10\% \times \text{Rs. } 54,000 = \text{Rs. } 5,400. \end{aligned}$$

Written Down Value On 31-12-2001/1-1-2002:

$$\begin{aligned} &= \text{Opening WDV} - \text{Depreciation} \\ &= \text{Rs. } 54,000 - \text{Rs. } 5,400 = \text{Rs. } 48,600. \end{aligned}$$

Depreciation For 2002:

$$\begin{aligned} &= \% \text{ of Depreciation} \times \text{Opening WDV} \\ &= 10\% \times \text{Rs. } 48,600 = \text{Rs. } 4,860: \end{aligned}$$

Written Down Value On 31-12-2002/1-1-2003:

$$\begin{aligned} &= \text{Opening WDV} - \text{Depreciation} \\ &= \text{Rs. } 48,600 - \text{Rs. } 4,860 = \text{Rs. } 43,740. \end{aligned}$$

Thus, depreciation is charged @ 10 % per year on the opening written down value of the asset. The above details can be better understood in the form of a table:

Year	Opening Cost \ WDV	Depreciation for the year		Closing WDV
		Formula (C)	Amount (D)	
(A)	(B)			(E) = (B - D)
2000	60,000	10 % * 60,000	6,000	54,000
2001	54,000	10 % * 54,000	5,400	48,600
2002	48,600	10 % * 48,600	4,860	43,740

### Difference between SLM and WDV methods of Depreciation

Factors	SLM	WDV
1. Formula	Calculated as % of Original Cost.	Calculated as % of Written Down Value.
2. Yearly Charge	Yearly depreciation is constant.	Yearly depreciation decreases.
3. Total Charge	Total charge (repairs + depreciation) increases.	Total charge remains constant.
4. Nil Book Value	Book value at the end of life becomes zero.	Book value at the end of life does not become zero.
5. Suitable	Suitable for assets with fixed life e.g. lease.	Suitable for assets whose life reduces due to use, e.g. Plant.
6. Income-tax Act	Not allowed under the Income- tax Act	Only method allowed under, Income tax Act.

## 15.6 Performa Journal Entries:

### Entries for purchase of assets:

- (1) Purchase of Asset By Cash/Cheque:

Asset A/c      Dr.  
                    To Cash/Bank A/c

(Being the purchase of ..... asset)

- (2) Purchase of Asset On Credit:

Asset A/c      Dr.,  
                    To Party's A/c

(Being the purchase of ..... asset)

- (3) Incidental Expenses on New Asset:

Asset A/c      Dr.  
                    To Cash/Bank A/c

(Being the freight/installation/legal expenses on new asset)

### Entries for depreciation:

- (4) Record Depreciation at Year End:

Depreciation A/c      Dr.  
                                To Asset A/c

(Being the depreciation @ ... % on Rs.... for the period from .....to the year end)

- (5) Transfer Depreciation to P & L A/c:

Profit & Loss A/c      Dr.  
                                To Depreciation A/c

(Being the amount of depreciation transferred to P & LA/c)

**Note: Depreciation is a 'charge' against the profits. Hence depreciation is debited to the P & L A/c even if there is loss.**



**Entries on Sale of Asset:**

- (6) Depreciation till Date of Sale:  
Depreciation A/c      Dr.  
                                    To Asset A/c  
(Being the depreciation @ ... % on Rs. .... for the period from ... to the date of sale)
- (7) Sale of Asset:  
Cash/Bank/Party A/c    Dr.  
                                    To Asset A/c  
(Being the sale price of asset)
- (8) Profit on Sale of Asset:  
Asset A/c              Dr.  
                                    To Profit & Loss A/c  
(Being the profit on sale of asset: Sale Price - WD.V.)

**OR**

- Loss on Sale of Asset:  
Profit & Loss A/c      Dr.  
                                    To Asset A/c  
(Being the loss on sale of asset: WD.V. - Sale Price)
- (9) Transfer Depreciation to P & L A/c:  
Profit & Loss A/c      Dr.  
                                    To Depreciation A/c  
(Being the amount of depreciation till date of sale, transferred)

**15.7 Recording Depreciation – Provision Method**

In the afore-mentioned entries, the direct method has been used i.e. depreciation has been recorded directly in the concerned Asset A/c. However, Depreciation can also be recorded by another i.e. maintaining a separate account known as Provision for depreciation account. The entries under the 'provision method' for depreciation on purchase or sale of asset are passed as shown below:



(2) Transfer Asset A/c Balance:  
Asset Disposal A/c   Dr.  
                    To Asset A/c  
(Being the transfer of gross cost of asset sold)

(3) Transfer Prov. for Depreciation A/e Balance:  
Prov. for Depreciation A/c   Dr.  
                    To Asset Disposal A/c  
(Being the transfer of accumulated depreciation on the asset sold)

[Note: At this stage the balance of Asset Disposal A/c indicates the WDV of the asset on the date of sale i.e. Gross cost less Accumulated depreciation].

(4) Sale of Asset:  
Cash/Bank/Party A/c   Dr.  
                    To Asset Disposal A/c  
(Being the sale price of asset)

(5) Profit on Sale of Asset:  
Asset Disposal A/c   Dr.  
                    To Profit & Loss A/c  
(Being the profit on sale of asset: Sale Price - W.D.V.)

**OR**

Loss on Sale of Asset:  
Profit & Loss A/c   Dr.  
                    To Asset Disposal A/c  
(Being the loss on sale of asset: W.D.V. - Sale Price)

[Note: After this entry Asset Disposal A/c gets closed].

The entries for sale of assets, profit or loss on sale etc. are same under both methods, i.e. SLM as well as WDV. If the asset is sold at the beginning of the year, no depreciation is charged, because the asset was not used at all during the entire year. Thus, if an asset is sold on 1st January 2003, no depreciation is charged for the accounting year ending on 31 st December 2003.

However, if the asset is sold in the middle of the year, say on 1st July, 2003, proportionate (1/2) depreciation will be charged, because the asset was used for 6 months from 1-1-2003 to 30-6-2003 till the date of sale. The depreciation will be charged on the opening written down value of the asset. Under straight-line method, depreciation would be charged on the original cost. The profit or loss is computed in the same way under both methods by comparing the sale price and the WDV on the date of sale.

### **15.8 Change in Method:**

- (1) A business concern may change the method of charging depreciation from the straight line to written down value method or vice versa.
- (2) When a method is changed, there is a change in the amount of yearly depreciation. The new amount of yearly depreciation may be more or less than the old amount.
- (3) Further, such a change may be effective for future (prospective) or also for the past (retrospective).
- (4) In prospective change, the new method will be used only in future. The new rate will be applied to the existing balance in the asset account.
- (5) In a retrospective change, the depreciation is recalculated by applying the new rate right from the beginning. The difference between the new amount and the amount already charged as depreciation is adjusted in the profit & loss account. If the new amount of depreciation is more, the extra amount is debited to the profit and loss account. If the new amount is less, the difference is credited to the profit & loss account. The asset account is adjusted as if the new rate is in use from the date of original purchase of the asset. A new WDV is calculated for the asset, which is equal to Original Cost - New depreciation till Date of Change, the new rate will then be applied to such new WDV in future.
- (6) According to Accounting Standard AS 6 issued by the Institute of Chartered Accountants of India, the change in method should have only retrospective effect. Thus, AS 6 does not approve of giving prospective effect to a change in the method of depreciation. Hence only retrospective change in method has been explained and illustrated below.
- (7) Suppose a concern, which started business from 1-4-1997, changes its method of depreciation from 1-4-2003, with retrospective effect. The following Table sums up the steps for recording this in the book:

**15.9 Change in Method with Retrospective Effect:**

**Step What is to be done:**

- A. Calculate depreciation on assets existing as on 1-4-2003 debited to the profit and loss A/c from 1-4-1997 to 31-3-2003 under the old method.

[Ignore assets sold etc. between 1-4-1997 and 1-4-2003]

- B. Calculate depreciation on such assets by using the new method right from 1-4-1997.
- C. Calculate the difference between (A) and (B).
- D. There is surplus [A is more than B], pass a Journal entry on 1-4-2003 crediting such surplus to profit & loss A/c and debiting the Asset A/c.

OR

If there is deficit [A is less than B], pass a Journal entry on 1-4-2003 debiting such deficit to profit & loss A/c and crediting the Asset A/c.

- E. Calculate and charge depreciation for the year beginning on 1-4-2003 and new method, on the new value of the Asset.

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# INTRODUCTION TO STATISTICS

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## **ACKNOWLEDGEMENT**

Centre for Valuation Studies, Research & Training Association (CVSRTA) is thankful to the author of this subject Dr. Vijay Damodar Pathak for preparing the study material and also surrendering his right in favor of CVSRTA to get copyright in favor of CVSRTA. CVSRTA is also thankful to Prof. (Dr.) Vipul Karmakar for rendering the service as subject editor and Mr. Bhadrakkumar Majmudar as language editor.

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## OVERVIEW OF STATISTICS

Statistics is a Science of collection, presentation, analysis, and reasonable interpretation of data. Statistics presents a rigorous scientific method for gaining insight into data.

For example, suppose we measure the weight of 100 patients in a study. With so many measurements, simply looking at the data fails to provide an informative account. However statistics can give an instant overall picture of data based on graphical presentation or numerical summarization irrespective to the number of data points. Besides data summarization, another important task of statistics is to make inference using data and predict relations of variables.

Why valuers are required to study statistics?

Because, valuers estimate the price of an asset on the basis of number of data.

- We collect number of data, for example, in case of real estate;
- Identify the identical or similar asset or property under valuation;
- Identify the various factors which will affect the value of the property such as shape, size, location, social factors like nearness to market, school, hospital, railway station, bus station, playground, recreational places, cinema, theatre, banks, government offices, legal factors like DCR, FSI, ULC Act, Rent Control Act, Technological factors like specifications of building, material of constructions, arrangement of rooms, light, air, ventilation etc;
- Give the weightage to each factor as per the preferences of the local public;
- Find out final weightage score;
- Compare all heterogeneous property by bringing them to the same platform;
- Comparison of heterogeneous property is possible;
- Draw our conclusion about the value.
- in case of plant and machinery, statistical methods are useful in comparison as well as in estimation of balance life.

**OBJECTIVES**

- To show the difference between samples and populations
- To convert raw data to useful information
- To construct and use data arrays
- To construct and use frequency distributions
- To graph frequency distributions with histograms, polygons and ogives

## UNIT – 1

### DATA CLASSIFICATIONS AND PROCESSING, GRAPHICAL REPRESENTATION OF DATA, FREQUENCY DISTRIBUTIONS

#### 2.1 DATA

Data is any kind of Information pertaining to any subject, theme or phenomenon.

For example,

- Number of patients visit hospital for check-up
- Selling of car per day
- Number of students using bike.

Data could be of two types:

- i. Qualitative: Information relating of occurrence or non occurrence of some phenomenon.
- ii. Quantitative: Information dealing with magnitude or amount of values of some entities determining a phenomenon.

A collection of observations is called a data set or simply data, and a single observation is called a data point.

#### **Collection of data :**

Select the observations so that all relevant groups are represented in the data.

e.g. To determine potential market for a new product, suppose analyst study 100 consumers in a certain area. Analyst must be certain that this group contains people from various income levels, races, neighborhoods, having different educational background, etc.

### **Source of data :**

Primary data: Generated or collected directly by the researcher.

Secondary data: Obtained from published sources (Statistical yearbooks / statistical handbooks /population census) such as departmental reports and census and other publications.

### **Use of data :**

Data can assist decision makers in making guesses, probable effects of certain characteristics in a given situation.

Past experience can be useful in predicting future trends.

## **2.2 SAMPLE AND POPULATION**

- population is a whole, and a sample is a fraction or segment of that whole.
- Statisticians gather data from a sample.
- Use this information to make inferences about the population that the sample represents.

A population is a collection of all the elements we are studying and about which we are trying to draw conclusions.

A sample is a collection of some, but not all, of the elements of the population.

A representative sample contains the relevant characteristics of the population in the same proportions as they are included in that population.

### **To find a meaningful pattern in the data**

There are many ways to sort data. If the data is quantitative, we can list the data points from lowest to highest in numerical value. But if the data is qualitative like colour, degree of skill of worker, then we must organize them differently as per organizing principle like divide data into similar category or classes and count the number of observation that fall into each category or class. This is known as frequency distribution.

- Purpose of organizing data is to enable us to see quickly some of the characteristics of the data.

- The information like the range, apparent patterns, what values the data may tend to group around, what values appear most frequent from our sample can be very much helpful in understanding the population and better decision can be made.

**Raw data or Ungrouped data:**

Information before it is arranged and analyzed is called raw or Ungrouped data. Raw because it's unprocessed by statistical methods.

Use of biased and incomplete data leads to poor decisions.

**Data array :**

It arranges values in ascending or descending order.

**2.3 FREQUENCY DISTRIBUTION (F.D.)**

**It compresses the data :**

In F.D. some information can be lost as compared to array because in array, each data point is listed whereas in F.D., number of data points that fall into each group are recorded but due to construction of F.D., pattern or trend can be ascertained. When data is organized in this form it is called a grouped data.

A F.D. is a table that organizes data into classes i.e. into groups of values describing one characteristic of the data.

Example: 1- Consider the Data ~~array~~ of average sales in thousands, for 20 stores :

2.0	3.8	4.1	4.7	5.5
3.4	4.0	4.2	4.8	5.5
4.3	4.1	4.3	4.9	5.5
3.8	4.1	4.7	4.9	5.5

The Frequency distribution of the above data :

Class (Group of similar values of data points)	Frequency (No. of observations in each class)	<u>Relative frequency</u>
2.0 to 2.5	1	1/20 = 0.05
2.6 to 3.1	0	0/20 = 0.00
3.2 to 3.7	2	2/20 = 0.10
3.8 to 4.3	8	8/20 = 0.40
4.4 to 4.9	5	5/20 = 0.25
5.0 to 5.5	4	4/20 = 0.20
	20	1.00

A F.D. shows the number of observations from the data set that fall into each of the several non-overlapping classes.

Note that, In this case, in class 1, we consider all possible values  $\geq 2$  and  $\leq 2.5$ , in class 2, all the  $\geq$  values 2.6 and  $< 3.1$  etc. In the last class all the values  $\geq 5.0$  and  $\leq 5.5$  are considered.

Suppose 'N' is the no. of observations then ideally No. of classes (C) into which the data should be grouped is given by:  $C = 1 + 3.3 \log_{10} N$ .

And width of the Class interval is given by:

$$\text{Class width} = \frac{\left( \begin{array}{l} \text{Next Unit Value after} \\ \text{Largest value in data} \end{array} \right) - \left( \begin{array}{l} \text{Smallest Value} \\ \text{In data} \end{array} \right)}{\text{Total number of class interval}}$$

Example: 2 Consider another dataset:

16.25, 16.52, 16.0, 15.82, 16.77, 16.33, 15.6, 15.8, 16.39, 15.44, 16.64, 15.65, 15.88, 16.18, 15.7, 15.79, 16.27, 15.95, 16.05, 15.93, 16.88, 15.81, 16.59, 15.89, 15.87, 15.52, 15.99, 15.26, 16.30, 17.0

Observe that here,  $N = 30$  and hence,  $C = 1 + 3.3 \log_{10} 30 = 1 + 4.87 = 5.87 \cong 6$ .

$$\text{Class width} = (17.0 - 15.2) / 6 = 1.8 / 6 = 0.3$$

Thus the Frequency distribution for this data is as follows

	<u>Class</u>	<u>Frequency (f)</u>	<u>Relative Frequency</u>
15.2 to	15.5	2	0.06
15.5 to	15.8	5	0.17
15.8 to	16.1	11	0.37
16.1 to	16.4	6	0.20
16.4 to	16.7	3	0.10
16.7 to	17.0	3	0.10
		30	1.00

Note that, In above case, in class 1, we consider all possible values  $> 15.2$  and  $< 15.5$ , in class 2, all the  $>$  values  $15.5$  and  $< 15.8$  etc. In the last class all the values  $> 16.7$  and  $< 17.0$  are considered. Such a frequency distribution is called continuous frequency distribution.

In-case we consider classes consisting of only one distinct data value starting from lowest value to highest value like  $15.2, 15.3, 15.4, 15.5 \dots 16.9, 17.0$  and class frequency as number of times the class value occurs in the data set Then the type of frequency distribution we get, is called discrete frequency distribution.

In case of qualitative data also, if we consider classes corresponding to each category in the data set, we get a discrete frequency distribution.

Example 3:

Guests staying at Marada Inn were asked to rate the quality of their accommodations as being **excellent (E)**, **above average (AA)**, **average (A)**, **below average (BA)**, or **poor (P)**. The ratings provided by a sample of size  $N = 20$  guests are shown below:

BA, A, AA, AA, AA, AA, AA, BA, BA, A, P, P, AA, E, AA, A, AA, A, AA, A.

The Frequency distribution for this data is given by:

Rating	Frequency (f)	Relative Frequency(f/N)	% ((f/N)100)	Frequency
Poor	2	0.1	10	
Below average	3	0.15	15	
Average	5	0.25	25	
Above average	9	0.45	45	
Excellent	1	0.05	5	
Total	20	1.00	100	

#### 2.4 GRAPHICAL/DIAGRAMATIC PRESENTATION OF QUANTITATIVE DATA:

Frequency distribution or relative frequency distribution gives tabular representation of the raw data. Such a grouped / tabular data can be nicely presented in the form of diagrams or graphs for better understanding of the nature of data. Quantitative data can be represented by Histogram, frequency polygon, frequency curve, Ogive curve etc. while; qualitative data can be represented by bar charts, Pie charts etc. We illustrate these diagrams for the examples given above.

##### HISTOGRAM / FREQUENCY POLYGON / FREQUENCY CURVE

graphical presentation of quantitative data is called a Histogram. In histogram, the variable of interest is placed on the horizontal axis and the frequency, relative frequency, or percent frequency is placed on the vertical axis. A rectangle is drawn above each class interval with its height corresponding to the interval's frequency, relative frequency, or percent frequency. A histogram has no separation between rectangles of adjacent classes.

If midpoints of the upper side of the rectangles in a Histogram are connected by straight lines, the resulting curve is called the Frequency Polygon.

If points on frequency polygon are connected by smoothed curve is called Frequency Curve.



Figure -1: Histogram & frequency polygon for example-2

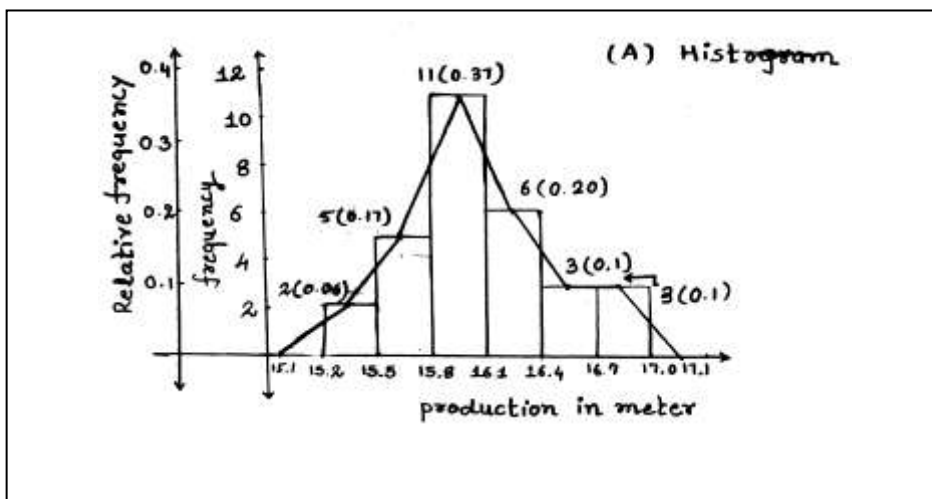
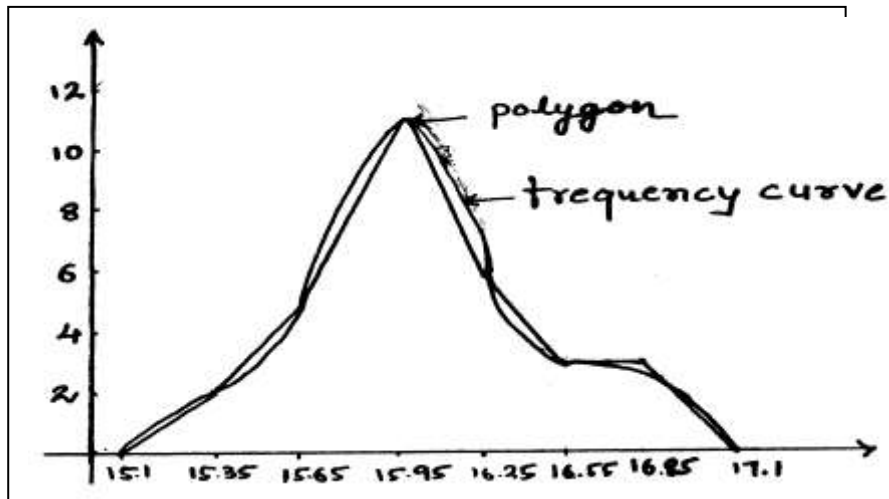


Figure 2: Frequency Polygon and Frequency curve (example-2)

**OGIVE**

A cumulative frequency distribution enables us to see how many observation lie above or below certain values, rather than merely recording the number of items within intervals.

