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Preface

Commerce is a applied branch of Economics. Economics helps to the commerce students to take business decisions in actual practices. Therefore the Study of Applied Economics is essential to them. Applied Economics is also called Managerial Economics it includes the various topics as Introduction to Managerial Economics, Demand analysis, Theory of consumer's Choice, Production theory, Different markets, Pricing practices, Investment analysis, Business cycles and Inflation Phillips curve etc. This study is very useful to Business Managers. The topics are explained with help of Tables, diagrams, mathematical equations, with simple language, which make subject matter very clear and easy to understand. So, we hope that this book will prove more useful to the teachers, students and readers in various fields.

We are grateful to all the writers, officers of distance education, printers and publishers those who participated in the publication of this books.

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M. Com. Part-I

SIM IN MANAGERIAL ECONOMICS

INDEX

Each Unit begins with the section objectives -

Objectives are directive and indicative of :

1. what has been presented in the unit and
2. what is expected from you
3. what you are expected to know pertaining to the specific unit, once you have completed working on the unit.

The self check exercises with possible answers will help you understand the unit in the right perspective. Go through the possible answers only after you write your answers. These exercises are not to be submitted to us for evaluation. They have been provided to you as study tools to keep you in the right track as you study the unit.

Dear Students

The SIM is simply a supporting material for the study of this paper. It is also advised to see the new syllabus 2016-17 and study the reference books & other related material for the detailed study of the paper.

Semester-I

Unit 1

INTRODUCTION TO MANAGERIAL ECONOMICS

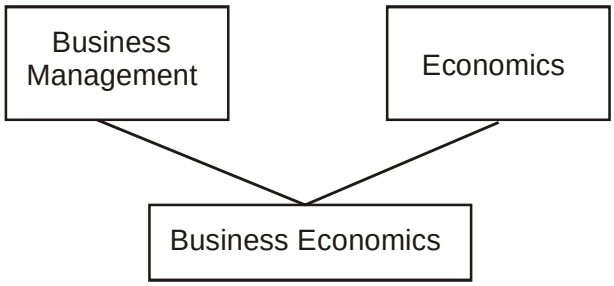
1.0 Objectives

1) To study the origin, nature and scope of Managerial Economics.
2) To study relationship between economic theory and managerial theory.
3) To study role and responsibilities of business manager.
4) To study various objectives of business firm.

1.1 Introduction

In 1951 Joel Dean published a book entitled "Managerial Economics." Then the subject Managerial Economics has gained popularity. Managerial Economics reveals that how economic analysis is used to formulate the economic' policies in respect to the business firms.

Managerial Economics was formerly known as "Business Economics." It is also called as "Applied Economics". The word Business Economics is formed from the two words Business and Economics.



In the word 'Business Economics' "Business" means a state of being busy. It means any activity continuously undertaken by a man in order to earn income.

In other words Business if referred to commercial activities aimed at making profit. The word Management is formed from the^ word 'to manage.' The meaning of the word "to manage" is to get the work done through others. Management is what brain is to the human body. Hence Business Management means any activity undertaken to earn profit, run by a person and managed with the help of economics. Therefore Managerial Economics is also called Business Economics.

In Managerial Economics the concepts, principles and theories in pure economic science are applied to any business activities. Therefore it is also called as Applied Economics. A manager of business firm manages the business with the help of economic theories. So it plays a vital part in running the business activities.

1.2 Definitions

The subject Managerial Economics is defined by many eminent scholars as follows.

1) According to 'E.T. Brigham' and "J. L. Pappas', "Managerial Economics is the application of Economic theory and methodoloty to business administration practice."

   This definition throws light on the application of principles and theories of economics in practice to run successfully the business,

2) "McNair and Meriam' defined it as "Managerial Economics consists of-the use of

Economic modes of thought to analyse business situations."

This definition stresses on how manager of business firm uses the economic thoughts and concepts to solve the problems prevailing in business activities. Everyday business manager has to face different problems, while running the business. They would be solved with the help. of economic theories.

3) 'M. H. Spencer' and "L. Siegelman' defined as "Managerial Economics is the intergration of economic theory with business practice for the purpose of facilitating decision making and forward planning."

This definition enlights the process of business decision making with the help of economic theories. Manager intergrates the economic theories with the business practices and takes decision as well as plans the activities of his business firm.

It is clear from the above definitions that Managerial Economics deals with the economic aspects of managerial decisions, which can be used by managers, while running the business activities. It is a midway between Economics and Business Management and serves as' a link between the two.

In Managerial Economics, economic theories and principles are put in relation to the real business behaviour and prevailing conditions. Analytical techniques in economic theory builds economic models by which we arrive at certain assumptions and conclusions. With the help of these assumption and conclusions, the problems faced by manager in his daily business activities would be solved. In practice, with the help of economic concepts of profit and costs, one can use the financial data more effectively to cope up with the needs of decision making and advance planning. Thus, Managerial Economics attempts to have conciliation between economic concepts and accounting concepts.

By using the economic concepts like elasticity of demand, cost and output etc. and their previous data business forecasts could be made.

Economics studies the concepts like business cycles; fluctuations in national income and government policies related to taxation, labour relations, anti-monopoly measures, foreign trade, licensing policies, price control etc.

The manager of a business firm has to see the relevance and effects of the external forces on business activities.

Thus managerial economics is related with the study of economic analysis applied to the real business activities in practice.

1.3 Features of Managerial Economics

Following are the main characteristic features of Managerial Economics which constitute the nature and subject matter.

1) Managerial Economics means the application of economic concepts, theories and principles to the business activities.

2) Managerial Economics is related with the micro-economics. It is micro in nature. It is mainly related with the problems of individual unit.

3) Also it deals with the macro-economics. Manager of the farms has to study the macro economic concepts like National Income, Business Cycles, Labour Relations, Government Policies on taxation, budget, monetary issues and international trade etc. By studying these macro economic concepts Manager of a business firm takes the decisions in respect of his firm.

4) Managerial economics deals with the theory of firm which is pure theory of economics. Economic principles of .this theory are applied to his firm to decides it's profit. It means that managerial economics deals with the theory of distribution.

1.4 Nature and Scope of Managerial Economics

The subject matter of managerial economics deals with the economic aspects of managerial decisions. These economic decisions are based on the economic contents. Thus managerial economics is a body of knowledge techniques and practices based on those economic concepts which are useful in deciding the business strategy. Managerial behaviour involves planning motivation, co-ordination or control for which economic considerations are required. It forms the subject matter of managerial economics.

According to 'J. L. Pappas' and 'E. T, Brigham', Managerial Economics is designed to provide a rigorous treatment of those aspects of economic theory and analysis that are most useful for managerial decision analysis.

Therefore, Managerial. Economics focuses on those tools and techniques which are useful in decision making.

Decision making is one-of the main functions of every manager. His decisions depends entirely upon himself or sometimes on other factors. The problems before him may be simple or complex in nature. Also they may be major or minor.. In order to .solve these problems decision making .and planning becomes the significant function of managerial persons. Decision making is the process of selecting one course of action from two or more alternative courses of action. It means that manager which solving the problems before his business firm, chosses one alternative out of various available alternatives, e.g. suppose in order to increase the sale of his product among many competitions in market, a manager of business firm have various alternatives available as to reduce the cost of production, to impose lower price, to increase the quality of his product to give incentives to the consumers who

purchase his products, implementation of advertising techniques etc. Among these various alternatives he choose one of the alternative. The choice of one alternative increases the sale of his product in market is called the process of decision making.

After decision making he has the forward planning, it means establishing plants for the future, Both of these acts run one after the another.

Where in which the conditions, manager works-and takes decisions which are based on uncertainty. The fact of uncertainty makes the decision making and planning function more complex. If there is any future knowledge, plans might have been so constructed so as to give perfection without errors and no changes could be expected. In reality, the manager has no knowledge about the future as regards the sales, cost of production, capital investments. Therefore, all decisions are formulated -on past data available; current, information 'and the estimates about the predicated future. For the fulfillment of plans requires a time, during such period more facts come to be known and so there is a change in the plan and the course is vitiated. In this way, at every stage, .the manager goes on through unending series of decision making with unknown and uncertain future and they have to adjust according to it.

Thus function of decision making under uncertainty conditions, the managers uses the economic theory with considerable advantage, economic theory has following concepts and principles relating to profit, demand, cost, pricing, production, competition, business cycles, national income. By using the Economic concepts and principles along with accounting, statistics and mathematics, it leads to solve the problems of business management. Thus, managerial economics means the solving business problems through economic analysis.

Scope of Managerial Economics :

Scope of any subject means the area of it's study. Managerial economics has it's roots in economic theory. But it's scope is different from economic theory. Managerial Economics provides management with a strategic planning tool. Thus the perspective of business world would be clarified in regards to it's working. Managerial Economics is mainly concerned with the application of economic principles and theories. The scope of managerial economics covers two areas of decision making.

1) Operational or Internal issues.

2) Environmental or External Issues

Manager of any business firm faces various problems in his daily working. These problems are divided into two types. First kind of problems are related with the internal issues of business firms and another kind of problems are related with environmental issues of the business firms. Hence they are referred as operational or internal issues and environmental or external issues respectively.

1) Operational or Internal Issues :

The manager of business firm faces the problems, which are related to the internal issues of the firm. They are controlled by the manager with the help of economic theories and principles. They are as follow.

i) What to produce ? i.e. Problem of choice of commodity.

ii) How to produce ? i.e. what techniques are to be used ? Either capital intensive or labour intensive techniques.

iii) What capital-labour ratio is to be used ?

iv) What price is to be levied ?

v) How to invest ? And at what quantity ?

vi) How to sale ? At what price ? How to compete ?

vii) How the capital and the profit can be managed in order to make the best use of it ?

Such types of problems are faced by every manager of business firm which are solved with the aid of economics. These problems are related to the economic theories and principles as follows.

1) Demand Analysis : The manager thinks about the demand for his firm's product. A firm can survive, if it is able to cater the demand for its product in market at the proper time and in the right quantity. A firm can economically stand in the market, when it's goods are continuously demanded and sold in the market. Manager looks to the market demand of his firm's product. He mades the accurate estimate of demand and makes the decisions. Before he comes to the final conclusions manger of every business firm can study the basic concepts and theories of demand analysis in economics as law of demand, demand forecasting, elasticity of demand, and their variant factors. It provides the basis for analysing the market influences on his product. Demand analysis also throws light on the factors affecting the demand for the business firm. Thus, demand analysis helps to manager in estimating and manipulating the market demand for his product.

2) Theory of production : Theory of production is also called as the theory of firm. Along with the cost of production it also consists the firm's revenue. It includes the relationship between various factors of production, input-output analysis, capital - labour ratio, optimum production, break even analysis, etc. These economic concepts help to business manager in solving the problems related with the production. .

3) Cost-Analysis : Cost of production is very significant factor in the process of production. Therefore every manager must to possess a good knowledge of cost analysis it includes various kinds of costs, which are very essential in decision making. The various factors responsible for the variation in cost estimates must be

given due weightage. These cost estimates are necessary in future planning. There is uncertainty in regards to cost due to unknown factors. Cost estimates are very essential for most sound profit planning. Hence to find out the firms cost of production the knowledge of cost analysis is very essential for business manager. It includes various costs concepts cost Output analysis, economics of scale, production function, cost control etc.

4) Pricing theories : Managerial economics deals with the pricing theories. Pricing of a product incurs income to the firm. The success of the firm can be comprised in a sound pricing policy of its product, how the price is to be determined in various forms of market such as perfect competition, monopoly, monopolistic competition, oligopoly, duopoly, etc. What conditions are affecting on the pricing process in different markets should be known by the manager of a business firm. Therefore he has to possess the good knowledge of market forms with the help of this knowledge he can form a sound pricing policy. It means that knowledge of pricing theories helps him to formulate good pricing policy and it further assists to decision making.

5) Theory of profit : Profit maximization is a aim of business firm making profit in long run is a sign of successful entrepreneur. Profit depends on various factors such as internal factors and external factors. These factors are many in number e.g. demand for product, input prices, factor prices, competition, economic policy, business risks and the amount of investment etc. Knowledge of sound profit earning policy and techniques of profit planning are also important to business manager. Economic theory provides this knowledge.

6) Resource Allocation : Managerial economics also deals with the problem of optimum allocation of resources. Resources are scare, so they should be allocated efficiently . to different uses by the manager. In order to solve the problem of resource allocation the manager should possess the knowledge of input-output analysis, linear programming etc. With the help of these economic analysis methods manager arrives to the final conclusions in respect of his decision making.

7) Capital-Investment Analysis : Capital is scare and fundamental factor of production. It is foundation of business. Large amount of capital is invested in big firms. So many problems come up before management. In order to solve these problems enough time and labour are required. In brief, the capital budgeting .involves planning and control of capital expenses. This topic consists of cost of capital, rate of return, selection of project, Cost-benefit analysis etc. The knowledge of Capital Theory helps to take investment decisions.

8) Inventory Management : Every firm requires raw material. It would be stored in inventories. What would be the ideal stock of inventories ? How the stock of inventories should be maintained and controlled ? These are some' of the problems

which the manager has to solve. Knowledge of this stock inventory is achieved from economic theory.

9) Advertising : Advertising is the .heart of modern business practices. It is one of the features of modern marketing system. It helps to increase the sale of a product. Therefore every businessman can follow these techniques. How much amount is spent on advertising expenditure ? it increases the cost of production of a commodity as well as sales. The advertising expenditure affects the cost-and sales. More the advertising expenses, more is the cost and the sales and vice versa. Thus economic theory helps to businessmen in solving their problems and to arrive at definite conclusions.

2) Environmental or External Issues :

These issues are related to the general business environment in which the firm or business operates. These are social, economic and political environments, economic environment includes kinds of economic systems, situations existing in the field of production, income, employment, prices, saving and investment, financial institutions as banks, financial corporations, Insurance companies, trends in international trade. It also includes the conditions prevailing in labour and capital markets, government policy, industrial policy, monetary policy etc. Beside this social environment affects the business conditions. It includes trade unions, consumer's co-operatives etc. Political environment is related to state activities. It includes the state's attitude towards business firms. Managerial Economics takes the congnizance of all types of environments affecting the business activity.

These external or environmental issues in managerial economics are related with the Macro-Economics. Thus, the scope of managerial economics reaches in the sphere of micro as well as macro economic theories.

1.5 Economic Theory and Managerial Theory :

In recent years many new subjects are evolved due to the interaction between basic disciplines. Managerial Economics is a new subject among social sciences. It's roots are found in economic theories. Which are the main theme of Economics. Economics deals with pure economic theories, principles and concepts. The subject Economics is of two types

i) Positive Economics and ii) Normative Economics. Positive Economics deals with the fundamental laws, principles, and theories of economics and on the other hand normative . economics is related with the normative values and applications of economics. Normative values are the ideals or ethical values, which deals with welfare Economics.

Managerial Economics deals with the positive economics for the theory of the consumer and the firm. While it depends upon normative economics to give recognition

of what is good or bad from the point of view. of society. Cigarette, liquor manufacturing is dangerous to health, so such warning labels should be printed on the product. In positive economics a manager may ignore the effect of pollution, but in normative economics he has to recognize the special Costs of pollution and to adopt anti pollution measures.

Economics is divided into two parts, i.e. Micro Economics and Macro Economics. Micro Economics deals with the study of a unit of individual behaviour of a economic variables. e.g. Individual consumer, individual firm and other such micro organisations. Managerial economics also studies the individual behaviour of a firm or consumer. It studies several micro economic concepts, like marginal cost, marginal revenue, elasticity of demand, individual firm, consumer etc. Hence the roots of managerial oeconomics are found in micro economic theories.

Macro Economics deals with the macro behaviour of economic variables. It studies the whole economy. Macro Economics, therefore defined as the study of group or aggregates or averages covering the entire economy. It studies national income, the level of employment, general price level, consumption and investment in economy, foreign trade, money, public-finance, fiscal policy, monetary policy etc. These are all significant factors of economic environment in which the business firm functions. Thus every manager has to possess the knowledge of economic environment. Such knowledge of macro economic theories is helpful to successful managers.

'Baumol' says that there are three main contributions of economic theory to Managerial Economics, i) It helps to managerial economics by building analytical models. These models .are .helpful to solve the problems of managerial economics and also in decision making. 2) economic theory contributes a set of analytical methods. It helps to enhance the analytical capabilities of the business analyst. 3) Economic theory helps to clarify concepts used in business analysis, which helps the managers to avoid conceptual pitfalls.

The Managerial functions involve decision making in various fields and economic, theory which helps it to provide clear understanding of all these problems. Economic theory is useful to the firm in various areas like marketing, sales applications, production and personnel managements, financial management etc.

In the field of marketing, economic theory contributes through the use of applied demand theory. Sales function is related to the analysis of consumer demand. The size of markets depends upon various factors viz. population, advertising, elasticity of demand and supply etc. These concepts are included in demand analysis and market theory.

Economic theory provides these analytical concepts to managerial economics. These concepts are actually applied in managerial economics to derive conclusions.

Managerial economics applies these concepts in the field of consumption and production.

Managerial economics uses the concepts of economic theory like economies' of scale, laws of returns, cost concepts etc. to build a sound pricing' policy and pricing decisions.