A graph of a cumulative frequency distribution is called an 'Ogive' (pronounced as 'Ohjive').

'LESS THAN' OGIVE: Cumulative distribution ( $\leq$ ) for example-2 is given below.

<u>Class</u>	<u>Cumulative Frequency</u>
Less than 15.2	0
Less than 15.5	2
Less than 15.8	7
Less than 16.1	18
Less than 16.4	24
Less than 16.7	27
Less than 17.0	30

'More than' Ogive for example-2 is as follows:

<u>Class</u>	<u>Cumulative Frequency</u>
Less than 15.2	30
Less than 15.5	28
Less than 15.8	23
Less than 16.1	12
Less than 16.4	6
Less than 16.7	3
Less than 17.0	0

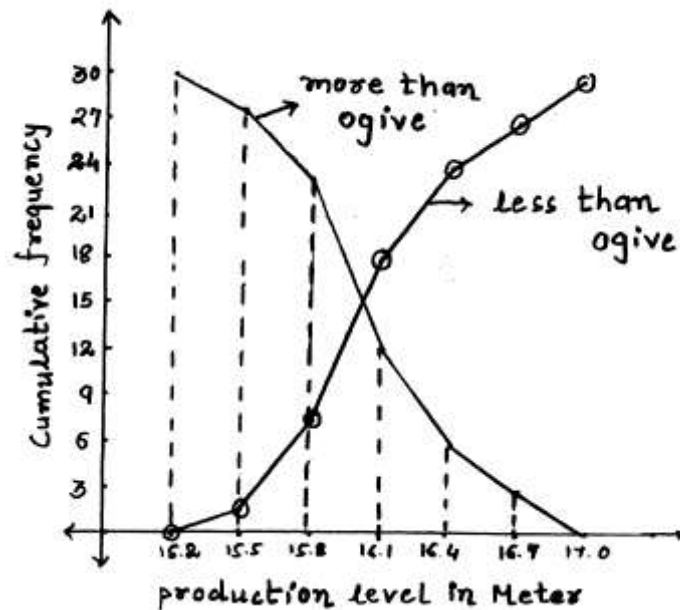


Figure 3:  $\leq$  and  $\geq$  Ogive

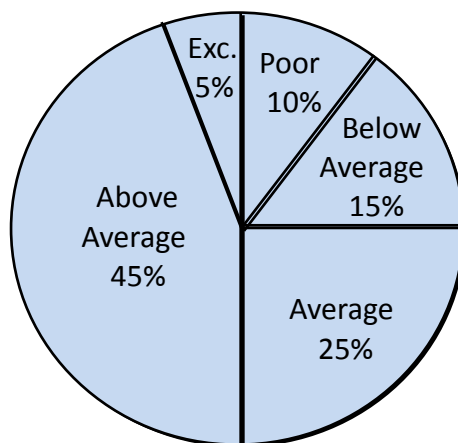
**2.5 GRAPHICAL PRESENTATION OF QUALITATIVE DATA:**

In contrast to quantitative data graphs that are plotted along a numerical scale, qualitative graphs are plotted using non-numerical categories. In this section, we will examine two types of qualitative data graphs: (1) pie charts, (2) bar charts.

**PIE – DIAGRAM (CIRCLE DIAGRAM)**

A pie chart is a circular depiction of data where the area of the whole pie represents 100% of the data and slices of the pie represent a percentage breakdown of the different classes / categories. Pie charts show the relative magnitudes of the parts to the whole. They are widely used in business, particularly to depict such things as budget categories, market share, and time / resource allocations. A typical Pie chart is depicted below.

Pie Chart for Example 3 is given by:

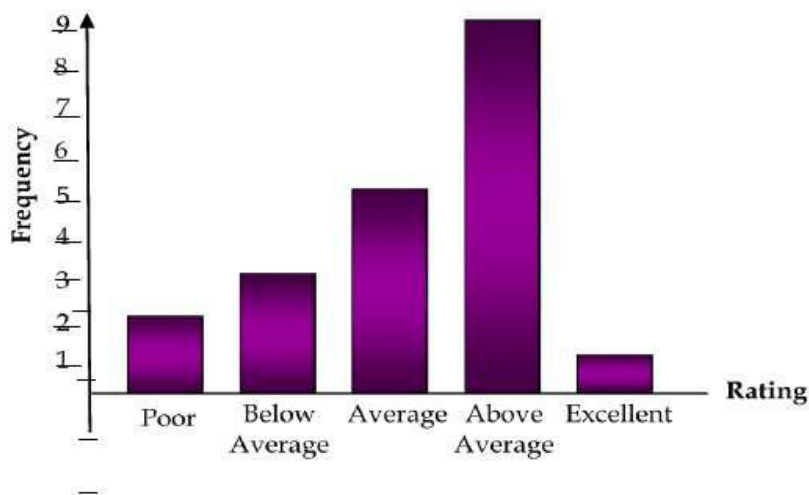


**Figure 4: Pie chart for example 3 (Quality rating)**

**BAR CHART:**

A bar graph or chart contains two or more categories along one axis and a series of bars, one for each category, along the other axis. Typically, the length of the bar represents the magnitude of the measure (amount, frequency, money, percentage, etc.) for each category. It is similar to Histogram except that in this case bars are separated from each other.

Bar chart for example 3 is given below.



**Figure 5: Bar Chart for example 3**

## 2.6 REVIEW

2.6.1 Here are the ages of 50 members of a country social service programme.

83	51	66	61	82	65	54	56	92	60
65	87	68	64	51	70	75	66	74	68
44	55	78	69	98	67	82	77	79	62
38	88	76	99	84	47	60	42	66	74
91	71	83	80	68	65	51	56	73	55

Use these data to construct relative frequency distributions using 7 equal intervals and 13 equal intervals. State policies on social service programmes require that approximately 50 percent of the programme participants be older than 50.

- Is the programme in compliance with the policy?
- Does your 13-interval relative frequency distribution help you answer part (a) better than your 7-interval distribution?
- Suppose the Director of Social Services wanted to know the proportion of programme participants between 45 and 50 years old. Could you estimate the answer for her better with a 7 or a 13 interval relative frequency distribution?

2.6.2 High performance bicycle products company in Firozpur, sampled its shipping for a certain day with these results:

Time from Receipt of Order to Delivery (in Days)

-----

4	12	8	14	11	6	7	13	13	11
11	20	5	19	10	15	24	7	29	6

Construct a frequency distribution for these data and a relative frequency distribution. Use intervals of 6 days.

- a. What statement can you make about the effectiveness of order processing from the frequency distribution?
- b. If the company wants to ensure that half of its deliveries are made in 10 or fewer days, can you determine from the frequency distribution whether they have reached this goal?
- c. What does having a relative frequency distribution permit you to do with the data that is difficult to do with only a frequency distribution?

2.6.3 Mr. Amit, a safety engineer for the Ratnagiri Power Generating Station, has charted the peak reactor temperature each day for the past year and has prepared the following frequency distribution:

<u>Temperature in °C</u>	<u>Frequency</u>
Below 500	4
501-510	7
511-520	32
521-530	59
531-540	82
541-550	65
551-560	33
561-570	28
571-580	27
581-590	23
Total	360

List and explain any errors you can find in Mr. Franks's distribution.

2.6.4 Here is a frequency distribution of the weight of 150 people who used a passenger lift on a certain day. Construct a histogram for these data:

Class	Frequency
75-89	10
90-104	11
105-119	23
120-134	26
135-149	31
150-164	23
165-179	23
180-194	9
195-209	6
210-224	2

- What can you see from the histogram about the data that was not immediately apparent from the frequency distribution?
- If each passenger lift chair holds two people but is limited in total safe weight capacity to 400 pounds, what can the operator do to maximize the people capacity of the ski lift without exceeding the safe weight capacity of a chair? Do the data support your proposal?

2.6.5 The V.S. Hospital has the following data representing weight in pounds at birth of 200 premature babies.

Class	Frequency
0.5-0.9	10
1.0-1.4	19
1.5-1.9	24
2.0-2.4	27
2.5-2.9	29
3.0-3.4	34
3.5-3.9	40
4.0-4.4	17

Construct an ogive that will help you answer these questions:

- c. What was the approximate middle value in the original data set?
- d. If premature babies under 3.0 pounds are normally kept in an incubator for several days as a precaution, about what percentage of V.S.'s premature babies will need an incubator?

## UNIT – 2

### MEASURES OF CENTRAL TENDENCY, DISPERSION AND SKEWNESS

#### CHARACTERISTICS OF FREQUENCY DISTRIBUTIONS:

##### 3.1 CENTRAL TENDENCY

Data is a set of observations and each observation gives some information / value of interested variable, say  $x$ . Now there is a natural tendency to concentrate most of the information at centre point (like centre of gravity). Our aim is to locate this central point and measure the information at this point. Figure - 6 depicts three distributions (curves A, B and C) for values of  $x$ . Central locations of Curve 'A' and Curve 'B' is equal but Central locations of Curve 'C' lies to the right of those of Curve 'A' and Curve 'B'.

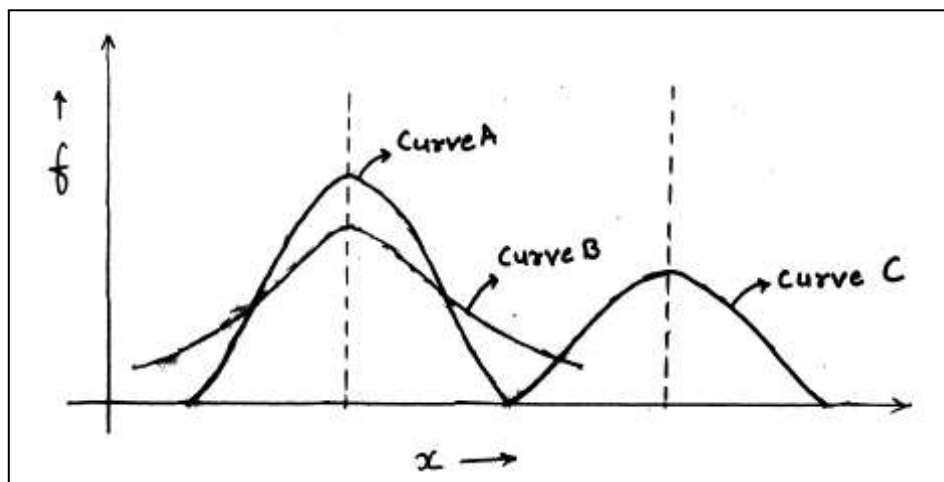


Figure 6: Central locations of distribution of  $x$



### 3.2 DISPERSION

Dispersion is the spread of the data in a distribution. i.e. the extent to which the observations are scattered. Curve 'B' has wider spread or dispersion than Curve 'A'.

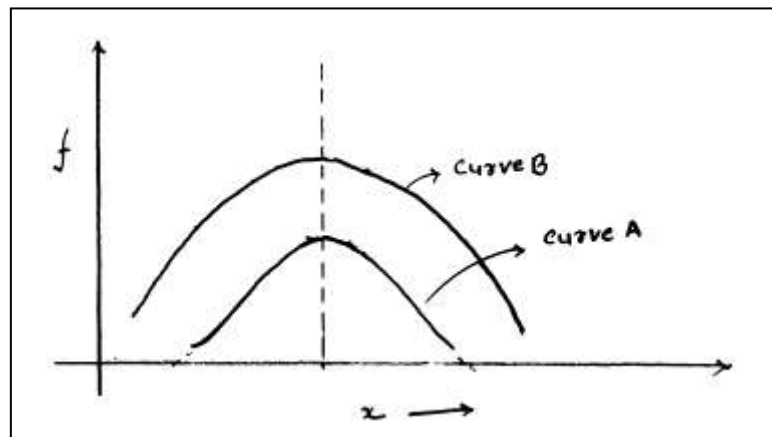


Figure 7: Dispersion of distribution of x

Other two characteristics to make decision are: Skewness and Kurtosis

### 3.3 SKEWNESS

Distributions representing the data points in the data set may be symmetrical or skewed.

Symmetrical curve A like shown in figure 8 i.e. if vertical line drawn from center of the curve to Horizontal Axis divides the area under the Curve into two equal parts. Mirror image of the other

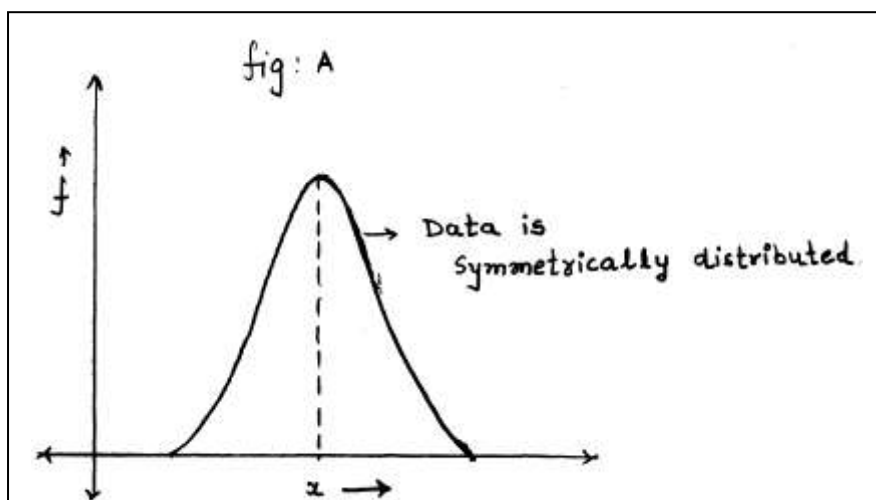
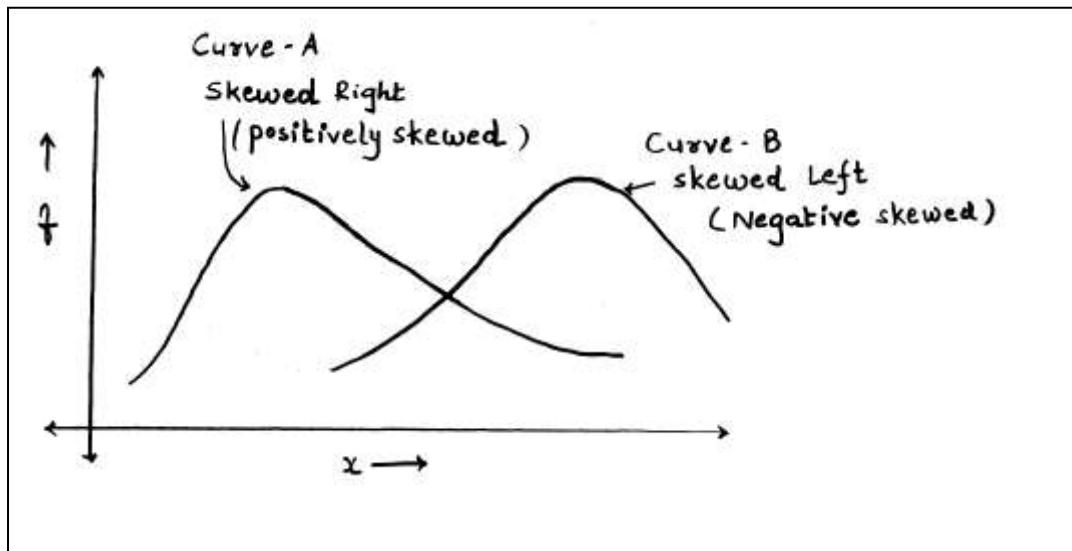


Figure 8: symmetric distribution



**Figure 9: Skewed distributions**

Curve 'A' and Curve 'B' shown in Figure 9 are skewed curves. They are skewed because values in their frequency distributions are concentrated at either lower or higher end of the measuring scale on the horizontal axis. The values are not equally distributed. Curve 'A' is skewed to right (or positively skewed) because it tails off towards the higher end of the scale. Curve 'B' is just opposite. It is skewed to left (negatively skewed) because it tails off towards the lower end of the scale.

e.g. Curve 'A' might represent the frequency distribution of the number of hours Vs. Supply of the Daily News Paper of distributor. The curve would be skewed to the right, with many values at early hours of the morning and very few in the evening. Stocks will turn over rapidly.

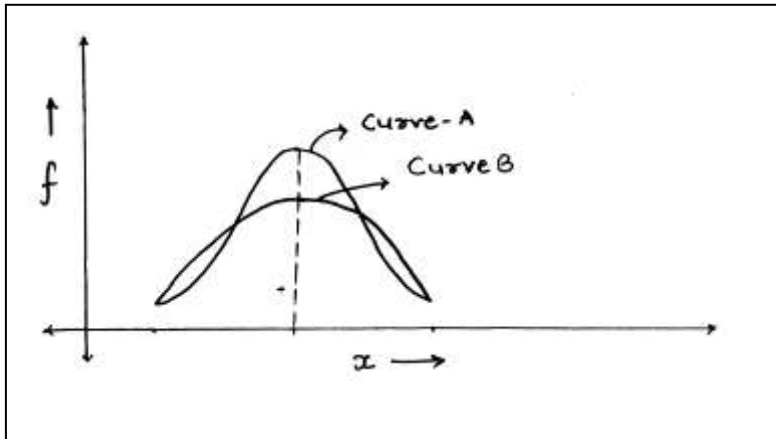
Similarly, Curve 'B' could represent the frequency of the number of days a real estate broker requires to sell a house. It would be skewed to the left, with many values at the high end and few at low, because selling of houses of a big project turns over very slowly.

**KURTOSIS:**

Peakedness of a data set is called Kurtosis.

Curve 'A' and Curve 'B' differ only in that one is more peaked than the other.

They have same Central Location and Dispersion and both are symmetrical but the two curves have different degrees of Kurtosis (Different Peak)



**Figure 10: Distributions with different Kurtosis**

Two curves with same central location. Dispersion and both are symmetrical but different Kurtosis.

**3.4 MEASURES OF CHARACTERISTICS OF PROBABILITY DISTRIBUTIONS:**

In the previous section, various characteristics of a probability distributions like, Central tendency, dispersion, skewness, kurtosis have been discussed conceptually. In this sections we give numerical measures for these characteristics.

**MEASURES OF CENTRAL TENDENCY:**

Commonly used measures of central tendency are Mean, Median and Mode. The formulae for these measures are different for grouped and ungrouped data.

**The arithmetic mean for ungrouped data:**

If the ungrouped data is given as  $\{x_1, x_2, \dots, x_n\}$  then the Mean (the simple Arithmetic mean)

$$\bar{x} = \frac{\{\sum_{i=1}^n x_i\}}{n} = \frac{\text{Sum of all data values}}{\text{Total number of observations}}$$

**Example: 4** Suppose time required to complete the job by 7 labours are as under :

Worker	:	1	2	3	4	5	6	7
Time in hours:		4.2	4.3	4.7	4.8	5.0	5.1	9.0

$$\bar{x} = \frac{(37.1)}{7} = 5.3 \text{ hours}$$

Observe that the 7<sup>th</sup> data value 9 is much away from other data values lying in the interval [4.2, 5.1]. If we exclude the worker no.7 and compute mean time for first 6 worker, the mean is 4.7 hours.

This extreme value of 9.0 distorts the value we get for the mean. It would be more representative to calculate mean without including extreme value. Such extreme values in the data are called outliers.

**The Arithmetic Mean for Grouped Data:**

Consider the group data distributed in k class intervals  $[a_i, b_i]$  having frequency  $f_i$ , for  $i = 1, 2, \dots, k$ . Let  $x_i =$  class midpoint  $= (a_i + b_i) / 2$ . Then the Arithmetic mean for such a group data is given by  $\bar{x} = \frac{\sum_{i=1}^k x_i f_i}{n}$ , where  $n = \sum_{i=1}^k f_i$ .

**Assumed Mean Method:** This method is used to reduce the computational efforts in computing the arithmetic mean for the group data in which the data values are large. To achieve this, it is assumed that the mean of the data is the midpoint of the middle class, say a. Compute  $y_i = (a - x_i) / (\text{Class width})$  for all  $i = 1, 2, \dots, k$ . Then the Arithmetic mean for such a group data is given by:

$$\bar{x} = a + \bar{y} \cdot (cw) = a + \frac{\{\sum_{i=1}^k y_i f_i\} \cdot cw}{n}, \text{ where } n = \sum_{i=1}^k f_i.$$

Example 5 Find out the average floor area of the house (arithmetic mean) of a following grouped data :

Class (a <sub>i</sub> – b <sub>i</sub> ) Floor area in Sq. ft.	Frequency f <sub>i</sub> Nos. of houses	$\left[ \frac{a_i + b_i}{2} \right]$ Mid value x <sub>i</sub>	x <sub>i</sub> f <sub>i</sub>	For Assumed Mean Method	
				y <sub>i</sub>	y <sub>i</sub> f <sub>i</sub>
100 - 800	15	450	6750	-3	-45
800 - 1500	3	1150	3450	-2	-6
1500 - 2200	2	1850	3700	-1	-2
2200 - 2900	2	2550	5100	0	0
2900 - 3600	2	3250	6500	1	2
3600 - 4300	1	3950	3950	2	2
4300 - 5000	0	4650	0	3	0
	Σf <sub>i</sub> = 25 n = 25		Σ f <sub>i</sub> x <sub>i</sub> = 29450		Σ y <sub>i</sub> f <sub>i</sub> = -49

Average floor area of the house = Arithmetic Mean  $\bar{x}$

$$= \frac{\{\sum_{i=1}^n x_i \cdot f_i\}}{n} = \frac{29450}{25} = 1,178 \text{ sq. ft.}$$

Computing the arithmetic mean for this data by Assumed mean method:

Here, we take assumed mean a = Midpoint of 4<sup>th</sup> class = 2550.

Class width = 700 and hence y<sub>i</sub> = (x<sub>i</sub> – 2550) / 700, for i = 1, 2, ..., 7.

Column 5 and 6 in table gives values of y<sub>i</sub>'s and y<sub>i</sub> f<sub>i</sub>.

This gives,  $\sum_{i=1}^n y_i \cdot f_i = -49$ .

$$\begin{aligned} \text{Hence, } \bar{x} &= a + \bar{y} \cdot cw = a + \frac{\{\sum_{i=1}^k y_i \cdot f_i\} \cdot cw}{n} \\ &= 2550 + (-49 \times 700) / 25 = 1178 \text{ sq. ft} \end{aligned}$$

- For large number of observations, it's tedious to compute mean.
- Unable to compute the mean for the dataset that has open-ended classes at high or low end of the scale.

e.g. Open ended class like 5.1 and above, 2.1 and less etc.

### 3.5.1 CENTRAL TENDENCY : THE WEIGHTED MEAN

The weighted mean enables us to calculate an average that takes into account the importance of each value to the overall total.

e.g. Labour input in G.I.D.C., Vitthal Udyognagar

Grade of Labour	Hourly wages in INR	Labour hours per unit Product X
Unskilled	50	1
Semi-skilled	100	2
Skilled	150	5

Arithmetic mean of labour wage

$$= \text{Rs.} \left\{ \frac{50 + 100 + 150}{3} \right\} = \text{Rs. 100 per hour'}$$

But this answer is incorrect.

To get the correct answer, we must take into account that different amounts of each grade of labour.

We should consider, that, how much time each labour has spent. Considering these times 1 hr, 2hr and 5 hr we get

$$\text{Arithmetic Mean} = \frac{(50 \times 1) + (100 \times 2) + (150 \times 5)}{(1+2+5)}$$

Average labour cost per unit = Rs.125/- per unit

This type of arithmetic mean is called Weighted arithmetic mean. Note that in this case, data item 50, 100, 150 are assigned the weights 1, 2 and 5.

Thus, the weighted mean  $\bar{x}_w$  of the data points  $\{x_1, x_2, \dots, x_n\}$  having corresponding weights (the relative importance of the values of x)  $\{w_1, w_2, \dots, w_n\}$ , is given by

$$\bar{x}_w = \frac{\sum_{i=1}^n w_i x_i}{\sum_{i=1}^n w_i}$$

### 3.5.2 CENTRAL TENDENCY : THE GEOMETRIC MEAN

When we are dealing with quantities that change over a period of time, we need to know an average rate of change, such as an average growth rate over a period of several years. In such cases, we need to find is the Geometric Mean (G.M.).

$$\text{G.M.} = \sqrt[n]{\text{Product of all } x \text{ values}}, \text{ where } n = \text{No. of } x \text{ values}$$

Example 6: In very highly inflationary economies, banks must pay high interest rates to attract savings. Suppose let us assume a very unstable and inflationary economy of Iraq, they have decided to pay interest at annual rates of 100, 200, 250, 300 and 400%, which correspond to Growth Factors of 2, 3, 3.5, 4 and 5

Year	Interest Rate	Growth factor	Saving at the end of the year
1	100%	2	\$ 1000 x 2 = 2000
2	200%	3	6000
3	250%	3.5	21,000
4	300%	4.0	84,000
5	400%	5.0	4,20,000

Suppose initial deposit is \$ 1,000. This will grow \$ 1000 x 2 x 3 x 3.5 x 4 x 5

$$\text{Arithmetic Growth factor} = \frac{(2+3+3.5+4+5)}{5} = 3.5$$

Corresponds to an average interest rate 250%. If the banks actually gave interest at a constant rate of 250% per annum, then \$ 1000 would grow to

$$\$ 1000 \times 3.5 \times 3.5 \times 3.5 \times 3.5 \times 3.5 = \$ 5,25,219$$

This answer will exceed the actual \$ 4,20,000 by more than \$ 1,05,219.

This is a very big error.

Let's find Geometric Mean for the above case.

$$\begin{aligned} \text{G.M.} &= \sqrt[5]{\text{Product of all } x \text{ values}} \\ &= \sqrt[5]{2 \times 3 \times 3.5 \times 4 \times 5} = \sqrt[5]{420} = 3.347 \end{aligned} \quad \text{Average growth factor.}$$

This growth factor corresponds to an average interest rate of  $(3.347 - 1 = 2.347 \cong 234.7\%$  per annum). With this growth rate \$ 1000 would grow to

$\$ 1000 \times 3.347 \times 3.347 \times 3.347 \times 3.347 \times 3.347 = 420028$  which is very close to the exact value.

Hence, the appropriate mean in this case is the G.M. which makes significant difference.

### 3.5.3 CENTRAL TENDENCY : HARMONIC MEAN

Harmonic Mean is the reciprocal of the arithmetic mean of the reciprocal of the individual observation. For the ungrouped data  $\{x_1, x_2, x_3, \dots, x_n\}$ ,

$$H. M. = \frac{n}{\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \dots + \frac{1}{x_n}} = \frac{n}{\sum_{i=1}^n \left(\frac{1}{x_i}\right)}$$

For grouped data with discrete distinct data points  $\{x_1, x_2, x_3, \dots, x_k\}$ , with corresponding frequencies  $\{f_1, f_2, f_3, \dots, f_k\}$ , the Harmonic mean is given by

$$H. M. = \frac{n}{\sum_{i=1}^k \left(\frac{f_i}{x_i}\right)}, \text{ where } n = \sum_{i=1}^k f_i.$$

For grouped data with continuous data points with  $k$  distinct classes having class mid-points  $\{m_1, m_2, m_3, \dots, m_k\}$ , with corresponding frequencies  $\{f_1, f_2, f_3, \dots, f_k\}$ , the Harmonic mean is given by

$$H. M. = \frac{n}{\sum_{i=1}^k \left(\frac{f_i}{m_i}\right)}, \text{ where } n = \sum_{i=1}^k f_i.$$



**Example 7:** An automobile driver travels from plain to hill station 100 km distance at an average speed of 30 km per hour. He then makes the return trip at an average speed of 20 kilometer per hour. What is his average speed over the entire distance (200 kilometer)?

$$\text{Arithmetic Mean} = (30 + 20) / 2 = 25 \text{ km / hour.}$$

But A.M. is not correct as indicated by the following computations:

	Distance	Average Speed	Time Taken
Going	100 kms	30 kms per hour	3 hours 20 minutes
Returning	100 kms	20 kms per hour	5 hours 00 minutes
<b>Distance</b>	<b>200 kms</b>		<b>8 hours 20 minutes</b>

Hence, the average speed =  $200 / 8.33 = 24 \text{ km / hr.}$

$$\text{Now, H.M.} = \frac{2}{\frac{1}{20} + \frac{1}{30}} = \frac{2 \times 60}{5} = 24 \text{ km/hr.}$$

Which gives correct average speed.

If distances are same then H.M. is correct 24 kms per hour.

If time is same then Arithmetic mean gives the correct average.

Speed	Hour	Distance
30 kms per hour	4	120 kms
20 kms per hour	4	80 kms
	<b>8</b>	<b>200 kms</b>

$$\text{Average speed} = \frac{200}{8} = 25 \text{ km / hr., which is same as the Arithmetic mean.}$$

### 3.5.4 CENTRAL TENDENCY : THE MEDIAN

The Median is a measure of Central Tendency different from any of the means discussed earlier.

**For ungrouped data:**

The median of a data set is the value in the middle when the data items are arranged in ascending order.

If there is an odd number of items, the median is the value of the middle item.

If there is an even number of items, the median is the average of the values for the middle two items.

Median =  $\left(\frac{n+1}{2}\right)^{\text{th}}$  item in a data array sorted in the ascending order if number of items  $n$  in the array is odd.

Suppose, in a data array, students admitted a valuation programme since last 7 years.

a)	1996	1997	1998	1999	2000	2001	2003
	13	14	16	17	18	18	19

Note that number of data items is odd and data values are already sorted in the ascending order. Hence,

$$\text{Median} = \left(\frac{n+1}{2}\right) = \frac{8}{2} = 4^{\text{th}} \text{ item} = 17.$$

b) No. of completion certificate issued by the Municipal Authority in Anand since last 8 months.

Dec'02	Jan	Feb	March	April	May	June	July'03
20	25	28	30	32	35	38	40

Note that here number of data items is 8 which is an even number and data items are sorted in the ascending order. And  $(n+1)/2 = 9/2 = 4.5$ . Hence,

$$\text{Median} = \text{Average of } 4^{\text{th}} \text{ and } 5^{\text{th}} \text{ data items} = (30 + 32) / 2 = 31.$$

If the raw data is not in sorted order, the data items has to be sorted first and then the above procedure should be applied.

**Median for grouped data**

Suppose that the grouped data is organized in the form of following cumulative frequency distribution for data items lying in the interval [a, b].

Class	frequency	Cumulative frequency
a - a <sub>1</sub>	f <sub>1</sub>	f <sub>1</sub> = C <sub>1</sub>
a <sub>1</sub> - a <sub>2</sub>	f <sub>2</sub>	f <sub>1</sub> + f <sub>2</sub> = C <sub>2</sub>
a <sub>2</sub> - a <sub>3</sub>	f <sub>2</sub>	f <sub>1</sub> + f <sub>2</sub> + f <sub>3</sub> = C <sub>3</sub>
-		
- (previous class)	f <sub>p</sub>	C <sub>p</sub>
a <sub>l</sub> - a <sub>u</sub> (Median class)	f <sub>m</sub>	C <sub>m</sub>
-		-
-		-
a <sub>n</sub> - b	f <sub>n+1</sub>	f <sub>1</sub> + f <sub>2</sub> + ... + f <sub>n+1</sub> = N

**Median class:** Class in which  $\left(\frac{N+1}{2}\right)^{th}$  item lies. That is  $C_p < (N+1)/2 \leq C_m$ ,

Where C<sub>p</sub> and C<sub>m</sub> are cumulative frequencies of previous class (class previous to median class) and median class respectively.

Then the Median =  $a_l + \frac{\frac{N}{2} - C_p}{f_m} W$ , where

a<sub>l</sub> = lower limit of the median class; a<sub>u</sub> = upper limit of the median class;

f<sub>m</sub> = frequency of the median class;

W = a<sub>u</sub> - a<sub>l</sub> = class width of the median class.

**Example 8:** Estimate Median from the following group data :

Area of plot in sq. mt. in TP-1	Number of plots	Cumulative frequency
100 – 105	15	15
105 – 110	20	35
110 – 115	22	57
115 – 120	23	80
120 – 125	28	108
125 – 130 (Median class)	30	138
130 – 135	35	173
135 – 140	45	218
	N = 218	

Now since  $108 < N/2 = 109 < 138$ , the Median class interval is [125, 130].

Hence, in this case, a<sub>l</sub> = 125; a<sub>u</sub> = 130; C<sub>p</sub> = 108, f<sub>m</sub> = 30 and W = 130 – 125 = 5.

Hence, Median =  $125 + \left(\frac{109-108}{30}\right) \times 5 = 125.167$ .

### 3.5.5 CENTRAL TENDENCY : MODE

The mode is the value that is repeated most often in the data set. For ungrouped data Mode is the value of the variate for which the frequency is maximum.

Example 9: 1, 2, 3, 4, 5, 5, 5, 5, 6, 7, 8, 8, 8, 9, 9, 10

Here, value 5 is maximum times repeated than any other values.

$\therefore$  Mode = 5

If there are two values having maximum frequency then Mode is not an appropriate measure of central tendency.

For a grouped data organized in the following form

Class	frequency
a - a <sub>1</sub>	f <sub>1</sub>
a <sub>1</sub> - a <sub>2</sub>	f <sub>2</sub>
a <sub>2</sub> - a <sub>3</sub>	f <sub>2</sub>
-	-
- (pre-modal class)	f <sub>m-1</sub>
a <sub>l</sub> - a <sub>u</sub> (Modal class)	f <sub>m</sub>
- Post-modal class	f <sub>m+1</sub>
-	-
a <sub>n</sub> - b	f <sub>n+1</sub>

Modal class is the class for which the frequency is maximum.

Then the mode for this grouped data is given by:

$$\text{Mode} = a_l + \frac{f_m - f_{m-1}}{2f_m - f_{m-1} - f_{m+1}} \times W$$

Where,

a<sub>l</sub> = Lower limit of the modal class;

f<sub>m</sub> = Frequency of the modal class;

f<sub>m-1</sub> = Frequency of the class just before the modal (pre-modal) class;

f<sub>m+1</sub> = Frequency of the class just after the modal (post-modal) class;

W = a<sub>u</sub> - a<sub>l</sub> = Class width of the modal class.

**Example 10:** Find the modal daily wages of employees in a factory.

Daily wages in Rs.	Number of workers
100 - 150	2
150 - 200	10 = $f_{m-1}$
200 - 250 (Modal class)	26 = $f_m$
250 - 300	19 = $f_{m+1}$
300 - 350	11
350 - 400	5

$a_l = 200$ ;  $W = \text{class width} = 50$ .

$$\text{Mode} = a_l + \frac{f_m - f_{m-1}}{2f_m - f_{m-1} - f_{m+1}} \times W$$

$$= 200 + \frac{26 - 10}{52 - 10 - 19} \times 50$$

$$= 200 + (16 / 23) \times 50 = 234.78$$

**Example 11:** The summer earnings of a Sardar Patel University students are as under :

Summer earning in Rs.	No. of students
0 - 500	231
1000 - 1500 (Modal class)	304 = $f_{m-1}$
1500 - 2000	400 = $f_m$
2000 - 2500	296 = $f_{m+1}$
2500 - 3000	123
3000 or more	68
	23

If student aid is restricted to those whose summer earnings were at least 10% lower than the modal summer earnings, how many of the applicants qualify?

- Modal class = Rs.1,000/- – Rs.1,500/-
- Hence  $a_l = 1000$ ;  $W = 500$ . Hence,

$$\text{Mode} = a_1 + \frac{f_m - f_{m-1}}{2f_m - f_{m-1} - f_{m+1}} \times W = 1000 + \frac{400 - 304}{800 - 304 - 296} \times 500$$

$$= 1000 + (96 / 200) \times 500 = 1240.$$

- c) Modal summer earnings = 1240  
 10% lower than summer earnings =  $0.9 \times 1240 = 1116$

Draw less than Ogive and find out frequency @ 1116 point from the curve :

Less than	0	0
Less than	500	231
Less than	1000	535
Less than	1500	935
Less than	2000	1231
Less than	2500	1354
Less than	3000	1422

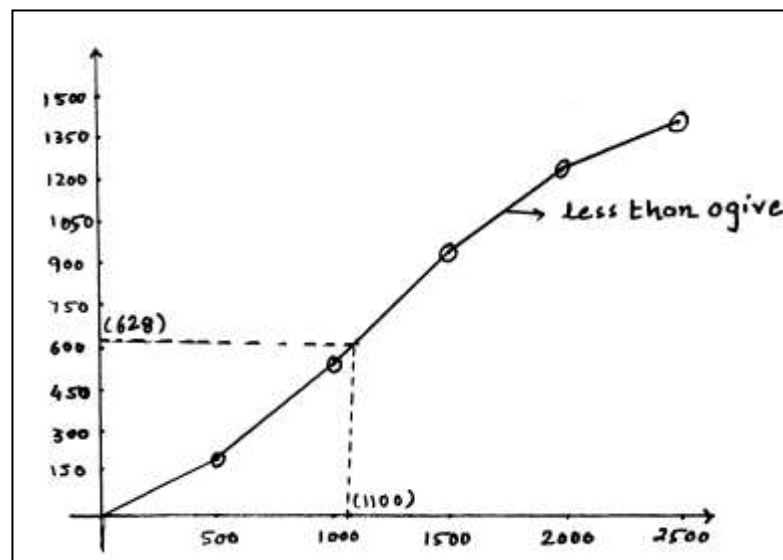


Figure 11: Less than Ogive

Approximately 628 students qualify for students aid.

### 3.5.6 RELATIONSHIP BETWEEN MEAN, MEDIAN AND MODE

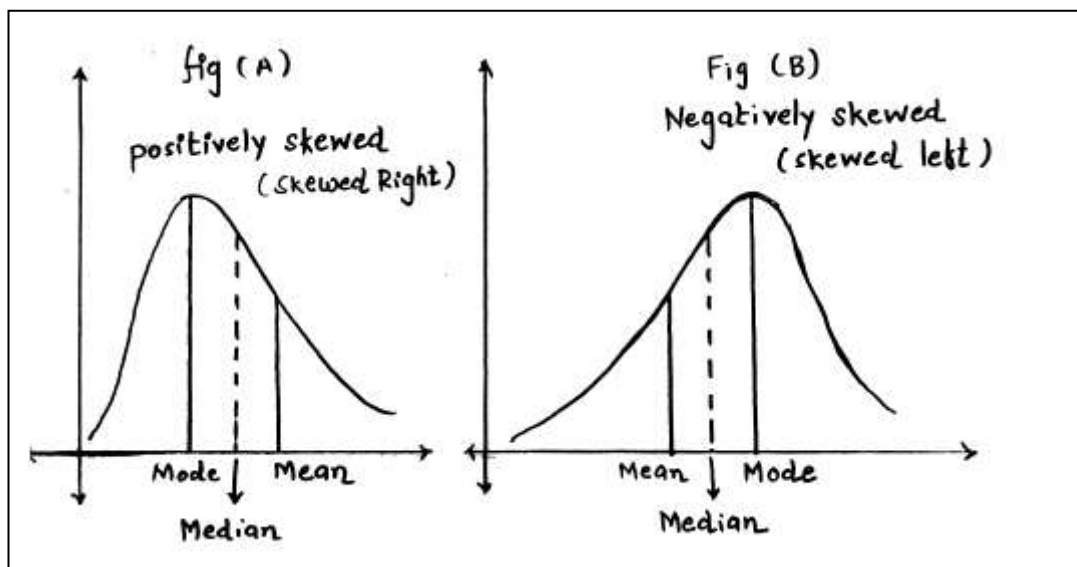
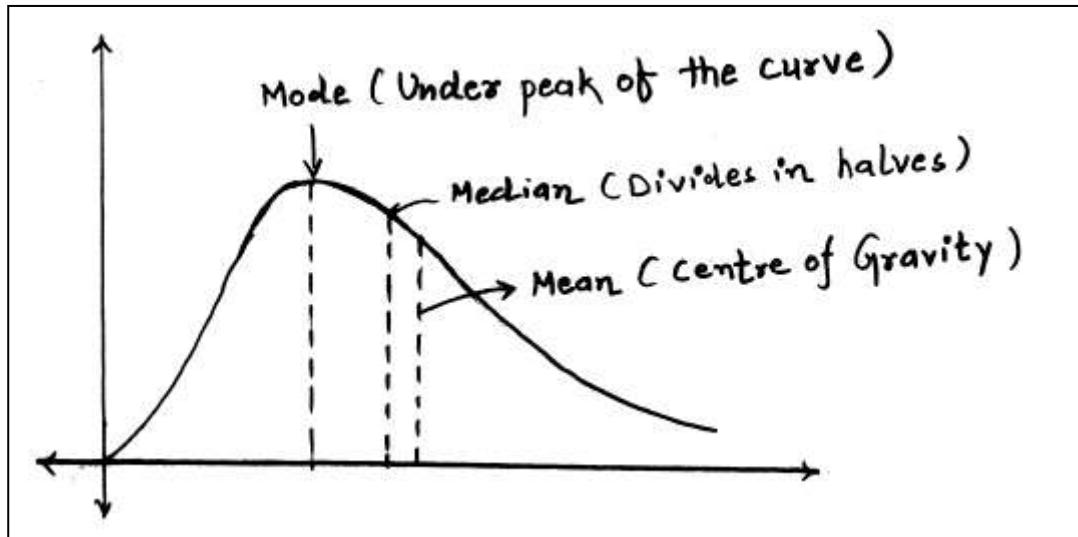


Figure 12: Relative positioning of Mean, Median, and Mode.