Economic theory helps to managerial economics in resource allocation to the firm. Financial decisions are taken by the manager of a business firm with the help of economic, theory such as the amount to be invested in new plant or the amount to be spent on advertisement. Managerial economics analyses the nature of financial trade-offs and reveals how the economics helps in resource allocation decisions,

Economics helps to the managers in better decision making process. Economic theories serve as useful tool to solve the problems easily. Also it reduces the time in decision making and chances of making wrong decisions.

The relationship between the Managerial Economics and Economics is very close. Economics formulates the theories and they are applied by managerial economics in real world. Thus Economics provides philosophy to managerial economics in decision making. They are practically used by managerial economics. Therefore 'Spencer and Siegelman', while stating the relationship between these two, say that "Managerial economics is the integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management."

***Difference between Economics and Managerial Economics**

Economics	Managerial Economics
1) *It is a pure Economics.	1) It is applied Economics.
2) It consists of economic theories and principles.	2) Managerial Economics applies economic theories and principles to solve the business problems.
3) Economics has similar emphasis on both Micro and Macro Economics.	3) Managerial Economics relatively give more stress on micro economics than macro economics.
4) 'Micro economics part of Economics considers both Individual consumer as well as firm.	4) It's micro economic part considers only individual firm.
5) It's micro economic analysis deals With rent, Interest, wages and profit.	5) Micro economic part of Managerial Economics is related only with profit.

1.6 Role and Responsibilities of Managerial Economist

Decision making is the main and very important function of the Managerial Economist, His correct and accurate decisions helps to bring prosperity of the business firm. He has to determine the key factors which influence the business of the firm. These factors are of two types, i.e. external factors and internal factors. External factors are national income, foreign trade Government policy etc. which are outside the purview of management. They are determined by the outside environment of the firm. Hence they are not controlled by the manager of a firm. Internal factors are within the limit of firm's management, so they are controlled by the manager e.g. price of his product; rate of .investment, expansion or contraction of his business, production etc.

A manager of a firm has sound knowledge of economic theory and. analytical tools, with the help of these, He executes the policy of a business firm. Policy making is one of his, functions. He should be equipped with specialised skills and modern techniques so that he is able to evaluate the decision making process. He works as decision maker in regards to sales, pricing, financial issues; labour relations, profitability etc. Manager helps in decision making keeping in view the different goals of the firm.

An important role of a manager is to deal with the demand forecasting. He prepares the short period forecasts of his business activity. Every business firm requires two types of : forecasts. Short term fore casts and long term forecasts are up to one year and long term forecasts are upto more than one year forecasts. He has to be every alert to gauge the changes in market conditions. He should evaluate the market potential. He should be adept at market research. Market research provides the information about the market conditions such as present and future market trends. A manager who has detailed knowledge of market conditions helps to plan product improvement, new product policy, pricing and sales promotion strategy.

The next function of managerial economist is to undertake an economic analysis of the industry. It is related with the project evaluation and the project feasibility. So, he should know the cost benefit analysis. With the help of cost-benefit analysis he judges the feasibility of project and comes to the conclusion whether the project is profitable or not with the knowledge of investment appraisal methods. Thus, economic analysis involves the knowledge of. competition comprised/possibility of internal and foreign sales, the general business conditions etc.

Manager of a firm functions as-advisor i.e. he performs advisory functions. He advises on all matters of production and trade. He works as advisor of the top executives or the policy makers. He advises in all matters both the technical and financial to the top management. Manager of a firm deals with the proper princing strategy. The pricing decision is one of the most significant and difficult, because of

non availability of sufficient information. Pricing of established product is different from new products. Government regulation, competitions are prevailing in market, so the manager should be alert and dynamic to take correct pricing decisions.

Analysis of environmental issues is also one of the function of manager in modem times. He has to recognise the social responsibility of the business firm. He has to know the effect of a firm on environmental factors. It's effect should not be adverse on natural environment. All types of pollutions are to be prevented by the productive firm. It is the duty of manager, to be alert about pollution control.

Thus, the role of manager not only deals with decision making but with analyzing, concluding and recommending to the policy maker.

1.6.1 Responsibilities of Managerial Economist :

Manager exercises leadership in the whole group of management personnel. He is responsible for optimum utilization of the scare resources to achieve maximum productivity. His prescriptions for business performance under entertainments of future are important for forward planning.

Managerial Economists suggestions in respect of costs are very important for the growth and survival of the firm.

Managerial Economists is responsible to the business firm in regards to the social responsibilities. He should have to consider various sociological issues, viz. Pollution control, price fixation, profit etc. Decisions taken in respect of these issues do not result into exploitation of the common people.

In order to become a more practical man, managerial economist should also possess the knowledge of other disciplines. Therefore external factors affecting the existence and the working of the business firm should not be restricted. These external factors are Government policies, foreign trade conditions, trade cycles, labour situation in the country, various economic legislation etc.

Lastly, management is greatly helped by the managerial economist by his significant role in decision making and forward planning, he must look at his responsibilities and obligations discharges them effectively. Thus, Managerial Economist have to perform the above responsibilities in order to achieve the higher growth and better future of the business firm.

1.6.2 Managerial Economics and Decision making :

Decision-making and forward planning are two very important functions of the managerial economist. He makes the correct decisions, prepare future plans and implements them to .earn expected profit.

Decision making is essentially a process of selecting the best out of alternative

opportunities open to the firm. Every manager of a business firm has to face the various kinds of business problems. They are simple or complex in nature. So the most important function of the managerial economist is the-decision making and forward planning of a. business firm. According 'Louis A. Alien'.

"Decision making is the work which a manager performs to arrive at conclusion and judgment." It means that before taking the decision the manager examines the relationship' between various factors and then come to the conclusion. This act is referred as decision making. .

'George Terry' defined it as, "Decision making is the. selection based on some criteria from two or more possible alternatives."

'D. E. Macfarland' calls it as, "A decision is an act of choice wherein an executive forms a conclusion about what must be done in a given situation. A decision represents behaviour chosen from a number of possible alternatives."

'Herbert Simon' opines that "Decision making comprises, three principles phases finding occasions for making decisions, finding possible courses of action and choosing among courses of action."

All above definitions clarify the meaning of decision making. Decision making comprises the points viz. .

1) Decision making is a process of. selecting the best alternative out of available alternatives.
2) It is an intellectual work, which manager has to perform before arriving .at any conclusion.
3) It is an act of choosing from different alternatives.

Thus, process of decision making consists of four phases. They are as follows.

1) Determining and defining the objective.
2) Collection of information in respect of social, political and technological environment and forecasting on them.
3) Inventing, developing and analysing possible courses of action.
4) Selecting a particular course of action, from available alternatives.

In the process of decision making the management of a company can apply the theories and tools of economic analysis. Economic theories express the functional relationship between two or more economic variables, under certain given conditions. Application of the economic theories to the problems of business influences decision making process in three ways.

1) It offers clarity of various economic concepts viz. demand, price, cost of production, externalities etc.

2) It helps in ascertaining the relevant variables and specially reveals the relevant data.

3) Economics expresses the relationship between various economic variables arid provides consistency in analysis. It helps in drawing the accurate conclusions. Thus applications of economic theories to the problems of business firms guides, assists and streamlines the decision making process, as well as it contributes to the valid decisions.

Economics helps to the business manager in various ways. By the application of economic theories and principles manager of a firm solves the various problems in business sector. Internal problems are solved with the help of micro-economic analysis like demand, production, costs, price, profit, investment, resource allocation etc. Also the external problems are solved with the helps of macro economic theories like, national income, fiscal policy, economic policy, monetary policy, employment, business-cycles, international trade, inflation, deflation etc.

By using the micro and macro economic theories managerial economist arrives at final conclusions and business decisions are taken. Thus economic theories helps to manager to analyse the problems, to derive the conclusions, to take the decisions, and to solve the business problems. Thus decision making and forwards planning is prime functions of managerial economist.

1.7 Objective of business Firm

Traditionally, the business firm is known as economic unit. So profit maximization is a main objective of business firm. This view was later on, replaced by stating that besides profit maximization object sales maximization, revenue maximization, growth maximization etc.' are .the other objectives to be achieved.

According to Prof. Boulding, Bamou!, Higgins, scitovski, melwin Reader, perter Drucker, 'Joel Dean etc. Profit maximization is not only a sole objective of business firm but other objectives are also important which are performed by the firm.

Following are the main objective's of business firm.

1.7.1 Profit - Maximization :

The traditional goal of .a business firm is profit maximization. It means that to achieve more and more amount of profit over a period of time in short and long run. Price of product of business firm is determined in market by demand and supply conditions. Price is determined at the point of equilibrium, where demand equals supply of a product. Business firm has to maximize it's profit at this market price. In

perfect competition firm is price taker and in imperfect competition it is price searcher. Because in imperfect competition the number of sellers is small so each seller has control over it's selling price.

Profit's is the difference between total Revenue and total cost. It can be calculated by deducting the total cost from total revenue.

Profit = Total Revenue - Total cost.

In order to maximize the profit there are two conditions which must be fulfilled in any form of market.

1) Marginal cost must be equal to marginal Revenue, i.e. MC = MR

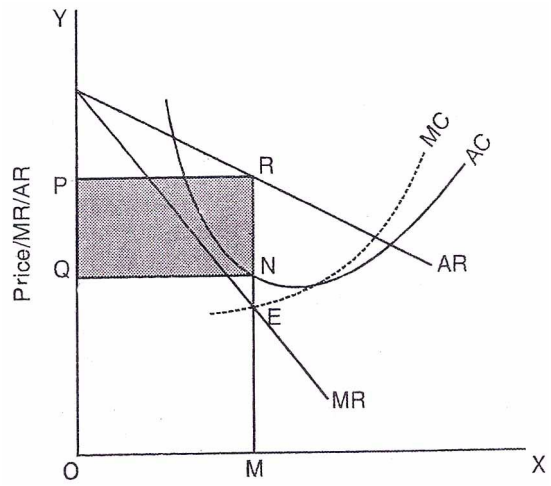
This condition is called the necessary condition.

2) Marginal cost curve must intersect Marginal revenue from below.

i.e. MC $\neq$ MR.

This is secondary condition, or sufficient condition.

Where these two conditions are to be fulfilled, the firm achieves maximum profit at this point. This marginal conditions of profit maximization is illustrated as below.



Output

Fig. 1.1

In the figure 1.1 AR and MR are the Average and Marginal revenue curves slopping downwards to the right. AR curve lies above the MR curves. Such situation prevails in monopoly market. AC is average cost curve, it is U-Shaped. MC is marginal cost curve. It is rising from left to right upwards.

MC curve Intersects MR curve form below at point E. Hence E is the equilibrium point. At the point E both conditions MC = MR and MC curve intersects MR curve form below are fuelled. Up to the OM level of output MR is greater than MC. Therefore monopolist will be in equilibrium at the point E. He produces OM level of output and determines OP price.

By selling OM output at OP price he will achieve profit equal to rectangular □ PQNR.

Profit	=	Total Revenge	Total Cost
	=	Total output x Average cost.	Total output x Average Revenue
	=	OM x OP	OM x MM
	=	□ OPRM	□ OQNM
	=	□ PQRN	

Hence momopolistic firm can achieve and maximise profit equal to a PQNR.

1.7.2 Sales - Revenue Maximization

It is an another objective of the business firm. According to 'Baumot Sale revenue maximization is an alternative objective to profit maximization. Every firm prefers maximization of sales revenue for various reasons as. .

1) Managers salary and other earnings are more closely related to sales and revenue. It results into healthy personnel policy.
2) Banks and other financial institutions look at sales revenue of a firm while financing to it.
3) Sales-revenue trend is an indicator of performance of a firm.
4) Rise in sales-revenue of a firm is prestigious to manager of a business firm, but profit goes to others.
5) Manager of the firm finds profit maximization a difficult objective to fulfill consistently over a period of time with same level.
6) Growing sales strengthen competitive spirit of the firm in the market.

Baumol's sales-revenue maximization model is based upon the following assumptions.

1) Sales maximisation object is subject to minimum profit. It means that when firm achieves sales-revenue maximisation, it has to leave profit maximization goal.
2) To maximise sales, advertisement plays very important role. It causes to increase the demand for product of business firm.

3) Advertisement costs are not included in costs of production.

4) Price of the product remains to be constant.

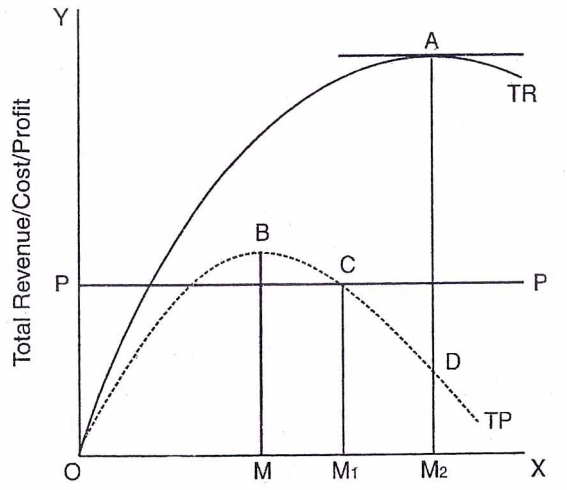


Fig. 1.2 : Output

In the figure 1.2 output is taken on x-axis and Total revenue, total cost and profit is taken on Y axis. PP is minimum profit line drawn parallel to X-axis. TR and TC are the total revenue and total cost curves respectively. Tp is total profit curve, it rises up to the point B and then falls. Total Revenue curve is also rising from left to right and further it becomes parallel to X-axis in the point A and then it is declining. The Point A on TR curve is shown by a tangent line. It reveals that in the point A TR curve becomes parallel .to X axis. There fore in the point A marginal revenue becomes zero (0). At the level of output at the point A sales revenue of a firm becomes maximum. It reveals OM_2 level of output. .

The point B on TP curve is the apex point. Which shows the maximum profit; It shows the OM level of output.

If firm has to achieve the maximum profit goal, it has to produce OM level of output. But profit maximization is not a goal of business firm but instead of it sales revenue maximization is the goal of a firm. So it attempts to sale OM_2, level of output and gets M_2D profit.

But M_2D profit is lower than minimum level of profit 'PP' or M1C previously determined by the manager. So the firm can't accept to sale OM level of output. While falling the TP curve it intersects minimum profit line PP in the point C and at the output level OM,. Hence firm can accept to sale OM, level of output which is more than profit maximization output. So firm will produce OM_1 output. This theory shows that manager of business firm may consider non price competition through sales maximination.

1.7.3 Other Objectives :

Business manager may also consider other economic objectives besides profit and sales revenue maximization goals. They are as follows.

1) Maximization of growth Rate :

'Morris' an eminent economist has suggested this objective' of maximization of growth rate of the firm. It means that maximization of demand for firm's product. Morris says that by maximising these variables, manager of a business firm maximise their own utility function as well as that of the owners. Manager's utility function includes factors like salaries, status, job security, power etc. Profit, capital, market share etc. factors' are included in owners utility function. All of these factors are positively co-related with a single variable, i.e. size of the firm. Maximization of these variables depends upon the maximization of the growth rate of the firm. Therefore manager tries to seek the rapid and steady growth rate of the firm.

Thus, this is a dynamic objective -of a firm, with which a firm can attain maximum rate of growth with optimum profit.

2) Desire for Liquidity :

According to 'Prof. Joel Dean' the liquidity criterion is also more important. It means that a firm is willing to keep adequate amount of cash to avoid liquidity problem. The fear of financial problems and bankruptcy are very important and powerful factors in influencing the firm to hold adequate cash. Thus, desire to keep adequate cash with itself is. an one of the economic objectives of a firm.

3) Survival in Long-run :

'Rothschild' suggested this objective of a firm that survival in long-run period. He says that survival in long run period is an objective of a firm 'Peter F. Drucker' has also supported this view. This is a long term goal and it requires profitability. Profit should not be maximum but it is reasonable profit. Firm can survive in long period only if it will achieve good will of the people by producing best quality of it's products. A good will earned would help the firm to enjoy a bigger share of the market and this will enable it to survive in long period.

4) Building up public confidence for the product :

This is the secondary goal of survival of the business firm. Therefore firm may build lip the customers confidence in respect of his produce, firms are applying advertising techniques, to build up the public confidence for it's products.

5) Entry-prevention and risk avoidance :

Some writers suggested that entry prevention of new firms is also one of the objective of the firm. Every firm attempts to prevent the entry of new firms in industry.

It is so that to achieve the profit maximization goal in long run to stay in market constantly and to avoid the risks emerges due to the uncertain behaviour of new firms.

6) Sound business practice :

Some economists says that business firms also give 'more. importance to business ethics, They adopt fair and sound business practices viz. providing price lists, replacement of defective product to build up good will. etc.

1.8 Summary

Managerial economics is a new branch of economics. It is founded by 'Joel Dean' in 1951. It is also called 'Business Economics', 'Applied Economics'. Economic theories and principles are applied to the daily business. It contains the application of economics, principles, theories and concepts of actual business. Various economists defined it by various angles. It's meanings is similar. It's scope contains micro as well as macro economic principles.

Economics theories are applied by business manager to actual business in daily life. The association between econmic theory and managerial theory is explained. Managerial theories are dependent upon economic theories. So, Business manager plays an important role in the application of economic theories to daily business. So, he has very important role and responsibilities in running daily bsuiness decision making.