Symmetrical distributions have same value for the mean, median and mode. In a positively skewed distribution (one skewed to the right) as in Figure-A, Mode is the highest point of distribution, the median is to right and mean is right to median and in a negatively skewed distribution mean and median are left to Mode as shown in Figure-B.

### 3.5 DISPERSION

The mean of all three curves is the same, but curve 'A' has less spread (or variability) than curve 'B' which has less spread than curve 'C'. If we measure only the mean of these three distributions, we will miss an important difference among the three curves, likewise for any data, to increase our understanding of the pattern of the data, we must also measure its dispersion – its spread or variability.

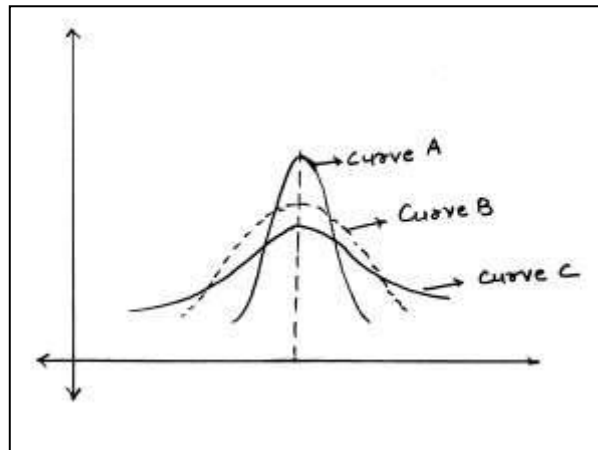


Figure 13: Distributions having same Mean and different dispersions

#### Use of dispersion measures

- i. To determine the reliability of an average.
- ii. To serve as a basis for the control of the variability means to determine nature and cause of variation in order to control variation itself.
- iii. To compare two or more series with regard to their variability.
- iv. To facilitate the use of other statistical measures.



**MEASURES OF DISPERSION : RANGE**

**3.6.1** The range is the difference between the highest and lowest observed values.

Range = highest observed value - lowest observed value

Example 12:

Annual Selling of books: 100 150 135 149 104 103 99 98 164 170 75 151 155 175

$$\text{Range} = 175 - 75 = 100$$

**Example 13:**

Series 'A'	56	6	56	56	56	56	6	56
Series 'B'	6	10	16	26	36	46	56	56
Series 'C'	356	356	345	348	349	350	310	306

Range for Series 'A', 'B', 'C' is same 50 but it does not mean that the distributions are alike, therefore Range is most unreliable guide to the dispersion of the values within a distribution.

Range cannot be computed in case of open-end distribution.

**3.6.2 MEASURES OF DISPERSION : THE INTERQUARTILE RANGE**

Range is based on two extreme items and it fails to take account of the scatter within the range. From this, there is a reason to believe that if the dispersion of the extreme items is discarded, the limited range thus established might be more instructive. For this purpose there has been a developed measure, called the inter-quartile range, the range which includes the middle 50% of the distribution. That is, one-quarter of the observations at the lower end, and another quarter of the observations at the upper end of the distribution are excluded in computing the inter-quartile range.

Inter-quartile range represents the difference between the third quartile and the first quartile.

$$\text{Inter-quartile range} = Q_3 - Q_1$$

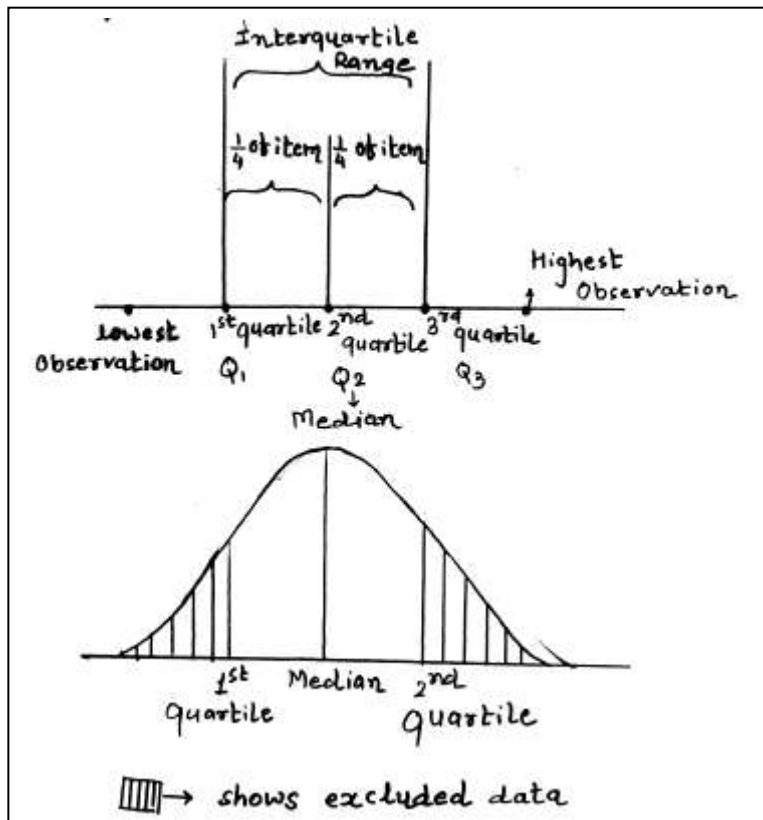


Figure 14: Inter-quartile range

The quartiles divide the area under the distribution into four equal parts, each containing 25% of the area. As shown in the figure, 25% observations have values below  $Q_1$  and 75% above  $Q_1$ . Whereas for  $Q_3$ , 75% observations have values below  $Q_3$  and 25% above  $Q_3$ . The second quartile is the median. The formulae for  $Q_1$  and  $Q_3$  can be obtained on the same lines as that of the Median.

Width of the four quartiles need not be equal.

### 3.6.3 MEAN DEVIATION FROM MEAN

The Mean Deviation is also known as the average deviation.

It is the average difference between the items in a distribution and the median or mean of that data.

Consider an ungrouped data with data values  $\{x_1, x_2, \dots, x_n\}$ , having mean  $\bar{X}$ .

Let  $d_i = |x_i - \bar{x}|$  = deviation of  $x_i$  from mean, for  $i = 1, 2, \dots, n$   
 = Absolute value of  $(x_i - \bar{x})$  (ignoring + or - signs). Then

$$\text{Mean Deviation from mean} = \frac{\sum_{i=1}^n d_i}{n}$$

For a grouped data with  $k$  classes having class mid-points as  $\{x_1, x_2, \dots, x_k\}$ , and frequencies  $\{f_1, f_2, \dots, f_n\}$ , having mean as  $\bar{x}$ ,

$$\text{Mean Deviation from mean} = \frac{\sum_{i=1}^n d_i f_i}{\sum_{i=1}^n f_i}$$

Co-efficient of Mean Deviation (C. D.) = (Mean Deviation (MD)) / Mean.

Example 14: Calculate the mean deviation from mean and also co-efficient of mean deviation for following data :

Sale price (Rs. in lakhs)	Number of Transaction ( $f_i$ )	(Mid-point) $x_i$	$x_i f_i$	$d_i$	$f_i d_i$
7.5 - 12.5	2	10	20	12	24
12.5 - 17.5	4	15	60	7	28
17.5 - 22.5	6	20	120	2	12
22.5 - 27.5	8	25	200	3	24
27.5 - 32.5	5	30	150	8	40
	$\sum_{i=1}^5 f_i = 25$		$\sum_{i=1}^5 x_i f_i$ = 550		$\sum_{i=1}^5 d_i f_i$ = 128

$$\text{Mean } \bar{x} = \frac{\sum_{i=1}^5 x_i f_i}{\sum_{i=1}^5 f_i} = \frac{550}{25} = 22$$

$$\text{Mean deviation from Mean} = \frac{\sum_{i=1}^5 d_i f_i}{\sum_{i=1}^5 f_i} = \frac{128}{25} = 5.12$$

$$\text{Co-efficient of Mean deviation} = \frac{\text{Mean deviation}}{\text{Mean}} = \frac{5.12}{22} = 0.2327$$

Example 15: Calculate mean deviation from Median and Co-efficient of mean Deviation for the data given in above example

Sale price (Rs. in lakhs)	Number of Transaction ( $f_i$ )	(Mid-point) $x_i$	Cumulative frequency	$d_i$	$f_i d_i$
7.5 - 12.5	2	10	2	12.8	25.6
12.5 - 17.5	4	15	6	7.8	31.2
17.5 - 22.5	6	20	12	2.8	16.8
22.5 - 27.5	8	25	20	2.2	17.6
27.5 - 32.5	5	30	25	7.2	36
	$\sum_{i=1}^5 f_i = 25$				$\sum_{i=1}^5 d_i f_i = 127.2$

Here  $N = 25$  and  $N / 2 = 12.5$  and hence Median class interval is [22.5, 27.5].

And  $f_m = 8$ ;  $f_p = 6$ ; and class width = 5; Hence,

$$\text{Median} = a_1 + \frac{\frac{N}{2} - C_p}{f_m} W = 22.5 + \frac{12.5 - 12}{8} \times 5 = 22.5 + 0.3125 \cong 22.8.$$

In this case,  $d_i = | x_i - \text{Median} |$ .

$$\text{Mean deviation from Median} = \frac{\sum_{i=1}^5 d_i f_i}{\sum_{i=1}^5 f_i} = \frac{127.2}{25} = 5.088$$

$$\begin{aligned} \text{Co-efficient of Mean deviation from Median} &= \frac{\text{Mean deviation from median}}{\text{Median}} \\ &= \frac{5.088}{22.8} = 0.2232 \end{aligned}$$

### 3.6.4 THE STANDARD DEVIATION AND THE VARIANCE

It is most important and widely used measure of studying dispersion. The standard deviation concept was introduced by Karl Pearson in 1823. Its significance lies in the fact that it is free from those defects from which the earlier methods suffer and satisfies most of the properties of a good measure of dispersion.

Standard deviation is also known as root mean square deviation for the reason that it is the square root of the mean of the squared deviations from the arithmetic mean. The mean of the squared deviations from the arithmetic mean is called the variance.

The standard deviation measures the absolute dispersion (or variability of a distribution). The greater the amount of dispersion or variability, greater the standard deviation, means greater will be the magnitude of the deviations of the values from their mean.

A small standard deviation means a High degree of uniformity of the observation as well as homogeneity of a series.

A large standard deviation means just the opposite.

Thus, if we have two or more comparable series with identical or nearly identical mean, it is the distribution with the smallest standard deviation that has the most representative mean.

Hence, standard deviation is extremely useful in judging the representativeness of the mean.

#### **Difference between Mean Deviation and Standard Deviation**

Both of the measures of dispersion are based on each and every item of the distribution, but they differ in the following respects :

- i. Algebraic signs are ignored while calculating mean deviation whereas in the calculation of standard deviation signs are taken into account. However, the signs become redundant while computing the standard deviation.

- ii. Mean deviation can be computed either from median or mean. The standard deviation, on the other hand, is always computed from the arithmetic mean because the sum of the squares of deviation of the items from the arithmetic mean is the least.

### 3.6.5 POPULATION VARIANCE (‘ $\sigma^2$ ’ SIGMA SQUARED)

If a Population consists of **ungrouped data** with data values  $\{x_1, x_2, \dots, x_N\}$ , having mean  $\mu$ , then the population variance ( $\sigma^2$ ) is defined as

$$\sigma^2 = \frac{\sum_{i=1}^N (x_i - \mu)^2}{N} = \frac{\sum_{i=1}^N x_i^2}{N} - \mu^2.$$

The last equality can be proved mathematically.

“Units in which the variance is expressed cause a problem i.e. units are the squares of the units of the data:

Dollars squared, this is confusing, to rectify this confusion, square root of variance is considered which is standard deviation, we take square root of unit as well as value in standard deviation ( $\sigma$ ), then the unit of  $\sigma$  becomes the same as original data”.

#### Population Standard Deviation ( $\sigma$ )

The population standard deviation for the **ungrouped data** as above is the square root of the population variance

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \mu)^2}{N}} = \sqrt{\frac{\sum_{i=1}^n x_i^2}{N} - \mu^2}.$$

**Example 16:** The rate (Rs. per sq. ft.) which the residential have been sold in a locality are as under : (ungrouped Population)

40	140	170	190	220
60	140	170	210	240
120	150	180	210	250

Find out the variance and standard deviation of rate of residential plots in rupees per sq. ft.

Observation ( $x_i$ )	Mean (2) $\mu = \frac{2490}{15}$	Deviation ( $x_i - \mu$ ) (1) - (2)	(Deviation) <sup>2</sup> ( $x_i - \mu$ ) <sup>2</sup>	(Observation) <sup>2</sup> ( $x_i$ ) <sup>2</sup>
(1)	(2)	(3)	(4)	(5)
40	166	- 126	15876	1600
60	166	- 106	11236	3600
120	166	- 46	2116	14400
140	166	- 26	676	19600
140	166	- 26	676	19600
150	166	- 16	256	22500
170	166	4	16	28900
170	166	4	16	28900
180	166	14	196	32400
190	166	24	576	36100
210	166	44	1936	44100
210	166	44	1936	44100
220	166	54	2916	48400
240	166	74	5476	57600
250	166	84	7056	62500
$\sum x_i = 2490$			$\sum (x_i - \mu)^2 = 50960$	$\sum x_i^2 = 464300$

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \mu)^2}{N} = \frac{50960}{15} = 3397.33$$

Or

$$\sigma^2 = \frac{\sum_{i=1}^n x_i^2}{N} - \mu^2 = \frac{464300}{15} - (166)^2 = 30953.33 - 27556 = 3397.33$$

Hence, Standard deviation  $\sigma = \sqrt{3397.33} = \text{Rs. } 58.28 \text{ per sq. ft.}$

- If a population consists of a **grouped data** with  $k$  classes having class mid points as  $\{x_1, x_2, \dots, x_k\}$ , and frequencies  $\{f_1, f_2, \dots, f_k\}$ , having mean as  $\mu$ , then the population variance ( $\sigma^2$ ) is defined as

$$\sigma^2 = \frac{\sum_{i=1}^k f_i (x_i - \mu)^2}{N} = \frac{\sum_{i=1}^k f_i x_i^2}{N} - \mu^2, \text{ where } N = \sum_{i=1}^k f_i$$

The population **standard deviation** for the **grouped data** as above is the square root of the population variance

$$\sigma = \sqrt{\frac{\sum_{i=1}^k f_i (x_i - \mu)^2}{N}} = \sqrt{\frac{\sum_{i=1}^k f_i x_i^2}{N} - \mu^2}.$$



Example 17: Determine the variance and Standard Deviation of area of 100 plots in the Town Planning Scheme No.1 of Anand.

Class (Sm) Area in Sq.Mt.	Mid point x (1)	Freq. $f_i$ (2)	$f_i \cdot x_i$ (3) = (1) × (2)	Mean $\mu$ (4)	$x_i - \mu$ (1) - (4)	$(x_i - \mu)^2$ ( (1) - (4) ) <sup>2</sup>	$f_i (x_i - \mu)^2$ (2) × ((1) - (4)) <sup>2</sup>	$f_i x_i^2$	
70 – 80	75	4	300	125	- 50	2500	10000	5625	22500
80 – 90	85	7	595	125	-40	1600	11200	7225	50575
90 -100	95	8	760	125	-30	900	7200	9023	72200
100-110	105	10	1050	125	-20	400	4000	11025	110250
110-120	115	12	1380	125	-10	100	1200	13225	158700
120-130	125	17	2125	125	0	0	0	15625	265625
130-140	135	13	1755	125	10	100	1300	18225	236925
140-150	145	10	1450	125	20	400	4000	21025	210250
150-160	155	9	1395	125	30	900	8100	24025	216225
160-170	165	7	1155	125	40	1600	11200	27225	190575
170-180	175	2	350	125	50	2500	5000	30625	61250
180-190	185	1	185	125	60	3600	3600	34225	34225
		N=100	12500				66800		162930
									0

$$\text{Hence, Mean} = \frac{\sum_{i=1}^k f_i x_i}{N} = 12500 / 100 = 125;$$

$$\sigma^2 = \frac{\sum_{i=1}^k f_i (x_i - \mu)^2}{N} = 66800 / 100 = 668;$$

Hence, Standard deviation  $\sigma = \sqrt{668} = 25.84$ .

### Sample Variance

If the population size is very large then computing measures of central tendency and dispersion is quite time consuming or in some cases data for the entire population may not be available. In such cases population measures are estimated by taking a sample and computing these measures for the sample.

#### For Ungrouped data

If a Sample consists of **ungrouped data** with data values  $\{x_1, x_2, \dots, x_n\}$ , having mean  $\bar{x}$  then

- a) If sample size (no. of observations,  $n$ ) is large relative to the size of the population (generally  $n > 30$ ), then we compute sample variance using following formula, which is same as that of population variance ,

$$s^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n} = \frac{\sum_{i=1}^n x_i^2}{n} - \bar{x}^2.$$

- b) But, when sample size is sufficiently small relative to the size of the population ( $n < 30$ ) the above estimate is not good and hence we use formula

$$s^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1} = \frac{\sum_{i=1}^n x_i^2}{n-1} - \frac{n\bar{x}^2}{n-1}.$$

#### For Grouped data

If a Sample consists of a grouped data with  $k$  classes having class mid points as  $\{x_1, x_2, \dots, x_k\}$ , and frequencies  $\{f_1, f_2, \dots, f_k\}$ , having mean as  $\bar{x}$ , then

- (a) If sample size is greater than 30, then sample variance

$$s^2 = \frac{\sum_{i=1}^k f_i (x_i - \bar{x})^2}{N} = \frac{\sum_{i=1}^k f_i x_i^2}{N} - \bar{x}^2, \text{ where } N = \sum_{i=1}^k f_i$$

- (b) If sample size is less than 30, then sample variance

$$s^2 = \frac{\sum_{i=1}^k f_i (x_i - \bar{x})^2}{N-1} = \frac{\sum_{i=1}^k f_i x_i^2}{N-1} - \frac{N\bar{x}^2}{N-1}, \text{ where } N = \sum_{i=1}^k f_i$$

### Sample Standard Deviation

As in the case of a population standard deviation, sample standard deviation in above four cases is the square root of the sample variance in the respective cases. For example, for sample of small size, consisting of a grouped data as above, the sample standard deviation

$$s = \sqrt{\frac{\sum_{i=1}^k f_i(x_i - \bar{x})^2}{N-1}} = \sqrt{\frac{\sum_{i=1}^k f_i x_i^2}{N-1} - \frac{N\bar{x}^2}{N-1}}, \text{ where } N = \sum_{i=1}^k f_i$$

Standard score of an item in a sample.

$$\text{Sample standard score} = \frac{x - \bar{x}}{s}$$

$x$  = Observation from the sample

$\bar{x}$  = Sample mean

$s$  = Sample standard deviation

Example 18:

In an attempt to estimate potential future demand, the National Motor Company did a study asking married couples how many cars the average energy-minded family should own in 1998. For each couple, National Motor Company averaged the husband's and wife's responses to get the overall couple response. The answers were then tabulated, and it is as under:

<u>Number of cars</u>	<u>Frequency</u>
0	02
0.5	14
1.0	23
1.5	07
2.0	04
2.5	02

- a) Calculate the variance and the standard deviation.
- b) Since the distribution is roughly bell-shaped, how many of the observations should theoretically fall between 0.5 and 1.5? Between 0 and 2 ? How many actually do fall in those intervals?

Answer :

No. of Cars – x	Frequency - (f)	fx	x <sup>2</sup>	f x <sup>2</sup>
0	02	00	0	0
0.5	14	07	0.25	3.5
1.0	23	23	1	23
1.5	07	10.5	2.25	15.75
2.0	04	08	4	16
2.5	02	05	6.25	12.50
	-----	-----	-----	-----
	∑ = 52	∑ = 53.5	∑ = 13.75	70.75

$$\bar{x} = \frac{\sum fix_i}{\sum f} = \frac{53.5}{52} = 1.0288 \text{ cars,}$$

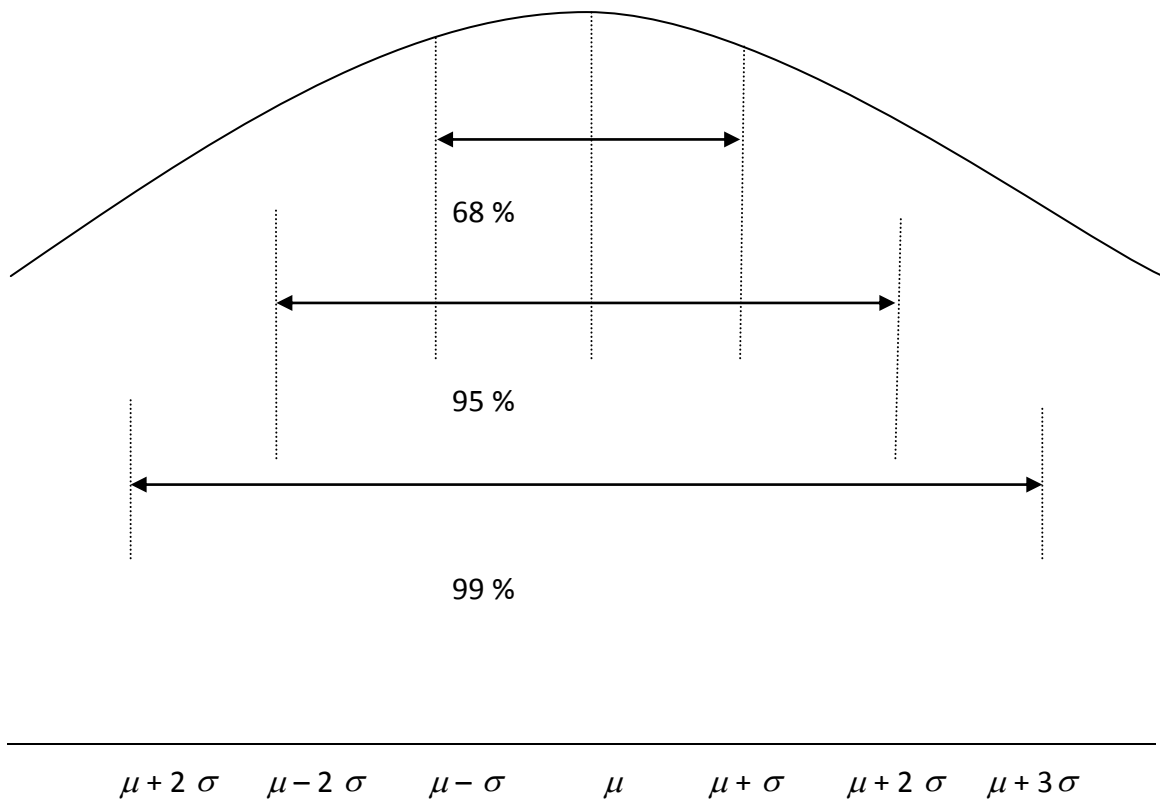
$$s = \sqrt{\frac{\sum fx^2}{n-1} - \frac{n\bar{x}^2}{n-1}} = \sqrt{\frac{70.75}{51} - \frac{52 \times (1.0288)^2}{51}} = \sqrt{1.387 - 1.079} = \sqrt{0.308}$$

$$= 0.55 \text{ cars.}$$

- c) (0.5, 1.5) is approximately  $\bar{x} \pm s$ , so about 68% of data, or  $0.68 \times 52 = 35.36$  Observation should fall in this range. In fact, 44 observations fall into this interval.

(0,2) is approximately  $\bar{X} + 2s$ , so about 95% of data, or  $0.95 \times 52 = 49.4$  Observations should fall in this range, in fact, 50 Observations fall into this interval.

**Use of the Standard Deviation (S.D.)**



**Figure 15: Number of observations in the given interval**

We can measure with even more precision, the percentage of items that fall within specific ranges in a symmetrical, bell-shaped curve as shown in Figure A.

About 68% of the values in the population will fall within  $\pm$  one S.D. from the mean.

$\cong$  95% within  $\pm 2 \times$  S.D. from the mean.

$\cong$  99% within  $\pm 3 \times$  S.D. from the mean.

If you analyse the above example.

By part (a), Mean = Rs.166/- per sq. ft. and  $\sigma$  = Rs.58.28 per sq. ft.

$$\mu - 2\sigma = 166 - 2 \times 58.28 = 166 - 116.56 = 49.44$$

$$\mu + 2\sigma = 166 + 2 \times 58.28 = 166 + 116.56 = 282.56.$$

14 values out of 15 values are actually falling within this interval ( $\mu - 2\sigma$ ,  $\mu + 2\sigma$ )

i.e. 93.33% of items fall in ( $\mu - 2\sigma$ ,  $\mu + 2\sigma$ ) interval, i.e. close to 95% for an interval of Mean  $\pm 2\sigma$  of a bell-shaped curve theoretically.

### 3.6.6 Concept of a Standard Score

The S.D. is also useful in describing how far individual items in a distribution depart from the mean of the distribution.

Standard score gives us the number of S.D. a particular observation lies below or above the mean.

Population Standard Score =  $\frac{x - \mu}{\sigma}$ , Where, x = Observation from the population;

$\mu$  = Population mean; and  $\sigma$  = Population standard deviation.

Suppose, we observe a rate of Rs.210/- per sq. ft., the standard score of an observation 210 is

$$\frac{210 - 166}{58.28} = 0.755.$$

The standard score indicates that a rate of Rs.210/- per sq. ft. deviates from the mean by 0.755 times standard deviation.

### 3.6.7 Co-efficient of the Standard Deviation

The standard deviation cannot be the sole basis for comparing two distributions. If we have a standard deviation 10 and mean 5, the values vary by an amount twice as large as the mean itself. On the other hand, if we have a S.D. 10 and a mean 5000, the variation relative to mean is insignificant. Therefore, we can not know the dispersion of a data set until we know the S.D. and the mean both.

What we need is a relative measure that will give us a feel for the magnitude of the deviation relative to the magnitude of the mean. The coefficient of variation is one such relative measure of dispersion. It relates S.D. and mean by expressing the S.D. as a % of mean.

#### Coefficient of Variation

$$\begin{array}{l} \text{Population Coefficient of variation} \\ = \end{array} \begin{array}{l} \nearrow \text{ S.D.} \\ \frac{S}{\bar{X}} \times 100 \\ \searrow \text{ mean} \end{array}$$



**Example 19:**

In a quality control department, a laboratory technician A completes on average 40 analyses per day with S.D. of 5 and technician B completes on average 160 analyses per day with a S.D. of 15. Which employees shows less variability?

$$\text{Co-efficient of variation} = \frac{S}{\bar{X}} \times 100$$

$$\text{For A} - \frac{5}{40} \times 100 = 12.5\%$$

$$\text{For B} - \frac{15}{160} \times 100 = 9.4\%$$

Technician B shows less variability.

Example 20: Sachin Tendulkar scores 10,000 test runs with an average 54 and S.D. 9 whereas Brian Lara has scored 8000 test runs with an average 60 and S.D. 18. who is most reliable player?

$$\text{C.V. of Sachin Tendulkar} = \frac{S}{\bar{X}} \times 100 = \frac{9}{54} \times 100 = 16.66\%.$$

$$\text{C.V. of Brian Lara} = \frac{18}{60} \times 100 = 30.00\%.$$

Sachin Tendulkar is more reliable than Brian Lara.

### 3 SKEWNESS

When a distribution is not symmetrical it is said to be asymmetrical or skewed. A distribution is said to be 'skewed' when the mean and the median fall at different points in the distribution and the balance (or center of gravity) is shifted to one side or the other to left or right.

**Difference between Dispersion and Skewness:**

Dispersion is concerned with the amount of variation rather than with its direction. Skewness tells us about the direction of the variation or the departure from symmetry.

In fact, measure of skewness are dependent upon the amount of dispersion.

#### 4.1 Measures of Skewness

Measures of skewness tell us the direction and extent of asymmetry in a series and permit us to compare two or more series with regard to these. They may be either absolute or relative.

$$\text{Absolute } s_k = \bar{X} - \text{Mode}$$

If  $\bar{X} > \text{Mode}$ , Skewness will be positive

$\bar{X} < \text{Mode}$ , Skewness will be negative.

The greater the distance, whether positive or negative, the more asymmetrical the distribution.

Absolute (When skewness is based on quartiles)  $S_k = Q_3 + Q_1 - 2 \text{ Median}$ .

The various measures of central tendency and dispersion can be expressed in terms of Statistical Moments which are defined as follows:

For an ungrouped data with data values  $\{x_1, x_2, \dots, x_n\}$ , having mean  $\bar{x}$ , the for any positive integer  $k$ , the  $k^{\text{th}}$  **Moment about origin** is defined as  $M_k^o = \frac{\sum_{i=1}^n x_i^k}{n}$ .

The  $k^{\text{th}}$  Moment about Mean is defined as:

$$M_k^m = \frac{\sum_{i=1}^n (x_i - \bar{x})^k}{n} \quad \text{OR} \quad \frac{\sum_{i=1}^n (x_i - \bar{x})^k}{n-1},$$

depending on whether the data corresponds to a sample of size significantly small as compared to the size of the population from which the sample is drawn. This definition immediately yields that

- a) First moment about origin is the Mean.
- b) Second moment about mean is the Variance.

**The Third moment about mean** measures the Skewness of the data, In fact, the Skewness of an ungrouped data as given above is defined as:

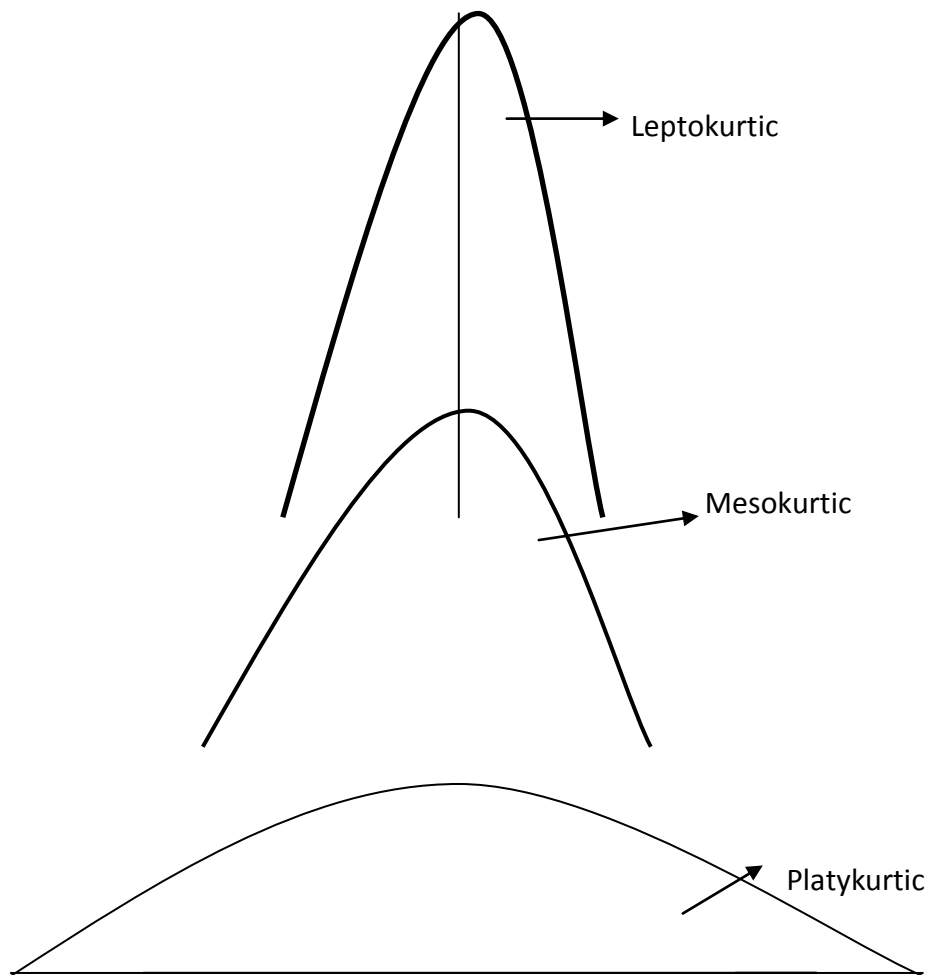
$$\text{Skewness} = \frac{M_3^m}{s^3}, \text{ where } s \text{ is the standard deviation.}$$

#### 4.2 Kurtosis

Kurtosis is the degree of peakedness of a distribution, usually taken relative to a normal distribution.

Kurtosis in Greek means 'Bulginess'. In statistics Kurtosis refers to the degree of flatness or peakedness in the region about the mode of a frequency curve. The degree of Kurtosis of a distribution is measured relative to the peakedness of Normal Curve.

If a curve is more peaked than the normal curve, it is called 'leptokurtic'. In such a case items are more closely bunched around the Mode. On the other hand, if a curve is more flat-topped than the normal curve, it is called 'platykurtic'. The normal curve itself is known as 'mesokurtic'.



**Figure 16: Kurtosis**

One of the measures of Kurtosis depend on the fourth Moment about Mean and is defined as: Kurtosis =  $\frac{M_4^m}{s^4}$ , where s is the standard deviation.

#### 4.3.1 Exercises

1. Comfy Furniture Company has a revolving credit agreement with the UTI Bank. The loan showed the following ending monthly balances last year in Rs. :

Jan.	121,300	Apr.	72,800	July	58,700	Oct	52,800
Feb.	112,300	May	72,800	Aug.	61,100	Nov	49,200
Mar.	72,800	June	57,300	Sept.	50,400	Dec	46,100

The company is eligible for a reduced rate of interest if its average monthly balance is over Rs.65,000. Does it qualify?

2. DB's Store advertises, "If our average prices are not equal or lower than everyone else's, you get it free." One of DB's customers came into the store one day and threw on the counter bills of sale for six items she bought from a competitor for an average price less than DB's.

The items cost in Rs.

1.29    2.97    3.49    5.00    7.50    10.95

DB's prices for the same six items are Rs.1.35, Rs.2.89, Rs.3.19, Rs.4.98, Rs.7.59, and Rs.11.50. DB told the customer, "My and refers to a weighted average price of these items. Our average is lower because our sales of these items have been."

7    9    12    8    6    3

Is DB getting himself into or out of trouble by talking about weighted averages?

3. Ajanta Distribution Company, a subsidiary of a major appliance manufacturer, is forecasting regional sales for next year. The Ahmedabad, with current yearly sales of Rs.193.8 million, is expected to achieve a sales growth of 7.25 percent; the Vadodara branch, with current sales of Rs.79.3 million, is expected to grow by 8.20 percent; and the Anand branch, with sales of Rs.57.5 million, is expected to increase sales by 7.15 percent. What is the average rate of sales growth forecasted for next year?
4. The growth in bad-debt expense for Desktop Office Supply Company over the last few years is as follows. Calculate the average percentage increase in bad-debt expense over this time period. If this rate continues, estimate the percentage increase in bad debts for 1997, relative to 1995.

1989	1990	1991	1992	1993	1994	1995
0.11	0.09	0.075	0.08	0.095	0.108	0.120

5. Marketing compares prices charged for identical items in all of its food stores. Here are the prices charged by each store for a pound of salt last week:

Rs. 1.08 0.98 1.09 1.24 1.33 1.14 1.55 1.08 1.22 1.05

- Calculate the median price per pound.
  - Calculate the mean price per pound.
  - Which value is the better measure of the central tendency of these data?
6. For the following frequency distribution determine
- The median class.
  - The number of the item that represents the median.
  - The width of the equal steps in the median class.
  - The estimated value of the median for these data.

Class	Frequency	Class	Frequency
100 – 149.5	12	300 – 349.5	72
150 – 199.5	14	350 – 399.5	63
200 – 249.5	27	400 – 449.5	36
250 – 299.5	58	450 – 499.5	18

7. Here are the ages in years of the cars worked on by the Autocare Workshop last:

5 6 3 6 11 7 9 10 2 4 10 6 2 1 5

- Compute the mode for this data set.
- Compute the mean of the data set.
- Compare parts (a) and (b) and comment on which is the better measure of the central tendency of the data.

8. The age of a sample of the students attending, Veer Narmad Community College this semester are:

19 17 15 20 23 41 33 21 18 20  
 18 33 32 29 24 19 18 20 17 22  
 55 19 22 25 28 30 44 19 20 39

- Construct a frequency distribution with intervals 15-19, 20-24, 25-29, 30-34, and 35 and older.
  - Estimate the modal value
  - Now compute the mean of the raw data.
  - Compare your answers in parts (b) and (c) and comment on which of the two is the better measure of the central tendency of these data and why.
9. Here are student scores on a Principles of Valuation quiz. Find the 80<sup>th</sup> percentile.

95 81 59 68 100 92 75 67 85 79  
 71 88 100 94 87 65 93 72 83 91

10. The IPCL Company is considering purchasing a new fleet of company cars. The financial department's director, Mr. Bharat Parikh, sampled 40 employees to determine the number of miles each drove over a 1-year period. The results of the study are as follow. Calculate the range and interquartile range.

3,600 4,200 4,700 4,900 5,300 5,700 6,700 7,300  
 7,700 8,100 8,300 8,400 8,700 8,700 8,900 9,300  
 9,500 9,500 9,700 10,000 10,300 10,500 10,700 10,800  
 11,000 11,300 11,300 11,800 12,100 12,700 12,900 13,100  
 13,500 13,800 14,600 14,900 16,300 17,200 18,500 20,300

11. The ABCL, Ltd., a Bollywood casting company, is selecting a group of extras for a movie. The ages of the first 20 men to be interviewed are

50 56 55 49 52 57 56 57 56 59  
54 55 61 60 51 59 62 52 54 49

The director of the movie wants men whose ages are fairly tightly grouped around 55 years. Being a statistical buff of sorts, the director suggests that a standard deviation of 3 years would be acceptable. Does this group of extras qualify?

12. Bharat Electronics is considering employing, one of two training programs. Two groups were trained for the same task. Group 1 was trained by program A; group 2, by program B. For the first group, the times required to train the employees had an average of 32.11 hours and a variance of 68.09. In the second group, the average was 19.75 hours and the variance was 71.14. Which training program has less relative variability in its performance?



## UNIT – 3

### ELEMENTARY THEORY OF PROBABILITY AND PROBABILITY DISTRIBUTIONS, SAMPLING AND SAMPLING DISTRIBUTIONS, ESTIMATION

#### 5. ELEMENTARY THEORY OF PROBABILITY

Suppose MGVCL is starting a project designed to increase the generating capacity of one of its Power plants in Gujarat. The project is divided into two sequential stages: stage-1 (design) and stage-2 (Construction). The management has to estimate the time required to complete each stage of the project depending on analysis of similar construction projects. Or if management set a goal of 1year for completion of the entire project, then one has to find the chances of completion of the project within the given time limit.

Probability theory plays a central role in dealing with problems involving such uncertainties.

As other illustrations, one would like to know the chances that a property will be sold at a price higher than the value fixed by the valuator?

Probability is a numerical measure of the likelihood that an event will occur or measure of the degree of uncertainty associated with an event.

A probability is a number which ranges from 0 (zero) to 1 (one) ( in percentage 0% to 100%).

Assigning a probability of 'zero' means that something will happen, is unlikely and a probability of 1 indicates that something will almost certainly happen.

#### 5.1 Experiments and Sample space

One of the approaches to define probability is the experimental approach, which is based on Experiments and their outcomes.

In probability theory, an event is one or more of the possible outcomes of doing something e.g. if we toss a coin, getting tail or head are events.

An Experiment is a process that generates well-defined outcomes. On any single repetition of an experiment, one and only one of the possible outcomes will occur. The Sample space for an experiment is the set of all experimental outcomes which are also called as Sample points. The following table gives few illustrations of some experiments and corresponding sample spaces:

Experiments	Sample Space
Toss a Coin	{ Head, Tail }
Roll a Die and observe a number on the Top face	{ 1, 2, 3, 4, 5, 6 }
Select a part for inspection	{ defective, non-defective }
Play a cricket match and note the result for your Team	{ win, Lose, Tie }
Toss two coins	{ (H, H), (H, T), (T, H), (T, T) }
Measure the height of any student in your class	Set of numbers representing Heights of the students.

## 5.2 Assigning Probabilities

Once all experimental outcomes (Sample space) are known, next task is to assign probability to each outcome (Sample point). When the Sample space is finite, this task can be done using one of the following three approaches.

- Classical
- Relative frequency
- Subjective method.

Whatever approach is used there are two basic requirements for assigning probabilities.

If the Sample space for an experiment is  $S = \{ e_1, e_2, \dots, e_n \}$  and if  $P(e_i)$  is the probability assigned to the outcome  $e_i$  then the requirements are:

- (i)  $0 \leq P(e_i) \leq 1$  for all  $i$ .      (ii)  $P(e_1) + P(e_2) + \dots + P(e_n) = 1$

### Classical Approach

This method is used when all the outcomes are equally likely and hence probability assigned to each outcome must be same. Thus if the Sample space is  $S = \{ e_1, e_2, \dots, e_n \}$ , then  $P(e_i) = 1/n$ , for all .

illustrations: 1. Tossing a fair coin experiment. Then  $S = \{ H, T \}$  and  $P(H) = P(T) = \frac{1}{2}$ .

2. Rolling a fair die experiment. Then  $S = \{ 1, 2, 3, 4, 5, 6 \}$  and  $P(1) = P(2) = P(3) = P(4) = P(5) = P(6) = 1/6$ .

### Relative Frequency Method

This method is used when data are available to estimate the proportion of times the experimental outcome will occur if the experiment is repeated large number of times.

Thus if the sample space is  $S = \{ e_1, e_2, \dots, e_n \}$ , then

$$P(e_i) = \frac{\text{Number of times } e_i \text{ occurs as per data}}{\text{Total number of times the experiment is repeated}} = \text{Relative frequency of } e_i.$$

Illustration: A toothpaste manufacturing company is studying five different package designs. In an actual experiment, 100 consumers were asked to pick up the design they preferred. The following data were obtained. Assign probability of preference to each of the five designs.