There are various objectives of business firm viz. 1) Profit maximization, 2) Sales revenue maximization and 3) Other objectives.

1.9 Questions For Self Study

A) Fill in the blanks.

1. Managerial Economics if founded by .....
2. Managerial Economics is also called as .....
3. Managerial Economics contains ..... and .....
4. ..... is the main function of Managerial Economics.
5. ..... is a traditional objective of Business firm.

Ans.: 1) Joel Dean

2) Applied Economics / Business Economics

3) Micro and Macro Economics

4) Decision Making

5) Profit Maximization

B) State True and False.

1. Managerial Economics is the integration of economic theories with business practice.
2. Managerial Economics helps to business manager in decision making.
3. Sales-Revenue maximization objective of business firm is given by Joel Dean.
4. MC = MR is the main condition for profit maximization.
5. Managerial Economics is only related with macro economics.

Ans. : 1) True 2) True 3) False 4) True 5) False

1.10 Questions for Practice

1. Define Managerial Economics, State its scope.
2. Explain role and responsibilities of business manager.
3. Explain profit maximization objective of business firm.
4. State Baumol's objective of business firm.
5. Short Notes :
   (i) Features of Managerial Economics
   (ii) Managerial Economics and Decision Making
   (iii) Role and Responsibilities of Business Manager
   (iv) Other Objectives of Business Firm.

1.11 References for more Reading

1. Managerial Economics : Dr. M. N. Shinde, Ajab Publications, Kolhapur.
2. Managerial Economics : H. C. Peterson and W.C. Lewis, Prentice Hall, New Delhi.
3. Managerial Economics : D. N. Dwivedi
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❑❑❑

Unit 2

DEMAND ANALYSIS

2.0 Objectives

1. To study demand function.
2. To study Law of Demand.
3. To study Elasticity of Demand

2.1 Introduction

The meaning of the term demand is commonly taken as the desire for a thing. In 'economics meaning of the word demand is different from the commonly used. In economics the word demand is always backed by the enough money to purchase a thing in market. Therefore the word demand is defined as below.

According to 'Stonier and Hague', "Demand in economics means to pay for the goods "demanded" It means .a consumer is willing to purchase a commodity and who is having sufficient money, thus the will to purchase a commodity is transformed into demand. Purchasing power therefore plays important part in creation of demand.

'Benham' has defined it as "the demand for anything at a given price is .the amount of it which will be bought per unit of time at the price."

This definition stresses on three aspects of demand viz. price, quantity demanded and time. Thus demand comprises the elements as purchasing power, price, quantity and time.

2.2 Demand-Function

Demand Function shows the relationship between demand for a commodity and factors affecting it. It states the functional relationship between the demand for a commodity and it's determining factors. These factors are as follows price of a commodity income, prices of substitutes and complementary goods, tastes and preferences of people, fashions, population etc. Therefore, the functional relationship between these determinant factors and demand for a commodity is called as demand function. It is mathematically shown as follow.

D = f (a, b,c,d, e....,...n)

Where,

D = Demand for commodity

f = Function

a = price of commodity

b = Income of people

c = price of substitutes and complementaries

d = population

e = Tastes and preferences of people

n = n^{th} or last factor affecting the demand

2.3 Law of Demand

'Alfred Marshall' stated the law of demand as "other things being constant, if. price of a commodity increases it's demand decreases and if price decreases it's demand increases."

This law shows the inverse relationship between the two variables demand and price of a commodity. Other things means the income, prices of substitutes and complementaries, tastes and preferences of people, population etc. When all of these other factors remain constant, the Law of demand founds to be true.

The law of demand is explained with the help of a demand schedule. The demand schedule shows the quantities demanded at different levels of prices.

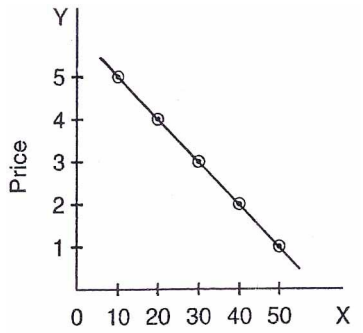
2.3.1 Demand Schedule :

Demand Schedule of a individual consumer reveals that when price falls as Rs. 5 to 4, 3, 2,1 the quantity demanded will increase as 10, 20, 30, 40 to 50 units respectively. It shows the inverse relationship between price and demand of a commodity.

Demand Schedule 2.1

Price (Rs.)	Demand (units)
5	10
4	20
3	30
2	40
1	50

With the help of demand schedule, we can draw the demand curve as follows.



Demand
Fig. 2.1

By taking the quantity demanded on x-axis and price on Y-axis. DD demand curve is drawn. It falls from left to right and shows the inverse relationship between price and demand of a commodity. Thus demand curve is downward slopping curve or falls from left to right downwards.

2.3.2 Market Demand Curve

Market demand is a sum of the individual demand for a commodity inmarket. Different consumers purchase different quantity at various prices. So all the consumers demand for a particular price is to be summed up and market demand is computed at different prices. It provides that total market demand schedule.

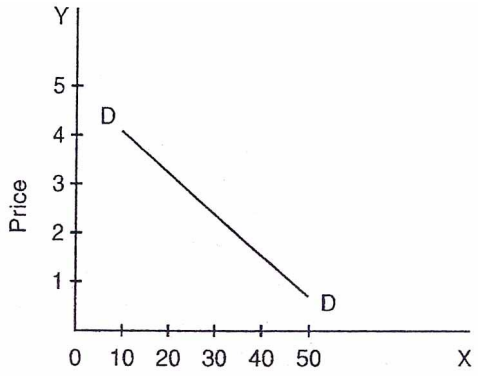
T - 2.2

Price (Rs.)	A's Demand	B's Demand	Market Demand
5	20	10	30
4	25	15	40
3	10	20	50

This table 2.2 shows that there are two consumers A and B in the market.

Quantities demanded by A and B consumers are as 20 + 10, 25 + 15, and 30 + 20 at the prices 5, 4 and 3-Rs. respectively. It shows the total market demand as 30, 40 and 50 units respectively at the above prices.

If this price-quantity demand relationship is plotted on a graph. We get the downward slopping demand curve. Which shows the inverse relationship between the price and quantity demanded of a commodity. As shown in following fig. 2.2.



Demand
Fig. 2.2

Assumptions :

The Law of demand is based on following assumptions.

1. Consumer's tastes and preferences remain constant, i.e. There is no change in it.
2. Income remains constant.
3. Prices of substitutes and complementaries remain constant.
4. No substitute is available to the commodity.
5. Population remains constant.

2.3.3 Limitations :

All above assumptions are the limitations to the Law of demand. They are as follow.

1. **Change in Income :** If there is change, in. consumer's income, Law of demand doesn't operate.
2. **Change in Tastes and Preferences :** If the tastes and preferences of people may go on change, the law of demand could not be found true.
3. **Change in prices of other goods :** If prices of other goods i.e. substitutes and complementaries are changed, the law of demand doesn't show the inverse relationship between price and demand for a commodity.
4. **Population chang**e : If Population changes the law of demand does not found true.
5. **Availability of close substitutes :** If there is existence of close substitutes to consumer's goods, the law of demand doesn't fulfill the inverse relationship between price and demand.

2.3.4 Exceptions :

There are few exceptions to the law of demand. In some particular situations it will not be existed. Hence these situations are called exceptions, they are as below

1. **War :** War period is exception to the law of demand. In this period scarcity of various goods is prevailing in the country. So people are purchasing goods more at higher prices also. It means that during the war period even though commodity prices remain high, people can demand more and more goods.
2. **Economic Depression :** The period of economic depression is also another exception to the law of demand. During this period commodity prices are existing at it's lowest level, till people do not demanding it in a large quantity. It means that,

during the period of economic depression price and demand both are remaining lower. Hence law of demand doesn't be operated.

3. **Status symbol commodities :** Precious commodities like diamonds, precious stones, old and scare pictures, idols etc. are the status symbols and it is always purchased by the rich people to confer social distinction. These commodities are .not purchased for their intrinsic value but for the prestige they confer upon the possessor. Therefore as the price of these goods falls, demand also falls and vice versa.

4. **Giffen goods :** Giffen goods are the low priced or inferior goods. They are exception to the law of demand. A fall in its price tends to reduce it's demand and rise in price causes to increase the demand. This relationship was searched by Sir Robert Giffen. Hence, it is named as Giffen goods.

5. **Essential goods :** The goods which are necessary to life of human beings. A consumer doesn't reduce it's daily consumption as it's price, rises or doesn't increase it's consumption as price falls. e.g. A family required 10 kg of rice per month, as price of rice rises family chief doesn't reduce it's consumption below 10 kg. If he does so, starvation would occur in his family. On the other hand price of rice falls, he can't consume 50 kg. of rice per month instead of 10 kg. Thus, the nature of life necessary goods is such that it's consumption can not be changed as price changes.

2.4 Elasticity of Demand

Elasticity of demand refers to the rate of change of demand to the rate of change in price. Law of demand only expresses the inverse relationship between price and demand of a commodity. But it doesn't say about the proportionate change in demand to the proportionate change in price. Therefore the concept of elasticity of demand is developed, by 'Alfred Marshall'. Elasticity of demand is defined as "It is the ratio, of proportionate change in quantity demanded to the proportionate change in price of a commodity." It means that elasticity of demand shows the ratio of percentage change in demand to the percentage change in price. Thus, the elasticity of demand expresses the degree of correlation between demand and price. It is the rate at which quantity demanded varies with a change in price.

With the help of this definition elasticity of demand is expressed in mathematical term as :

$$e = \frac{\Delta q}{q} \div \frac{\Delta p}{p}$$

Where, e = Elasticity of demand.

q = Initial demand

Δq = Change in demand

p = Initial price

Δp = Change in price.

e.g. Let us assume that price of a commodity is decreased, from Rs. 10 to Rs. 5 so that demand increased form 10 to 20 units. Therefore elasticity of demand is calculated as :

$$e = \frac{\Delta q}{q} \div \frac{\Delta p}{p} = \frac{10}{10} \div \frac{5}{10}$$

$$= \frac{10}{10} \times \frac{10}{5}$$

$$= \frac{10}{5}$$

= 2 Therefore elasticity of demand is equal to 2.

Elastic and inelastic Demand :

When the small change in price causes large change in demand, it is called as elastic demand, e.g. Suppose rise in price by 2%, causes fall in demand by 10% it results into elastic demand. In regards to this elasticity of demand is calculated as $e = \Delta q / \Delta p = 10/2 = 5$. When the elasticity of demand is greater than, 1, ($e > 1$).

This type of change in demand is called elastic demand.

Inelastic demand : When a big change in price causes a small change in demand, it is referred as inelastic demand, e.g. If price falls by 5% and demand rises by 4%. It results into inelastic demand, $e = \Delta q / \Delta p = 4/5 = 0.80\%$. The elasticity of demand is less than 1. ($e < 1$).

Hence, elasticity of demand is inelastic.

2.5 Types of Elasticity of Demand

There are three types of elasticity of demand.

1) Price elasticity of demand.
2) Income elasticity of demand.
3) Cross elasticity of demand.

1) Price elasticity of demand : The concept of price elasticity of demand is concerned with the change in price to the change in demand. It shows the effect of change in price to the change in demand. "Marshall' was the first economist, who defined the price elasticity of demand as the ratio of percentage change in quantity demanded in response to a percentage change in price." Mathematically it is shown as :

$$\text{Price elasticity of demand} = \frac{\text{proportionate change in quantity demanded}}{\text{Proportionate change in price}}$$

$$e = \frac{\Delta q}{q} \div \frac{\Delta p}{p} \qquad \therefore e = \frac{\Delta q}{q} \div \frac{p}{\Delta p}$$

Where, e = Price elasticity of demand

Δq = Change in quantity demanded

q = Original quantity demanded

Δp = Change in price

p = Original price.

There are five cases of elasticity of demand

1) Perfectly elastic or infinite elasticity demand
2) Perfectly Inelastic demand
3) Relatively Elastic demand
4) Relatively Inelastic demand
5) Unit Elastic demand

1) Perfectly Elastic or Infinite elastic demand :

When a small change in price leads to very large amount of change in demand, it is called as perfectly or infinitely elastic demand. It is diagrammatically represented as follow.

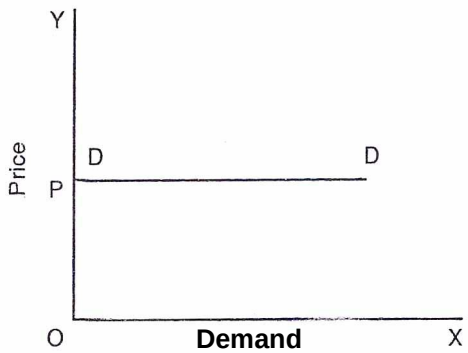
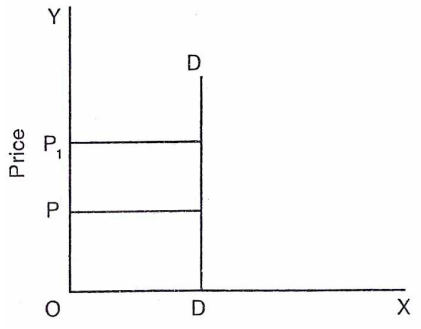


Fig. 2.3 :

DD is horizontal straight line demand curve. It shows that small fall in price leads to an unlimited increase in demand. It is hyper sensitive demands and elasticity of demand is infinite.

2) Perfectly inelastic demand :

When any change in price doesn't cause any change in quantity demanded, i.e. any change in price, it may be large or small doesn't cause any amount of change in demand. In this case demand remains constant to change in price. So it is called perfectly inelastic demand. It is diagrammatically shown as below.



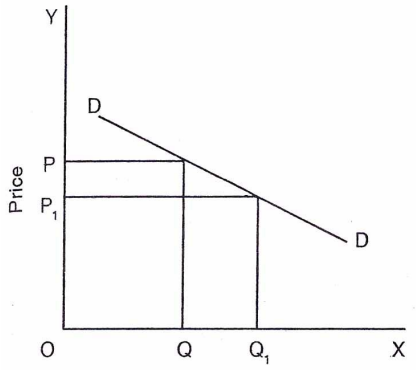
Demand

Fig. 2.4

DD is demand curve. It is vertical straight line curve parallel to Y axis. It shows there is no change in quantity demanded as price changes. Price changes from OP to OP1, but demand remains OD i.e. same.

3) Relatively Elastic demand (e > 1) :

When change in price is followed by big change in demand, it is called elastic demand. In other words, when the change in quantity demanded is greater that change in price is called relatively elastic demand. !n this case elasticity of demand is greater, than 1. (e > -1). It is diagrammatically shown as follow.



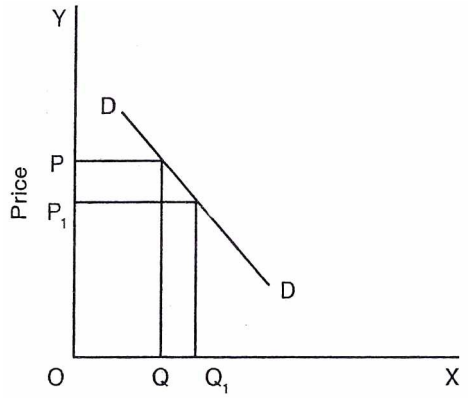
Demand

Fig. 2.5

In the figure, change in price PP_1 is smaller than the change in demand QQ_1. Therefore, DD demand carve is flatter.

4. Relatively Inelastic demand (e < 1) :

When change in demand is smaller than change in price, it is referred as relatively inelastic demand i.e. Large change in price leads to smaller change ,in quantity demanded. Diagrammatically it is shown as follow.



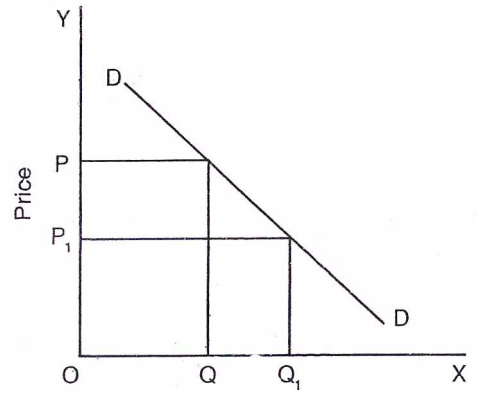
Demand

Fig. 2.6

DD is downward slopping demand curve. It shows that change in price PP, is greater than change in quantity demanded QQ, Hence, the demand is inelastic.

5) Unit Elasticity of demand (e = 1)

When the change in price is exactly equal to the change in demand, it is referred as unitary elastic demand. Here, demand changes in equal proportion of change in price. Therefore elasticity of demand is equal to 1. It is diagramatically shown as below.



Demand

Fig. 2.7

DD is downward slopping demand curve. It shows that change in price PP, is exactly equal to the change in quantity demanded QQ1.

Therefore price elasticity of demand is equal to 1, or it is called the unitary elastic demand.

2.6 Measurement of Elasticity of Demand :

There are three methods of measurement of elasticity of demand, viz.