Design	No. of times preferred	Probability of preference
1	5	$5 / 100 = 0.05$
2	15	$15 / 100 = 0.15$
3	30	0.3
4	40	0.4
5	10	0.1

### Subjective method

This method is used when experimental outcomes cannot be judged to be equally likely and little relevant data is available. Hence any other information available, such as previous experience or intuition, can be used to assign the probability. Thus,

$P(e_i)$  = degree of belief (on a scale from 0 to 1), on the bases of the available information, that  $e_i$  will occur.

It is subjective and depends on the person who is assigning the probability. Different persons may assign different probabilities to the same outcome.

Illustrations: 1. Whether it will rain on a cloudy day?

Two outcomes are possible { Yes, No }. Relevant data may or may not be available. A well experienced person in the region can predict the chances of rain which in turn will assign probabilities to these outcomes.

2. Whether a particular Stock will rise tomorrow?

Possible outcomes are { rise, fall, will not change}. An experienced player in the stock market can predict probabilities of all these outcomes.

### 5.3 Event and their Probabilities

Corresponding to any experiment, any subset of the Sample space is called an Event. Or Event is a collection of some Sample points

Illustrations: 1. Experiment: "Tossing of two coins".

Event E1: Getting at least one head = { (H, H), (H, T), (T, H) }.

2. Experiment: "Roll a Die"

Event E2: Getting an even number on Top = { 2, 4, 6 }

### Probability of an event

It is equal to the sum of probabilities of the Sample points in the event.

Note that for any experiment, the Sample space  $S$  and empty set  $\phi$  is itself an event and  $P(S) = 1$  &  $P(\phi) = 0$ . For illustrations 1 and 2 above the probabilities are given by:

$$1. P(E1) = P((H, H)) + P((H, T)) + P((T, H)) = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}.$$

$$2. P(E2) = P(2) + P(4) + P(6) = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{1}{2}$$

3. Consider the experiment in the Relative Frequency illustration. Suppose event

$$E3 = \{\text{Design-2, Design-3}\}. \text{ Then } P(E3) = P(2) + P(3) = 0.15 + 0.3 = 0.45.$$

### 5.4 Basic laws of probability:

#### Complement of an Event:

Suppose a sample space of an experiment is  $S$  and  $A$  is an event (i. e.  $A$  is a subset of  $S$ ). Then Complement event of  $A$ , denoted by  $A^c$  is the subset of  $S$  that contains all the sample points of  $S$  which are not in  $A$ . In any probability application, either event  $A$  or its complement  $A^c$  must occur. Hence  $P(A) + P(A^c) = 1$  or  $P(A^c) = 1 - P(A)$

illustration: Consider Experiment: "Roll a Die"

Event  $A$  = Getting an even number on Top =  $\{ 2, 4, 6 \}$ . Then  $P(A) = \frac{1}{2}$

Now,  $A^c$  = Getting an odd number on Top =  $\{ 1, 3, 5 \}$ . Then Clearly,

$$P(A^c) = \frac{3}{6} = \frac{1}{2} = 1 - \frac{1}{2} = 1 - P(A).$$

#### Union of two events

Union of two events  $A$  and  $B$  is the event containing sample points that belong to  $A$  or  $B$  or both and is denoted by  $A \cup B$ .

### Intersection of two events

Intersection of two events A and B: It is the event containing the sample points belonging to both A and B and is denoted by  $A \cap B$ .

#### 1. Law of Addition

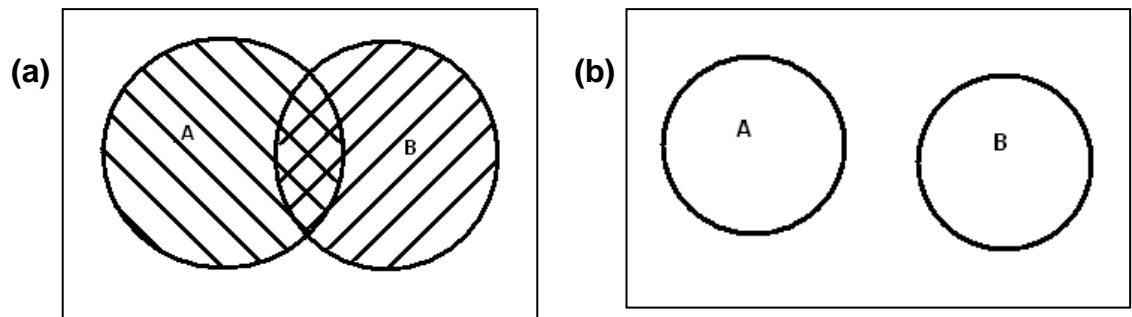


Figure 1: (a) Union and intersection of events (b) Mutually exclusive events

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Event  $(A \cap B)$  is contained in both A and B as well as in  $A \cup B$ . In order to calculate  $P(A \cup B)$  when we add  $P(A)$  and  $P(B)$ ,  $P(A \cap B)$  is added twice and hence we subtract once.

**illustration:** In a small Assembly plant with 50 workers, each worker is expected to complete work assignment on time in such a way that the assembled product will pass a final inspection. Some of the workers fail to meet the performance standards by completing work late or assembling a defective product. At the end of the performance evaluation period, production manager found that 5 workers completed work late, 6 workers assembled a defective product and 2 workers both completed work late, and assembled a defective product. What is the probability that the production manager decided to assign a worker a poor performance rating?

Event A = A Worker completed work late.

Event B = A worker assembled a defective product.

Event C = worker is assigned a poor performance rating by the production manager.

Clearly  $C = A \cup B$ . From given data,

$$P(A) = 5 / 50 = 0.1; \quad P(B) = 6 / 50 = 0.12 \quad \text{and} \quad P(A \cap B) = 2 / 50 = 0.04.$$

Therefore by Addition law,

$$P(C) = P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.1 + 0.12 - 0.04 = 0.18$$

### Mutually exclusive events

Two events A and B are said to be Mutually exclusive if there is no sample point common to both A and B, i. e.  $A \cap B = \phi$  and hence  $P(A \cap B) = 0$ . Hence the Addition law for Mutually exclusive events reduces to:  $P(A \cup B) = P(A) + P(B)$ .

Illustration: Consider Experiment: "Roll a Die"

Event A = Getting an even number on Top = { 2, 4, 6 }. Then  $P(A) = \frac{1}{2}$

Event B = Getting a number which is a multiple of 3 on Top = {3, 6 }. Then Clearly,

$P(B) = \frac{2}{6} = \frac{1}{3}$ . Then  $A \cap B = \{6\} \neq \phi$ . Hence, A and B are not mutually exclusive.

Let event C = Getting a number which is divisible by 5. Then  $A \cap C = \phi$  and hence, A and C are mutually exclusive. Observe that  $A \cup C = \{2, 4, 5, 6\}$  Hence,

$$P(A \cup C) = \frac{4}{6} = \frac{2}{3} = \frac{1}{2} + \frac{1}{6} = P(A) + P(C).$$

### A collectively exhaustive list

When a list of the possible events that can result from an experiment includes every possible outcome, the list is said to be collectively exhaustive.

Illustration: Consider the experiment: Tossing of two coins. Let A = Getting at least one head and B = Getting at least one Tail. Then  $A = \{HH, HT, TH\}$  and  $B = \{HT, TH, TT\}$ . Then  $A \cup B = \{HH, HT, TH, TT\} = S$ . And hence events A and B are collectively exhaustive.

Here are few Examples.

#### Example 1:

Find out the probability of getting an ace in a single trial

$$P = \frac{4 \text{ ace}}{52} = \frac{4}{52}$$

**Example 2:**

Find out the probability of getting 53 Sundays in a leap year (366 days)

$$52 \text{ weeks} \times 7 = 364 \text{ days}$$

Remaining 2 days and probability of being Sunday on these 2 days is  $\frac{2}{7} = 0.286$ .

**Example 3:**

Find out the probability of getting 5 Sundays in a February month in a leap year (i.e. 29 days in February in a leap year)

$$4 \text{ week: } 4 \times 7 = 28 \text{ days}$$

The probability of remaining one day is Sunday =  $\frac{1}{7} = 0.143$

**Example 4:**

Find out the probability of getting a sum of 9 on the top of two dice thrown together. Also find out the probability of getting a sum of 8 on the top of two dice thrown together.

A = Outcomes giving sum 9 are:  $\{(6, 3), (3, 6), (5, 4), (4, 5)\}$ ;

B = Outcomes giving sum 8 are:  $\{(6, 2), (2, 6), (5, 3), (3, 5), (4, 4)\}$

Total outcomes = 36.

Hence  $P(A) = 4 / 36 = 1 / 9 = 0.111$ ; and  $P(B) = 5 / 36 = 0.139$ .

**6 PROBABILITY DISTRIBUTIONS**

In an experimental approach probability assignment depends on the specific experiment and its Sample space. However, the concept of Random variable helps us to view Sample space of any experiment as well as any event associated with the experiment as a subset of set of all real numbers R.

**Discrete and Continuous random variables.**

Random variable is a Numerical description of the outcome of an experiment or it associates a numerical value with each possible experimental outcome. Thus, For an experiment with Sample space S, a random variable X is a function from S to R, the set of all real numbers and we write  $X: S \rightarrow R$ .

- A random variable that assumes either a finite or countably infinite number of values is called a Discrete Random variable (DRV).



e.g. (i) The month in which a person is born' is a DRV which takes values 1, 2, ..., 12.

(ii) No. of persons working in an industry is a DRV which may take any positive integer value.

(iii) Number of customers arriving at the service counter is a DRV which may take any non-negative integer value.

➤ A random variable that assumes any numerical value in an interval or collection of intervals is called a Continuous Random variable.

e.g. (i) Pressure or temperature of steam in the boiler.

(ii) Time in minutes between two successive customers arriving at a service counter can take any real value  $x \geq 0$ .

(iii) Percentage of the Statistical methods course completed in 10 lectures is a continuous random variable taking any value  $x$  between 0 and 100.

### Probability Distribution

If  $S$  is a sample space and  $X$  is a random variable the probability assignment can be done by assigning probabilities to subsets of  $X(S)$ . A Probability Distribution for a random variable describes how probabilities are distributed over the values of the random variable.

The distribution of discrete (continuous) random variable is called discrete (continuous) distribution.

**Example 5:** Suppose, in a clinic, the number of patients have been treated during last 100 days are recorded as under:

No. of patients treated: 100    105    110    112    115

Total Observations

Nos. of days:                    10    20                    40    20                    10                    100

Probability distribution and its graph for the discrete random variable 'Number of patients treated'

Number of patient treated (Value of random variable)	Probability that the random variable will take on this value
100	0.1
105	0.2
110	0.4
112	0.2
115	0.1

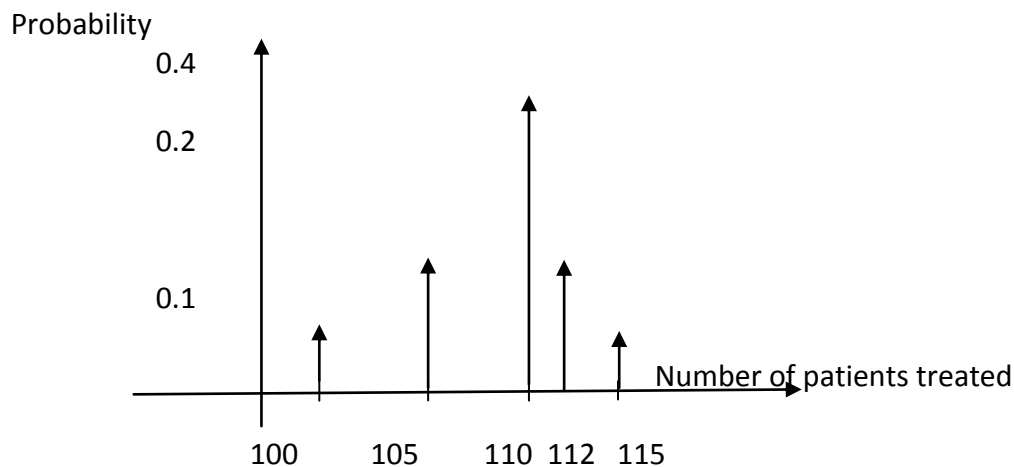


Figure 2: Graph of PD

For a Discrete Random variable  $X$  over a sample space  $S$ ,  $X(S)$  is either finite or an infinite sequence of real numbers. Thus,  $X(S) = \{x_1, x_2, \dots, x_n\}$  or  $\{x_1, x_2, \dots\}$ . Equivalently, we may say that  $X(S) = \{1, 2, \dots, n\}$  or  $X(S) = \{1, 2, \dots, n, \dots\}$ .

Discrete probability distribution on  $X(S)$  is defined by a function  $f: X(S) \rightarrow \mathbb{R}$ , which is called as Probability (mass) function which provides the probability  $f(x_i)$  for each  $x_i$  in  $X(S)$ , so that  $f(x_i) \geq 0$  for all  $i$  &  $\sum_i f(x_i) = 1$

Any event associated with a discrete random variable  $X$  on a sample space  $S$  can be viewed as a subset of  $X(S)$ . And hence, in the Discrete case an event  $E = \{x_{i_1}, x_{i_2}, \dots, x_{i_k}\}$  where  $i_1, i_2, \dots$  are positive integers, so that  $x_{i_1}, x_{i_2}, \dots$  all are in  $X(S)$ . Then

$$P(E) = f(x_{i_1}) + f(x_{i_2}) + \dots + f(x_{i_k}), \text{ where } f \text{ is Probability mass function (Pmf).}$$

Example 6: The following data were collected by counting the number of operating rooms in use at Sayaji general Hospital in the month of jun, 2010.

No. of operating rooms in use	1	2	3	4	Total
No. of days. (frequency)	6	7	10	7	30

- Construct a PD for the number of operating rooms in use on any given day.
- Show that the PD is a valid DPD.
- Find the probability that on a given day, 2 or more rooms are in use.

Answer: (a) We can find Probability distribution by relative frequency method:

No. of operating rooms in use	1	2	3	4
Relative frequency (Probability)	$\frac{6}{30}=0.2$	$\frac{7}{30}=0.234$	$\frac{10}{30}=0.33$	$\frac{7}{30}=0.233$

(b) Since  $P(i) > 0$ , for  $i = 1, 2, 3, 4$  and  $P(1) + P(2) + P(3) + P(4) = 1$ , this is a valid Probability distribution.

(c)  $P(2 \text{ or more rooms in use}) = P(\{2, 3, 4\}) = P(2) + P(3) + P(4) = 0.8$ .

### Distribution for a continuous random variable:

Let 'X' be a continuous random variable defined over an interval (a, b) i.e.  $a \leq x \leq b$ , or  $(-\infty, \infty)$  then probability density function of the random variable X is defined by  $f(x)$  satisfying the conditions.

(i)  $f(x) \geq 0$  for any  $a \leq x \leq b$  or  $-\infty < x < \infty$

(ii)  $\int_a^b f(x)dx = 1$  or  $\int_{-\infty}^{\infty} f(x)dx = 1$

Probability density function  $f(x)$  does not directly give probabilities. However, the area under the graph of  $f(x)$  corresponding to a given interval gives the probability that CRV assumes a value in that interval.

Probability of any particular value of CRV must be zero. Since area under the graph of  $f(x)$  at any particular point is 0.

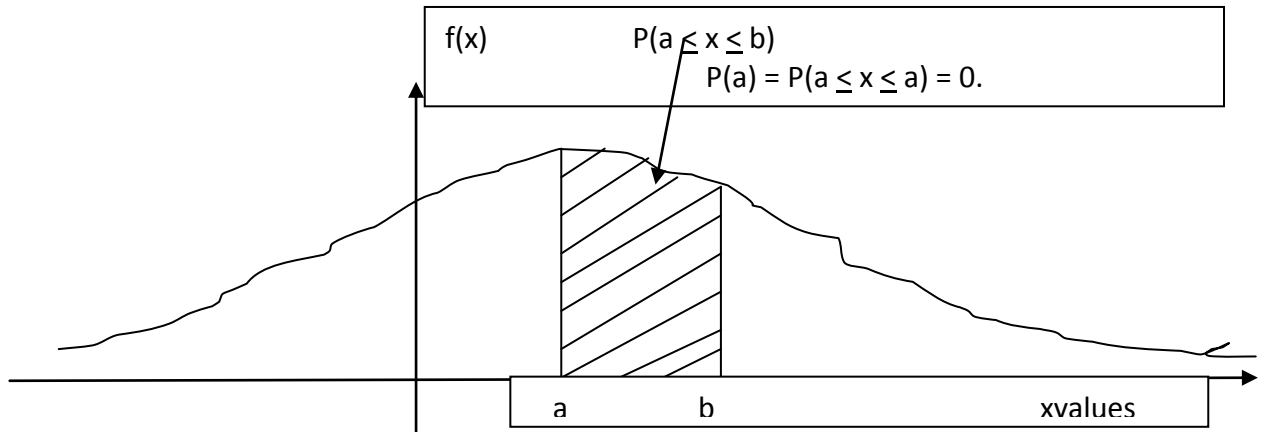


Figure 3: PDF of CRV

### Some well known Probability Distributions:

In probability theory there are many theoretical Probability Distributions which are suitable for random variables associated with some specific experiments. In Statistical inference these distributions play a central role. Most commonly used distributions are discussed below.

#### The Binomial Distribution

The Binomial Distribution is the widely used probability distribution of a discrete random variable.

BPD is associated with a Binomial experiment having following Properties:

- It consists of a sequence of  $n$  identical trials.
- Two outcomes are possible on each trial. One of these outcomes is referred as Success and other as Failure.
- The probability of success, denoted by  $p$  (Consequently the probability of failure,  $(1 - p)$  does not change from trial to trial.
- The trials are independent.

If properties 2, 3, 4 are present, we say that trials are generated by a Bernoulli Process. For a Binomial experiment, let  $x$  be a Discrete Random variable denoting number of successes in  $n$  trials. The PD associated with this Random variable is called the Binomial Probability Distribution.

Now, from combination formula, the number of outcomes providing exactly  $x$  successes in  $n$  trials is given by:  $C_x^n = \frac{n!}{x!(n-x)!}$   
 Also, Probability of a particular sequence of  $n$  trials with  $x$  successes =  $p^x (1-p)^{(n-x)}$

For a binomial experiment with  $n$  trials, the random variable  $x$  will take values  $0, 1, 2, \dots, n$ . Then from previous discussion it is clear that the BPD is given by the Binomial probability mass function  $f$ , given by

$$f(x) = C_x^n p^x (1-p)^{(n-x)}, \text{ for } x = 0, 1, \dots, n.$$

Where,  $n$  = number of trials and

$p$  = Probability of success are called the parameters of the BPD and will assume particular values in any illustration.

Example 7: Forty percent of business travelers carry either a cell phone or a Laptop. For a sample of 15 business travelers, If  $x$  = number of travelers carrying either a cell phone or a Laptop, Compute the Probability that

- (a)  $x = 3$  (b)  $x$  is at least 3. (c) 12 of the travelers carry neither a cell phone nor a Laptop.

Answer: Here, the experiment can be regarded as a Binomial experiment with  $n = 15$  and  $p = 0.4$ .

- (a)  $P(x = 3) = f(3) = \frac{(15 \times 14 \times 13)}{(2 \times 3)} (0.4)^3 (0.6)^{12} = 0.063$
- (b)  $P(x \geq 3) = f(3) + f(4) + \dots + f(12) = 1 - f(0) - f(1) - f(2)$   
 $= 1 - (0.6)^{15} - 15(0.4)(0.6)^{14} - (15 \times 14 / 2)(0.4)^2 (0.6)^{13} = 0.973$
- (c)  $P(12 \text{ of the travelers carry neither a cell phone nor a Laptop}) = P(x = 3) = 0.063.$

Computing Binomial probabilities  $P(x)$  for any value of  $x$  (between 0 and  $n$ ), for given  $n$  and  $p$  is usually time consuming and difficult. To avoid these difficulties, the readymade tables giving  $P(x)$  for various values of parameters  $n$  and  $p$  and for all possible values of  $x$  for a specific values of  $n$  and  $p$  are available. Following is the sample of such a table:

n	x	p	0.05	0.15	0.25	0.40
9	0		0.6302	0.2316	0.0751	0.101
	5		0.0000	0.0050	0.0389	0.1672
	9		0.0000	0.0000	0.0000	0.0003
10	7		0.0000	0.0001	0.0031	0.0425
	10		0.0000	0.0000	0.0000	0.0001

We may use these tables for computing  $P(x)$ .

For example if  $n = 10$  and  $p = 0.15$ ,  $P(7) = 0.0001$

For  $n = 9$ ,  $p = 0.4$ ,  $P(5) = 0.1672$ .

For  $n = 9$ ,  $p = 0.25$ ,  $f(5) = ?$ ; For  $n = 10$ ,  $p = 0.4$ ,  $f(7) = ?$

Software packages like EXCEL, SPSS, SAS, MINITAB, also provide a capability to compute Binomial probabilities.

### The Poisson Distribution

Consider the Discrete Random Variable  $x$  representing number of occurrences of an event over a specified interval of time or space. For example, The arrivals of trucks and cars at a toll booth; number of customers arriving at a service counter in a day;

- Number of cars on express way between Vadodara and Ahmedabad at 9 am;
- Number of leaks in 100 miles of pipeline, etc., In each of these cases the values  $x$  can take are 0,1, 2, . .

Such experiments are called Poisson experiments and their Probabilities are described by Poisson Probability Distribution.

Properties of a Poisson Experiments:

1. The probability of occurrence is the same for any two intervals of equal length.
2. The occurrence or non-occurrence in any interval is independent of the occurrence or non-occurrence in any other interval.

Poisson Probability function: PPD is defined through the following PDF. For any  $x \geq 0$ , the probability of  $x$  occurrences in an interval,

$$f(x) = \frac{\mu^x e^{-\mu}}{x!}, \text{ where } \mu \text{ is the parameter which represents Mean arrival rate and } e = 2.711828.$$

**Example 8:** Consider a Poisson distribution with a mean of two occurrences per time period.

- a) Write the appropriate PPF and compute probability of 2 occurrences in one time period.
- b) Write PPF to determine the probability of  $x$  occurrences in 3 time period and Compute probability of 5 occurrences in 3 time period.

Answer: (a) Since parameter gives mean occurrences in time period which is given to be 2, the PPF is given by

$$f(x) = \frac{2^x e^{-2}}{x!}$$

and hence,  $f(2) = (2^2 e^{-2})/2! = 2 e^{-2}$ .

(b) Mean arrivals in 3 time periods is 6, PPF is

$$f(x) = \frac{6^x e^{-6}}{x!}$$

and  $f(5) = (6^5 e^{-6})/5!$ .

Tables giving Poisson probabilities for any  $x \geq 0$  for various values of parameter  $\mu$  are available. A part of which is given below:

$\mu$	9.1	9.4	9.7	10
x				
0	0.0001	0.0001	0.0001	0.0000
5	0.0581	0.0506	0.0439	0.0378
10	0.1198	0.1228	0.1245	0.1251
15	0.0208	0.0250	0.0297	0.0347
15	0.0208	0.0250	0.0297	0.0347
15	0.0208	0.0250	0.0297	0.0347
20	0.0007	0.0010	0.0014	0.0019

Thus, for  $\mu = 9.4$ ,  $f(10) = 0.1228$ ; For  $\mu = 10$ ,  $f(15) = 0.0347$ ; For  $\mu = 9.7$ ,  $f(5) = 0.0439$ .

### Poisson Distribution as an Approximation of the Binomial Distribution

The Poisson distribution can be a reasonable approximation of the Binomial under conditions: When  $n$  is large and  $p$  is small, Where,  $n$  is number of trials and  $p$  is the binomial probability of success.

### The Normal Distribution

A very important continuous probability distribution is Normal Distribution. Many natural phenomena follow a Normal PD.

For example, CRVs representing heights and weights of people, test scores, amounts of rainfall, etc. do follow NPD.

The PDF defining a NPD, is defined in terms of mean and standard deviation of the corresponding CRV values. In general PDF for a NPD is given by

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}} \quad \mu$$

where  $\mu$  = Mean,  $\sigma$  = Standard deviation;  $\pi = 3.14159$ ; &  $e = 2.71828$ .

The NPD is a symmetric distribution and its shape is Bell shape. NPD is identified by two parameters  $\mu$  and  $\sigma$  and is denoted by  $N(\mu, \sigma)$ .



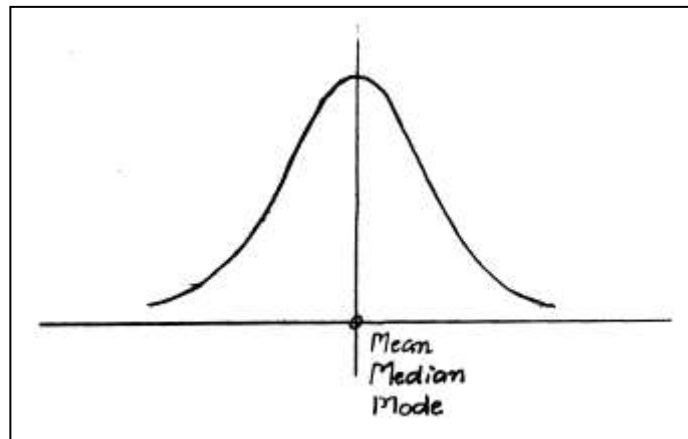


Figure 4: Bell-shape curve

Most of the real-life populations do not extend forever in both directions, but for such populations the normal distribution is a convenient approximation.

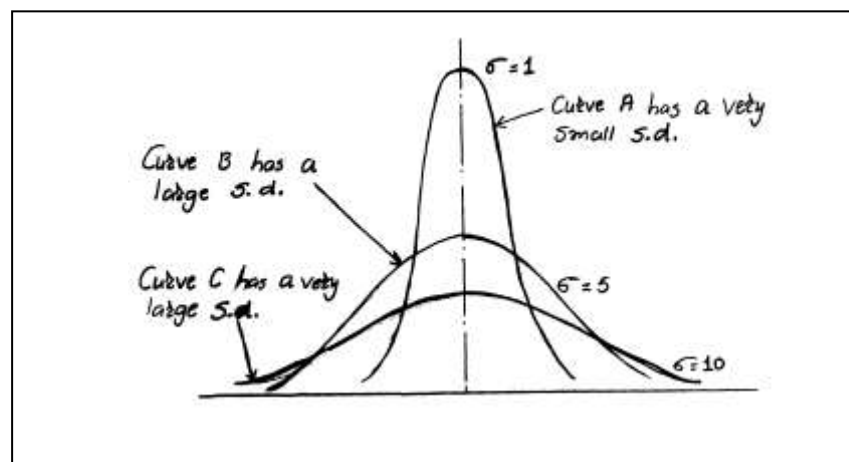
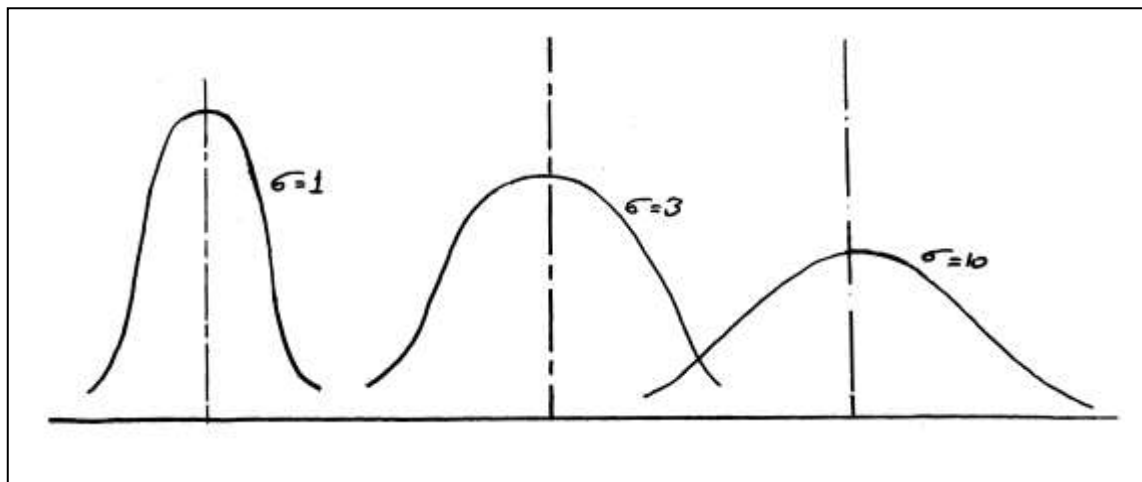
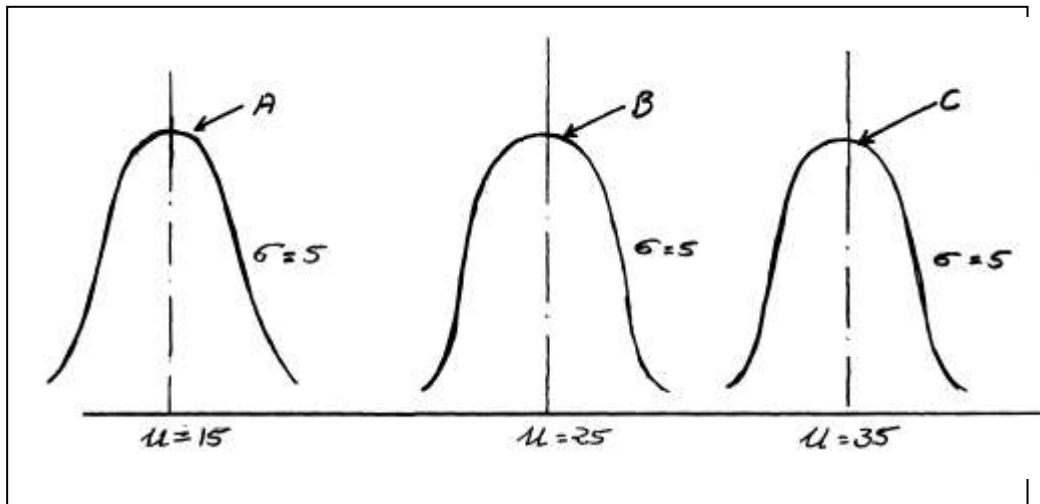


Figure – 5: NPDs with same Mean & different values of  $\sigma$



1. The highest point on the Normal curve is at the mean which is also the Median and Mode of the distribution.
2. The mean of the NPD can be any numerical value: Negative, zero, or positive. The Bell shape of the NPDs with same standard deviation are same and the position of the curve depends on the value of the mean.
3. The NPD is symmetric, with the shape of the curve to the left of the mean a mirror image of the shape to the right of the mean. The tails of the curve extend to infinity asymptotically in both directions. Because of symmetry skewness measure of the NPD is 0.
4. The Standard deviation determines how flat and wide the curve is. Larger value of s. d. result in wider, flatter curves, showing more variability in the data.
5. Probabilities for NRV are given by areas under the curve. Total area under the curve for NPD is 1. Because of symmetry the areas under the curve to the right and to the left of the mean are both 0.5.
6. No matter what the values of  $\mu$  and  $\sigma$  are for a normal probability distribution, the total area under the normal curve is 1.00, so that we may think of areas under the curve as probabilities. To compute Probability that a CRV is within any specific interval, we must compute area under the normal curve over that interval.
7. The percentage of values in some commonly used intervals are:
  - 68.3% values lie in the interval  $[\mu - \sigma, \mu + \sigma]$
  - 95.4% values lie in the interval  $[\mu - 2\sigma, \mu + 2\sigma]$
  - 99.7% values lie in the interval  $[\mu - 3\sigma, \mu + 3\sigma]$
  - That is  $P(\mu - 3\sigma \leq x \leq \mu + 3\sigma) = 0.997$ .

### Standard Normal Distribution

A Normal probability distribution with mean 0 and standard deviation 1 is called the standard Normal distribution (SND). Thus SND is  $N(0, 1)$ .

If a continuous random variable  $X$  follows a normal distribution  $N(\mu, \sigma)$  then  $Z = \frac{X - \mu}{\sigma}$  follows standard Normal distribution  $N(0, 1)$ .

For the standard NPD these areas have been computed and are available in the form of a table as given below. Since the NPD is symmetric the table gives probabilities of  $z$

being in the interval  $[0, z]$  which is:

where

$$f(x) = \frac{1}{\sqrt{2\pi}} e^{-x^2/2}$$

$$\int_0^z f(x) dx$$

z	0.0	0.02	0.04	0.06	0.08
0.0	0.0000	0.0080	0.0160	0.0239	0.0319
0.5	0.1915	0.1985	0.2054	0.2123	0.2190
1.0	0.3413	0.3461	0.3508	0.3554	0.3599
1.5	0.4332	0.4357	0.4382	0.4406	0.4429
2.0	0.4772	0.4783	0.4793	0.4803	0.4812
2.5	0.4938	0.4941	0.4945	0.4948	0.4951

The z is the standard Normal variable and from the table, we get the probability

$$P(0.0 \leq z \leq 1.0) = 0.3413; \text{ Then by symmetry } P(-1.0 \leq z \leq 0.0) = 0.3413;$$

$$P(-1.0 \leq z \leq 1.0) = P(-1.0 \leq z \leq 0.0) + P(0.0 \leq z \leq 1.0) = 0.3413 + 0.3413 = 0.6826;$$

Using properties of Normal distribution, we can compute  $P(a \leq z \leq b)$ , the probability for z in any interval [a, b]. And for any continuous random variable following normal distribution  $N(\mu, \sigma)$ , using the fact that  $Z = \frac{X - \mu}{\sigma}$  follows  $N(0, 1)$  we can compute probability  $P(a \leq x \leq b) = P\left(\frac{a - \mu}{\sigma} \leq Z \leq \frac{b - \mu}{\sigma}\right)$  which can be computed from the table.

## 7.0 SAMPLING AND SAMPLING DISTRIBUTIONS

A Population is the set of elements of interest in any study and a Sample is a subset of population.

For example, if we are interested in knowing the students from Vadodara, who will be interested in taking a training for valuation at the centre for valuation studies. Then Population is the set of all students from Vadodara, who are eligible to take such training. In order to compute number of such students, it may be infeasible to ask every student about his interest. What normally we do is select few students randomly from various sections from Vadodara and ask them about their interest, and from that estimate the required number. The set of students whom we select is the sample.

The accuracy of such estimates will depend on whether the selected sample appropriately represents the population or not. And this will depend on nature of the population and method of selecting a sample. The Sampling methods can be classified as Probability (Random) sampling method and Non-probability (Non-random or Biased) Sampling methods.

### 7.1 Probability (Random) sampling methods:

Elements selected in the sample have a known probability of being selected. Advantage of probability sampling is that the Sampling distribution of the appropriate sample Statistic generally can be identified and used to make a probability statement about the error associated with the sample results. Methods included are: (i) Simple Random Sampling (ii) systematic sampling.(iii) Stratified Random Sampling (iv) Cluster sampling.

#### Simple Random Sampling

The process of selecting a Simple Random Sample depends on whether the population is finite or infinite.

Sampling from a finite population:

A SRS of size  $n$  from a Finite Population of size  $N$  is a sample selected such that each possible sample of size  $n$  has the same probability of being selected.

Procedure: Choose the elements for the sample one at a time in such a way that, at each step, each of the remaining elements in the population has equal chance of being selected.

To ensure randomness in the selection we use table of random numbers as given below

63271	59986	71744	51102	15141	80714	58683	93108
88547	09889	95436	79115	08303	01041	20030	63754
55957	57243	83865	09911	19761	66535	40102	26646
46276	87453	44790	67122	45573	84358	21625	16999
20711	55609	36100	29430	70165	02421	32001	15987

Selection procedure using Table of Random numbers:

- Assign the numbers 1 to N to every element of the population. Let  $k$  = Minimum digits required to store N.
- Start from any cell in the table and select the numbers in forward or backward direction. The digits of the numbers selected are regrouped to form numbers of  $k$  digits.
- If a number in this list is within 1 to N, the corresponding element from the population is selected in the Sample, otherwise the number is ignored. The process continues till all  $n$  elements are selected.

### **Sampling from an Infinite Population**

In Practice, a population being studied is usually considered Infinite if it involves on going process that makes listing or counting every element in the population impossible. For example:

- All order that could be processed by a mail-order firm.
- All emergency phone calls that could come into a Police Station.

A simple Random Sample from an infinite population is the Sample selected such that the following conditions are satisfied: (1) Each element selected comes from the population. (2) Each element is selected independently.

### **Systematic sampling**

In case of a large population taking a SRS is time consuming and systematic sampling provides a good alternative to SRS. If sample of size  $n$  is required from a population of size  $N$ , we may sample one element for every  $N/n$  elements in the population. A systematic sample in this case involves selecting randomly one of the first  $N/n$  elements of the population list. The other elements in the sample are identified by moving systematically through the population list and identifying every  $(N/n)$  th element after the first randomly selected element. Since first element is selected randomly, a systematic sample is usually assumed to have properties of a SRS. The assumption is more valid if elements in the population are randomly ordered.

### **Stratified sampling**

To use stratified sampling, we divide the population into relatively homogeneous groups, called STRATA. Then we use one of two approaches. Either we select at random from each stratum a specified number of elements corresponding to the proportion of that stratum in the population as a whole or we draw an equal number of elements from each stratum and give weight to the results according to the stratum's proportion of total population. With either approach, stratified sampling guarantees that every element in the population has a chance of being selected.

Stratified sampling is appropriate when the population is already divided into groups of different sizes. The advantage of stratified samples is that when they are properly designed, they more accurately reflect characteristics of the population from which they were chosen than do other kinds of samples.

### **Cluster sampling**

In cluster sampling The elements of the population are divided into separate groups called clusters. Each element of the population lies into one and only one cluster. A Simple random sample of clusters is then taken. All elements within each sampled cluster form the sample.

Cluster sampling works best when each cluster provides a small scale representation of the population. If all clusters are alike in this regards, sampling a small number of clusters will provide a good estimate of the population parameter. One of the primary application is Area sampling, where clusters are city blocs or well defined areas. Cluster sampling generally requires a large sample, however it requires lower operational cost.

### **7.2 Non-probability (Non-random or Biased) Sampling methods:**

Elements are selected as per convenience or Judgment of the designer. Methods in this class are: (i) Convenience sampling (ii) Judgment sampling.

### Convenience sampling

Convenience sampling is a non-probability sampling technique, in which the sample is identified primarily by convenience. Elements are selected without pre-specified probabilities of being selected. It has an advantage of relatively easy sample selection and data collection. However, it is impossible to evaluate the “goodness” of the sample in terms of the representativeness of the population. No statistically justified procedure allows a probability analysis and inference about the quality of the sample results. Example of convenience sampling are: a professor conducting research at the university may use his students as sample elements; an inspector may sample a shipment of oranges by selecting oranges haphazardly from among several crates; wild life captures, etc.

### Judgment sampling

This is also a non-probability sampling technique in which the person most knowledgeable in the subject of the study selects elements of the population that he or she feels are most representative of the population. Often this method is a relatively easy way of selecting a sample. A reporter may select two or three MPS, judging that these MPS reflect the general opinion of the parliament. However, the quality of the sample results depends on judgment of the person selecting the sample. We should be cautious in drawing conclusions based on judgment samples used to make inferences about populations.

### 7.3 Sampling Distribution:

point estimates of the population parameters depends on the SRS used for finding the estimates. If the sample changes then estimates also change. If we consider the Process of selecting a SRS as an experiment, the sample mean  $\bar{x}$  is the numerical description of the experiment and hence a random variable. So,  $\bar{x}$  have a mean, standard deviation and a probability distribution, called a Sampling distribution of,

The Mean or Expected value of  $\bar{x}$ ,  $E(\bar{x}) = \mu$  the population mean.

The Standard deviation  $\sigma_{\bar{x}}$  of  $\bar{x}$  (Standard error of mean) is given by:

$$\sigma_{\bar{x}}$$

$$\sigma_{\bar{x}} = \sqrt{\frac{N-n}{N-1}} \left( \frac{\sigma}{\sqrt{n}} \right) \text{ For a Finite Population and } \sigma_{\bar{x}} = \left( \frac{\sigma}{\sqrt{n}} \right) \text{ for an Infinite Population.}$$



In case when Population is “large” and sample is relatively “small”, that is  $n/N \leq 0.05$ , i.

e. sample size is < 5% of Population size, then also, 
$$\sigma_{\bar{x}} = \left( \frac{\sigma}{\sqrt{n}} \right).$$

Form of the sampling distribution  $\bar{x}$  , is normal for any sample size if the population has a Normal or nearly Normal distribution.

If the population has any other distribution, by Central Limit theorem, the Sampling distribution of  $\bar{x}$  can be approximated by a Normal distribution as the Sample size  $n$  becomes large.

General Statistical practice is to assume that for most applications, the Sampling distribution of  $\bar{x}$  can be approximated by a Normal distribution whenever the sample size  $n$  is  $\geq 30$ .

Similarly we have Sds for other population parameters like  $\mu$  and  $p$ . These Sds help us make probability statement about how “good” the point estimate of respective population parameter is.

### 8.0 PARAMETER ESTIMATION

A sample statistic (various Statistical measures for sample) are used to estimate a population parameter. An estimator is a sample statistic used to estimate a population parameter. There are two types of estimates (1) Point Estimate (2) Interval Estimate.

### 8.1 Point Estimate

A point estimate is a single number that is used to estimate an unknown population parameter e.g. A firm estimates the next year’s average profit as :25 Lakhs.

Population parameter	Point Estimate (Sample Statistics )
Population Mean	Sample Mean
Population Standard deviation	Sample SD
Population Proportion p	Sample proportion = $x / n$  $x$ = No. of samples with a specific property

Note that if sample changes the point estimates will also change and hence point estimates are not reliable.