1) Total Outlay Method 2) Proportional Method 3) Geometrical Method

2.6.1 Total Outlay Method or Total Expenditure Method :

In this method change in total expenditure on a commodity resulted due to the price change is compared and elasticity is measured. These changes are compared in three ways as below.

1. When 'change in .price (rise or fall), doesn't lead to change in the total outlay on a commodity, it means that if price changes but total outlay-on a commodity doesn't-change or remains the same. It is referred as unitary elastic demand, or e = 1.
2. In this case, price rise is followed by decrease in total outlay or fall in price is resulted into rise in total outlay on a commodity. It is called as elastic demand In this case elasticity of demand is greater than 1 ,(e > 1)
3. If price rises, total outlay also rises or price falls, total outlay also falls/This type of elasticity is called as inelastic demand. Also it is referred as price elasticity of demand is less than one (e < 1).

This method is explained with the help of following table 2.3.

T - 2.3

Price (Rs.)	Demand (unit)	Total Outlay (Rs.)	Elasticity of Demand
10	5	50	
5	10	50	e = 1
10	5	50	
5	20	100	e > 1
10	5	50	
5	7	35	e <1

2.6.2 Proportional Method :

In this method the percentage change in price is compared with the percentage change in demand. The elasticity of demand is calculated with the help of formula as given below.

$$\text{Price Elasticity} = \frac{\text{Proportionate change in demand}}{\text{Proportionate change in price}}$$

e.g. $e = \frac{\Delta q}{q} \div \frac{\Delta p}{p}$

1. Suppose, price of a commodity is decreased by 10% and it caused to rise in demand by 20%. The elasticity of demand is equal to $e = \Delta q / \Delta p = 20/10 = 2$. Therefore elasticity of demand is greater than 1 i.e. 2 > 1, hence demand is elastic.
2. If price is decreased by 10% and demand is increased by 5%. In this case the elasticity of demand is $e = \Delta q / \Delta p = 5/10 = 1/2$ i.e. 0.5. The elasticity of demand is less than 1. Hence demand is inelastic. .
3. When price falls by 10% and demand increases by 10%. Here the elasticity of demand is $e = \Delta q / \Delta p = 10/10 = 1$. The elasticity of demand is equal to 1, i.e. 1 =1. Hence the demand is unitary elastic.

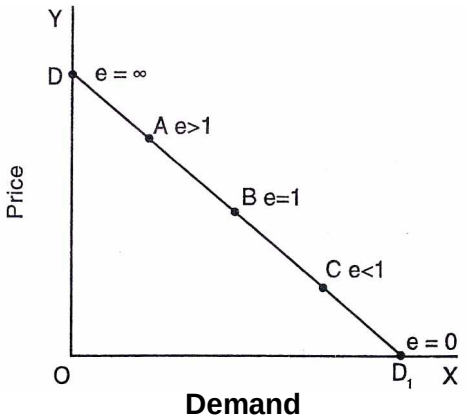
2.6.3 Geometrical Method : (Point Elasticity) :

In this method the elasticity of demand is measured at any point on demand curve. When the demand curve is a straight line demand curve. In order to measure elasticity of demand at any point on a demand curve, the formula used is as below.

Elasticity of demand at any point on demand curve is the ratio of lower part of the demand curve to the upper of the demand curve, from that point, where elasticity of demand is to be measured.

$$\text{Price Elasticity of demand} = \frac{\text{Lower Segment of the demand curve from that point}}{\text{Upper segment of the demand curve from that point}}$$

DD_1 is a straight line demand curve. It's length is 4". A, B, C, are points lying on that curve. B is a mid point, which divides DD curve equally into two parts. So BD =



Demand

Fig. 2.8

BD, = 2'. A point lies at the mid point of segment BD. Therefore BA = AD = 1'. Similarly C Point lies at the mid point of segment BD. so BC = CD = 1'.

Elasticn -

Demand at point $A = \frac{AD_1}{AD} = \frac{3}{1} = 3$

Hence elasticity of demand at point A is greater than 1.

Elasticity of demand of point $B = \frac{BD_1}{BD} = \frac{2}{2} = 1$

Therefore elasticity of demand at point B is equal to 1.

Elasticity of demand of point $C = \frac{CD_1}{CD} = \frac{1}{3} = 0.999$

The elasticity of demand at point C is less than 1.

The elasticity of demand at point D_1 : $D_1 = \frac{D_1}{DD_1} = \frac{0}{4} = 0$. So the elasticity

The elasticity of demand at point D : $D = \frac{DD_1}{D} = \frac{4}{0} = \infty$. so the

elasticity of demand at point D = ∞ .

In this way the elasticity of demand at the point curve is measured.

2.7 Income Elasticity of demand :

When person's income affects the demand for a commodity it results in to income elasticity of demand. As income changes, demand also changes. "The Ratio of change in income to the change in demand is referred as the income elasticity of demand." It measures the responsiveness of demand to changes in income. Therefore it is defined as "Income elasticity of demand is the ratio of the percentage change in the quantity demanded to the percentage change in Income."

Mathematically, it is put up as :

$$\text{Income elasticity of demand} = \frac{\text{Proportionate change in demand}}{\text{Proportionate change in income}}$$

$$E_y = \frac{\Delta q}{q} \div \frac{\Delta y}{y} = \frac{y}{q} \times \frac{\Delta q}{\Delta y}$$

Where, Ey = Income elasticity of demand

Δq = Change in quantity demanded

q = Original demand

Δy = Change in income

y = Original income.

Income elasticity of demand could be zero, -ve, or +ve. If it is positive, it can be shown as Ey = 1, Ey > 1, or Ey < 1. When it is 1, Income elasticity is unitary. If it is greater than 1, demand is income elastic, and when it is less than 1, demand is income inelastic.

2.8 Cross - Elasticity of Demand :

There are many substitutes or complementary goods available to any commodity in market. Therefore, if there is change in the. price of substitutes, it affects the demand for a particular commodity. Therefore the concept of elasticity of demand is applied to the two commodities related to each other. The relationship between the two commodities can be either substitutive or complementary. In the context of these relationships, the term cross elasticity of demand is used.

Cross elasticity of demand is defined as "The ratio of proportionate change in quantity demanded of commodity A to a given proportionate change in the price of related commodity B."

In order to calculate the cross elasticity of demand following formula is used.

$$\text{Cross elasticity of demand} = \frac{\text{Percentage change in the quantity demanded of A}}{\text{Percentage change in the price of B.}}$$

Suppose, that A and B are two commodities substitutes to each other. If the price of B rises and the price of A remains constant, it causes to .rise in the quantity demanded of commodity A. Because the consumers will substitute A for B. on the contrary if price of A rises and B's price remains constant.. It leads to rise .in demand of a commodity B. Because now consumers are preferring B for A.

The cross elasticity of demand may be infinity or zero; Also it may be positive, or negative. When goods are perfect substitutes to each other cross elasticity may be infinity. Where two goods are not substitutes to each other cross elasticity of demand will be zero. It means that change in price of one commodity doesn't affect the demand for another commodity. The cross elasticity varies between two extremes infinity and zero. It depends. upon the degree of substitutability.

When the two goods are substitutes to each other, then the cross elasticity of demand is positive (+ve). When the two goods are complementary to each other, the cross elasticity is negative (-ve).

2.9 Factors determining the elasticity of Demand

Elasticity of demand depends upon the following factors.

1) Nature of commodity : According to the nature of commodities, they are of three types as life necessities, comforts or the luxurious goods. If the goods are .life necessary, their demand is inelastic. On the other hand, if goods are comforts or luxurious their demand is elastic.

2) Total Expenditure : The elasticity of demand of a commodity depends upon proportion of expenditure spended on it. If a small proportion of total expenditure is expended on the goods, it's demand is inelastic. It's demand is not much affected by a change in price e.g. expenditure on Salt. Where the large proportion of total expenditure is absorbed by a commodity, the demand for that commodity is elastic, e.g. expenditure on food items. .

3) Substitutes : The elasticity of demand is also dependent upon the substitutability of goods. If the goods are substitutes to each other demand is elastic. On the other hand if they are not substitutes, the elasticity of demand is zero.

4) Several Uses : A commodity is used in various purposes. It's demand is elastic. When it's. price rises, it is used in most urgent uses only, so it's demand falls. If it's price falls it is used in several uses, so it's demand rises.

5) Price level : Where a price of a commodity is very high or-low, the demand for such commodities remains inelastic.

6) Joint demand : The demand for jointly used goods is less elastic. Suppose T.V. and antena are the joint products, if the price of TV prevails very high, the demand for Antena doesn't rise.

7) Income level : Income level affects the elasticity of demand. When income of people remains low, small change in price of the goods will lead to a big change in demand. So the poor people's demand is elastic. On the other hand where the income level is high, demand is inelastic, i.e. rich people's demand is inelastic.