### 8.2 Interval Estimates and Confidence Intervals

An interval estimate is a range of values used to estimate a population parameter. That is one finds an interval around a point estimator in which a population parameter is expected to lie. e.g. A firm estimate its next year’s profit as : Between 20 and 30 Lakhs. It indicates the error in two ways: (i) By the extent of its range and (ii) By the probability of the true population parameter lying within that range.

General form of Interval estimate is: Point Estimate + Margin of error. The purpose of Interval estimate is to provide information about how close the point estimate to the value of Population parameter. We also, compute a confidence or probability with which we can say that the population parameter will lie in the estimated Interval. In fact, given a confidence level L, we find the Interval estimate which is called L% confidence Interval. In estimation, the most commonly used confidence levels are 90%, 95%, and 99%. But we are free to apply any confidence level. We illustrate the computation of Confidence Interval for population Mean when population standard deviation is known.

In order to develop Interval estimate of the Population Mean, either Population  $\sigma$  SD or

Sample SD  $s$  must be used to compute the margin of error. Although  $\sigma$  is rarely known exactly, from historical data or other information we can obtain a good estimate of  $\sigma$  prior to sampling. In such a case we consider that  $\sigma$  is known. Earlier we have computed the probability  $L$  that the estimate of population mean  $\bar{x}$  will be within a given distance of  $\mu$ . In the Interval estimate for  $\bar{x}$  given probability  $L$  we compute Margin of error, so that  $\bar{x}$  lies in the Interval  $[\bar{x} - \text{Margin of error}, \bar{x} + \text{Margin of error}]$  with the given probability  $L$ . We compute the margin of error using the fact that the Sampling distribution of  $\bar{x}$  is Normal with mean  $\mu$  & SD  $\sigma/\sqrt{n}$ .

Procedure for determination of the  $\bar{x}$  Confidence Interval (Interval estimate with confidence level  $L$ ) for  $\mu$ :

- i. Choose Confidence level (90%, 95% or 99%) that is take  $L = 0.9, 0.95$  or  $0.99$ .
- ii. Determine  $c$  such that  $Z(c) = L/2$ , from the standard Normal distribution table.
- iii. Compute Sample mean  $\bar{x}$ .
- iv. Sampling distribution of  $\bar{x}$  is Normal distribution with mean  $\mu$  and SD  $\sigma/\sqrt{n}$  and  $\frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$  as standard Normal distribution where  $\sigma$  is known SD of the population.

- v.  $Z(c) = L/2$  means  $\text{Prob}(-c \leq Z \leq c) = L$ . That is,  $\text{Prob}\left(\frac{-c\sigma}{\sqrt{n}} \leq \bar{x} - \mu \leq \frac{c\sigma}{\sqrt{n}}\right) = L$ .

Thus,  $\text{Prob}\left(\bar{x} - \frac{c\sigma}{\sqrt{n}} \leq \mu \leq \bar{x} + \frac{c\sigma}{\sqrt{n}}\right) = L$  is the desired confidence interval. This means

for any sample with mean  $\bar{x}$  lies in the confidence interval  $\left[\bar{x} - \frac{c\sigma}{\sqrt{n}}, \bar{x} + \frac{c\sigma}{\sqrt{n}}\right]$

with probability  $L$ . Since  $Z$  follows the standard Normal distribution, the value of  $c$  for different values of  $L$  is given in the following table.

L%	L/2	c
90	0.45	1.645
95	0.475	1.96
99	0.495	2.576

**Example 9:** For a random sample of 36 items and a sample mean of  $\bar{x} = 211$ , compute a 95% confidence interval for  $\mu$  if the population standard deviation is 23.

By above formula the 95% confidence interval for  $\mu$  is

$$\left[ \bar{x} - \frac{c\sigma}{\sqrt{n}}, \bar{x} + \frac{c\sigma}{\sqrt{n}} \right] = \left[ 211 - \frac{1.96 \times 23}{\sqrt{36}}, 211 + \frac{1.96 \times 23}{\sqrt{36}} \right] = [203.487, 218.513].$$

In computing confidence intervals for  $\mu$  when  $\bar{x}$  is not known or for population standard deviation or other population parameters one has to use other probability distributions like Student's t distribution, Chi-Square Distribution, F Distribution etc., however the procedure remains same.

## UNIT – 4

### SIMPLE TEST OF SIGNIFICANCE, REGRESSION AND CORRELATION, MULTIPLE CORRELATION COEFFICIENT

#### 9.0 SIMPLE REGRESSION AND CORRELATION

In business, the key to decision making often lies in the understanding of the relationships between two or more variables. For example, a company in the distribution business may determine that there is a relationship between the price of crude oil and their own transportation costs. Or a valuator may like to know relationship between the value of an asset in a specific locality and the average family income in that locality. Regression analysis shows us how to determine nature and correlation analysis shows how to determine the strength of a relationship between two variables.

#### 9.1 REGRESSION ANALYSIS

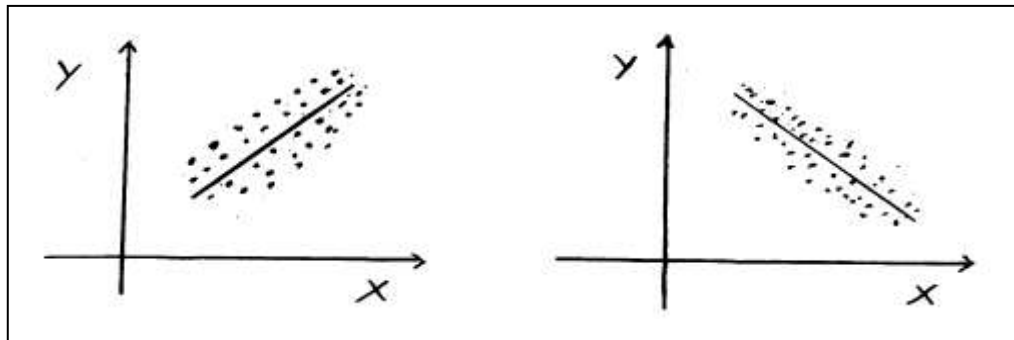
**Regression analysis** is the process of constructing a mathematical model or function that can be used to predict or determine one variable by another variable or other variables. The most elementary regression model is called **simple regression** or **bivariate regression** involving two variables in which one variable is predicted by another variable. In simple regression, the variable to be predicted is called the **dependent variable** and is designated as  $y$ . The predictor is called the **independent variable**, and is designated as  $x$ . In simple regression analysis, only a straight-line relationship between two variables is examined.

Usually, the first step in simple regression analysis is to construct a **scatter plot** (or scatter diagram), i. e. Plotting the data points  $\{(x_i, y_i) \mid i = 1, 2, \dots, n\}$  on  $XY$  plane. This yields preliminary information about the shape and spread of the data and will help us in deciding whether a line or some other curve will fit the data better.

Possible relationships between X and Y which can be inferred from scatter diagram are as indicated below:

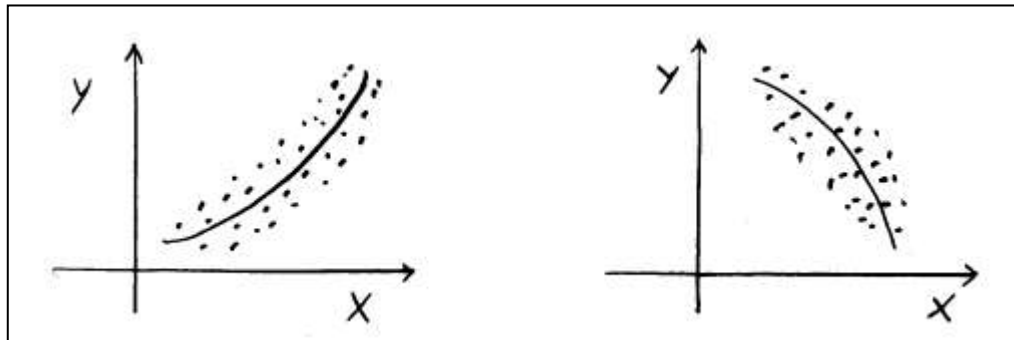
(a) Direct Linear

(b) Inverse Linear



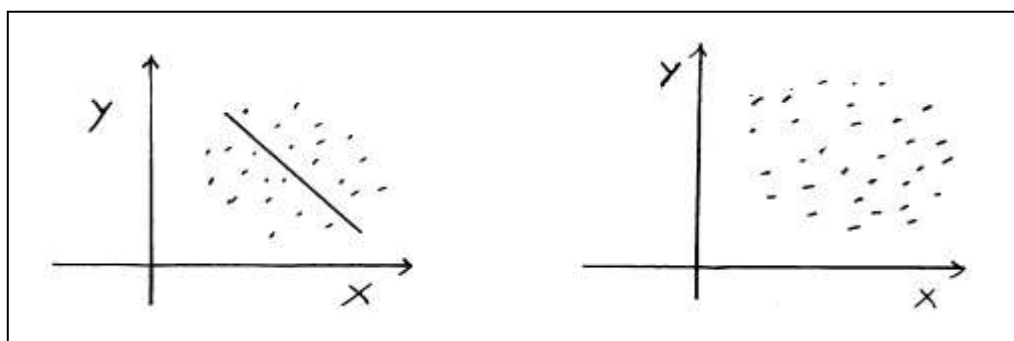
(c) Direct Curvilinear

(d) Inverse Curvilinear



(e) Inverse Linear with more scattering

(f) No Relationship



Graph (e) illustrates an inverse linear relationship with a widely scattered pattern of points. The wider scattering indicates that there is a lower degree of linear association between the independent and dependent variable than there is in graph (b). The pattern of points in graph (f) seems to indicate that there is no linear relationship between the two variables, therefore, knowledge of the past concerning one variable does not allow us to predict future occurrences of the other. We shall restrict our study to linear regression only.

Next step is to determine the straight line having equation in the form  $\hat{y} = b_0 + b_1x$  where  $\hat{y}$  = the predicted value of  $y$ ;  $b_0$  = the population  $y$  intercept;  $b_1$  = the population slope.

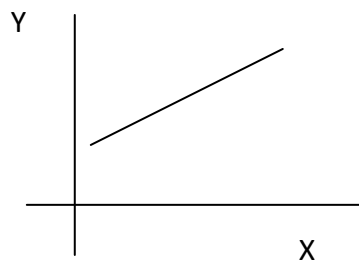
To determine the equation of the regression line of  $y$  on  $x$ , for a sample of data, one must determine the values for  $b_0$  and  $b_1$ , so that sum of the squared error, namely,  $\sum_{i=1}^n (\hat{y}_i - y_i)^2$  is minimum. It can be shown by using Calculus that:

$$b_1 = \frac{\sum_{i=1}^n (y_i - \bar{y})(x_i - \bar{x})}{\sum_{i=1}^n (x_i - \bar{x})^2} \text{ and } b_0 = \bar{y} - b_1\bar{x},$$

Where  $\bar{x}$  and  $\bar{y}$  are respectively the Means of  $x$  values and  $y$  values, gives the desired minimum squared error.

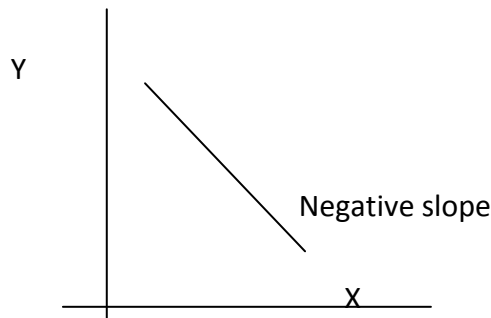
Type of relationship are as discussed below

**(1) Direct (positive) Linear relationship**



Plotting the independent variable on the X-axis and the dependent variable on the Y-axis, the above graph shows a direct Linear relationship. The slope of this line is positive because  $Y$  increases as  $X$  increases.

**(2) Inverse (negative) Linear relationship**



In the above graph, the dependent variable Y decreases (increases) as the independent variable X increases (decreases). This relationship is characterized by Negative Slope. This represents inverse relationship between X and Y.

**9.2 CORRELATION ANALYSIS**

Correlation analysis is the statistical tool that can be used to describe the degree to which one variable is linearly related to another.

Often, correlation analysis is used in conjunction with regression analysis to measure how well the regression line explains the variation of the dependent variable Y.

Correlation can also be used to measure the degree of association between two variables and is measured in terms of a widely used sample Karl-Pearson coefficient of correlation, *r*. For the sample data set  $\{(x_i, y_i) \mid i = 1, 2, \dots, n\}$ ,

Coefficient of correlation *r* is given by, 
$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\left[ \sum_{i=1}^n (x_i - \bar{x})^2 \right] \left[ \sum_{i=1}^n (y_i - \bar{y})^2 \right]}}$$

The formula indicates that *r* is a number that ranges from -1 to 0 to +1, representing the strength of the relationship between the variables. An *r* value of +1 denotes a perfect positive relationship between two sets of numbers. An *r* value of -1 denotes a perfect negative correlation, which indicates an inverse relationship between two variables: as one variable gets larger, the other gets smaller. An *r* value of 0 means no linear relationship is present between the two variables.



**Example 10:** Determine the value of the coefficient of correlation,  $r$  and the equation regression line for the following data.

X	4	6	7	11	14	17	21
Y	18	12	13	8	7	7	5

Answer:

$x_i$	$y_i$	$U_i = x_i - \bar{x}$	$V_i = y_i - \bar{y}$	$U_i^2$	$V_i^2$	$U_i V_i$
4	18	-6	9.25	36	85.56	-55.5
6	12	-4	3.25	16	10.56	-13
7	13	-3	4.25	9	18.06	-12.75
11	8	1	-0.75	1	0.56	-0.75
14	7	4	-1.75	16	3.06	-7
17	7	7	-1.75	49	3.06	-12.25
21	5	11	-3.75	121	14.06	-41.25
$\sum x_i = 80$ $\bar{x} = 10$	$\sum y_i = 70$ $\bar{y} = 8.75$			$\sum U_i^2 = 248$	$\sum V_i^2 = 134.92$	$\sum U_i V_i = -142.5$

$r = \frac{-142.5}{\sqrt{248 \times 134.92}} = \frac{-142.5}{182.92} = -0.78$  which indicates almost perfect negative relationship.

Now,  $b_1 = \frac{-142.5}{248} = -0.57$  and  $b_0 = \bar{y} - b_1 \bar{x} = 8.75 + 0.57 \times 10 = 3.05$ .

Hence Regression line of  $y$  on  $x$  is given by  $\hat{y} = 3.05 - 0.57x$ .

### 9.3 MULTIPLE REGRESSION AND CORRELATION ANALYSIS

We can use more than one independent variable to estimate the dependent variable to increase the accuracy of the estimate. This process is called multiple regression and correlation analysis.

e.g. Suppose the real estate agent who wishes to relate the number of houses and the number of firm sold in a month to the amount of his monthly advertising. Certainly, we can find a simple estimating equation that relates these three variables.

## UNIT – 5

### TIME SERIES

#### 10.0 TIME SERIES

Time-series analysis is one quantitative method we use to determine PATTERNS in data collected over time.

Time-series analysis is used to detect patterns of change in statistical information over regular intervals of time. We project these patterns to arrive at an estimate for the future.

Thus, time-series analysis helps us to cope up with uncertainty about the future.

We use the term time series to refer to any group of statistical information accumulated at regular intervals. There are four kinds of change, or variation, involved in time-series analysis:

1. Secular trend
2. Cyclical fluctuation
3. Seasonal variation
4. Irregular variation

#### **Secular trend**

The value of the variable trends to increase or decrease over a long period of time.

#### **Cyclical fluctuation**

The most common example of cyclical fluctuation is the business cycle. Over the time, there are years when the business cycle hits a peak above the trend line. At other times, business activity is likely to slump, hitting a low point below the trend line. The time between hitting peaks or falling to low points is at least 1 year and it can be as many as 15 or 20 years.

#### **Seasonal variation**

The seasonal variation involves patterns of change within a year that trend to be repeated from year to year.

#### **Irregular variation**

In many situations, the value of a variable may be completely unpredictable, changing in a random manner.

**Trend Analysis :**

Of the four components of a time series, secular trend represents the long-term direction of the trend component is to fit a line visually to a set of points on a graph.

## UNIT – 6

### INDEX NUMBERS

#### 11.0 INDEX NUMBERS

An index number measures how much a variable changes over time. We calculate an index number by finding the ratio of the current value to a base value. Then we multiply the resulting number by 100 to express the index as a percentage. This final value is the percentage relative. Note that the index number for the base point in time is always 100.

#### 11.1 TYPES OF INDEX NUMBERS

There are three principal types of indices: the price index, the quantity index, and the value index. A price index is the one most frequently used. It compares levels of prices from one period to another. The familiar Consumer Price Index (CPI), measures overall price changes of a variety of consumer goods and services and is used to define the cost of living.

A quantity index measures how much the number or quantity of a variable changes over time.

The last type of index, the value index, measures changes in total monetary worth. That is, it measures changes in the Rupee value of a variable. In effect, the value index combines price and quantity changes to present a more informative index. Usually, an index measures change in a variable over a period of time, such as in a time series. However, it can also be used to measure differences in a given variable in different locations. This is done by simultaneously collecting data in different locations and then comparing the data. The comparative cost-of-living index, for example, shows that in terms of the cost of goods and services, it is cheaper to live in Anand, than in Mumbai.

A single index may reflect a composite, or group, of changing variables. The Consumer Price Index measures the general price level for specific goods and services in the economy. It combines the individual prices of the goods and services to form a composite price index number.

### **Uses of Index Numbers**

Index numbers such as the Consumer Price Index are often cited in news reports as general indicators of the nation's economic condition. Management uses index numbers as part of an intermediate computation to understand other information better. Seasonal indices were used to modify and improve estimates of the future. The use of the Consumer Price Index to determine the real buying power of money is another example of how index numbers help increase knowledge of other factors.

### **Sources of Index Numbers**

Almost all government agencies distribute data about their activities, from which index numbers can be computed. Many financial newspapers and magazines provide information from which index numbers can be computed. When you read these sources you will find that many of them use index numbers themselves. In India, R.B.I. publishes indices.

## **11.2 UNWEIGHTED AGGREGATES INDEX**

The simplest form of a composite index is an unweighted aggregates index. Unweighted means that all the values considered in calculating the index are of equal importance. Aggregate means that we add, or sum, all the values.

An unweighted aggregates index is calculated by adding all the elements in the composite for the given time period and then dividing this result by the sum of the same elements during the base period. The formula for this index is:

$$\frac{\sum Q_i}{\sum Q_0} \times 100$$

Where,

$Q_i$  = quantity of each element in the composite for the year in which we want the index

$Q_0$  = quantity of each element in the composite for the base year

### 11.3 WEIGHTED AGGREGATES INDEX

This weighting allows us to include more information than just the change in price over time. It also lets us improve the accuracy of the general price level estimate based on our sample. The problem is to decide how much weight to attach to each of the variables in the sample.

The formula for this index is:

$$\frac{\sum P_i Q}{\sum P_0 Q} \times 100$$

where

$P_i$  = price of each element in the composite in the current year.

$P_0$  = price of each element in the composite in the base year.

$Q$  = quantity weighting factor chosen

### 11.4 LASPEYRES METHOD

The Laspeyres method, which uses quantities consumed during the base period, is the method most commonly used because it requires quantity measures for only one period. Because each index number depends on the same base price and quantity, management can compare the index of one period directly with the index of another.

Laspeyres formula is given by

$$\frac{\sum P_i Q_0}{\sum P_0 Q_0} \times 100$$

Where,

$P_i$  = prices in the current year

$P_0$  = prices in the base year.

$Q_0$  = quantities sold in the base year

## 11.5 PAASCHE METHOD

The second way to compute a weighted aggregates price index is the Paasche method. Finding a Paasche index is similar to finding a Laspeyres index. The difference is that the weights used in the Paasche method are the quantity measures for the current period rather than for the base period.

Paasche's formula is given by

$$\frac{\sum P_i Q_i}{\sum P_0 Q_i} \times 100$$

Where,

$P_i$  = current-period prices

$P_0$  = base-period prices

$Q_i$  = current-period quantities

### 11.6 FIXED-WEIGHT AGGREGATES METHOD

The third technique used to assign weights to elements in a composite is the fixed-weight aggregates method. It is similar to both the Laspeyres and Paasche methods. However, instead of using base-period or current-period weights (quantities), it uses weights from a representative period. The representative weights are referred to as fixed weights. The fixed weights and the base prices do not have to come from the same period.

The formula for this index is:

$$\frac{\sum P_i Q_2}{\sum P_0 Q_2} \times 100$$

where

$P_i$  = current-period prices

$P_0$  = base-period prices

$Q_2$  = fixed weights.

#### References:

1. Ken Black: Business Statistics For Contemporary Decision Making, John Wiley & Sons, Inc., 2010
2. David R. Anderson, Dennis J. Sweeney, Thomas A. Williams: Statistics for Business and Economics, 9e, Thomson South Western, 2005.