8) Market imperfections : Where market is imperfect the demand is inelastic. When consumer doesn't know about the conditions prevailing in market, the rise or fall in price doesn't affect the consumer's demand.

9) Postponement of demand : When the consumption of the commodity is postponable, the demand for such goods is elastic. If the consumption of a commodity can't be postponed, the demand for commodity is inelastic.

10) Time period : If long run period is prevailing, the elasticity of demand is greater, on the other hand, when short run is prevailing, the demand remains inelastic.

2.10 Applications of Elasticity of Demand in Managerial Decisions

The concept of elasticity of demand is widely used in managerial decisions.

1) Price Fixation : While fixing the price of a product, manager of a business firm in monopoly market or imperfect market takes into account the elasticity of demand of a that commodity. If the demand for commodity is elastic, lower price is fixed. On the other hand the demand for commodity is inelastic, the price fixed is high.

2) Joint Products : In case of joint products the separate costs are not accessed. The producer is guided mostly by demand and nature, a commodity. While fixing, the price of joint products manager takes in to account ifs elasticity of demand.

3) Production : Manager of a business firm decides the total volume of production on the basis of demand for the product. If the demand for product is elastic, total production is not increased, on the other hand if the demand for product is inelastic, total production is increased. Thus, the concept elasticity of demand is used in making the decisions regarding the volume of production.

4) Useful in distribution : While fixing the rewards of factors of production, the concept of elasticity of demand for the factors of production is used. If the demand for factors of production is inelastic, higher rewards are fixed. On the other hand, where the demand is elastic, lower rewards are fixed.

5) Useful in International trade : Elasticity of demand helps in fixing the terms of trade in international trade. Terms of trade means the rate at which the domestic commodity is exchanged for foreign commodities. These terms of. trade depends on the elasticity of demand of the products of the two countries.

6) Income elasticity of demand : This concept has greater significance in pricing the product to maximize the total revenue in short-run period. Also income elasticity of product is important in production planning and management in long period. Particularly in the period of business cycles. It is used in estimating the future demand as income rises. Thus income elasticity of demand is useful in demand forecasting.

7) Cross Elasticity of Demand : It is useful in changing the price of products, which have substitutes and complementaries. If cross elasticity is greater than one of the substitutes, it is not profitable to increase the price. In this case price reduction proves most beneficial. Thus with the help of cross elasticity of demand firm can forecast the demand for its product.

2.11Summary

Demand means the will to purchase a thing backed by money. Demand function means the relationship between the demand and factors determining it. Alfred Marshall has given law of demand which shows the inverse relationship between price and demand. Personal demand and market demand show similar inverse relationship between price and demand of a commodity. Law of demand has some limitations and exceptions as change in income, changes in tastes and preferences, change in prices of substitutes and complimentary goods. Population change etc. War, economic depression, status symbols, Giffen goods, essential goods etc.

Elasticity of demand shows the proportionate change in demand due to the proportionate change in price of a commodity. It is mathematically shown as

$$e = \frac{\Delta q}{\Delta p} \times 100 \quad \text{Or} \quad e = \frac{\Delta q}{q} \div \frac{\Delta p}{p}$$

Elasticity of demand is of 5 types as 1) perfectly elastic demand 2) perfectly in elastic demand 3) relatively elastic demand 4) relatively inelastic demand 5) unitary elastic demand.

Elasticity of demand is measured by 3 methods viz. 1) proportional method, 2) Total outlay method, 3) Geomerical method.

Income elasticity shows the relationship between the percentage change in demand due to the percentage change in income. It is shown as,

$$E_y = \frac{\Delta q}{\Delta y} \times \frac{y}{q}$$

Cross elasticity of demand means the proportionate change in demand of X commodity due to the change in price of Y commodity.

$$\text{Cross elasticity of demand} = \frac{\%\text{ change demand of X commodity}}{\%\text{ change in price of Y commodity}}$$

Elasticity of demand depends on various factors. It is useful to producers, government, in international trade, in distribution etc.

2.12 Questions For Self Study

A) Fill in the blanks.

1. Law of demand is given by .....
2. Law of demand shows ..... type of relationship between price and demand.
3. Giffen goods are ..... types of goods.
4. There are ..... types of Elasticity.
5. There are ..... methods of measurement of elasticity of demand.

Ans. : 1) Marshall

2) Inverse

3) Inferior

4) Five

5) Three

B) State True and False.

1. Concept of elasticity of Demand is given by Alfred Marshall.
2. When change in price is greater than change in demand is called less elastic demand.
3. Cross elasticity measures the relationship between the change in price and demand of substitute goods.
4. Elasticity of demand doesn't helps to producers in price fixation.
5. Demand for necessary goods in inelastic.

Ans. : 1) True 2) True 3) True 4) False 5) True

2.13 Questions for Practice

1. State law of Demand, what are the exceptions of it ?
2. What is elasticity of Demand ? State its types.
3. Explain the methods of measurement of elasticity of demand.
4. Short Notes :
   (i) Demand Function
   (ii) Exceptions to Law of Demand
   (iii) Factors determining the elasticity of Demand
   (iv) Income elasticity of Deamnd
   (v) Cross elasticity of demand
   (vi) Applications of elasticity of demand

2.14 References for more Reading

1. Managerial Economics : Dr. M. N. Shinde, Ajab Publications, Kolhapur.
2. Managerial Economics : H. C. Peterson and W.C. Lewis, Prentice Hall, New Delhi.
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5. Modern Economic Theory : K. K. Dewett.

❑❑❑

Unit 3

THEORY OF CONSUMER'S CHOICE

3.0 Objectives

1. To study Indifference Curve Analysis.
2. To Study Revealed Preference Theory.
3. To Study various theories of consumer's choice under risks
4. To Study demand forecasting.

3.1 Introduction

3.2 Indifference curve Analysis

Marshallian cardinal utility approach is criticised on several grounds by the Hicks Alien, Edgeworth, Slutsky etc. They propounded the ordinal approach to explain the demand theory. Slutsky was the first economist, who has given the ordinal approach i.e. Indifference curve analysis, to demand theory in 1915. Thereafter, a detailed study of indifference curve analysis is made by 'J. R. Hicks' and 'R. G. D. Alien' in 1928. This approach is more realistic and having few assumptions as compared, to marshallian utility analysis.

Assumptions :

Indifference curve approach is based on the following assumptions.

1) Rationality : This analysis assumes that every consumer is rational human being. He behaves rationally, so as to get maximum satisfaction from his expenditure. He chooses such combinations of goods, which are giving him maximum satisfaction.

2) Ordinal measurement : Indifference curve analysis believes that ordinal, measurement of utility is possible. It means that consumer is able to tell only the order of preferences of various combinations of goods. It doesn't require quantitative measurement of utility.

3) Scale of preference : The assumption tells that consumer arranges the various combinations of goods according to his scale of preference. He can arrange it either in ascending order of descending order, so he is able to show the combinations among which he is indifferent.

4) Diminishing Marginal rate of substitution : It is based on the assumption of diminishing marginal rate of substitution. It means that when consumer substitutes one commodity for another, he substitutes less and less quantity of one commodity,

while increasing the quantity of another commodity in order to keep equal amount of total satisfaction.

5) Assumption of consistency : It is assumed that consumer shows consistency in his behaviour. When he prefers A to B and B to C combination, then he doesn't prefer C to A or when he assumes A = B, and B = C he must assume A = C.

6) Transitivity Assumption : This assumption states that consumer's preferences do not contradict each other. When he prefers A to B at one time, he can't prefer B to. A at another time.

7) It assumes two goods only : While explaining the indifference curve analysis, only two goods are considered for the convenience.

8) Constant income : This analysis assumes that the consumer's income remains constant during the whole process of consumption.

9) Weak ordering : Indifference curve analysis is based on weak ordering. It means that consumer being indifferent between any two combinations, while preferring one combination to another. He may prefer A to B or B to A or he may be indifferent between these two combinations. As against weak ordering, strong ordering means that consumer has to show his preferences only. The possibility of indifference between two combination is ruled out in strong ordering.

3.2.1 Indifference curve :

An indifference curve represents satisfaction of a consumer-from .two commodities. The different combinations of two commodities on an indifference curve shows equal satisfaction. So, consumer is indifferent in respect of these combinations, which are chosen ? He can choose any combination lied on indifferences curve. When he chooses any combination lied on indifference curve, his position is neither better off nor worse off than before. Therefore he is indifferent between these combinations. When these combinations are plotted on a graph it gives rise to indifference curve.

Thus, an indifference curve is defined as the locus of the various combinations of two commodities yields the equal satisfaction to the consumer. Therefore he is indifferent between them, when consumer makes choice between various combinations of two goods. Hence, the indifference curve is called ISO-utility curve.

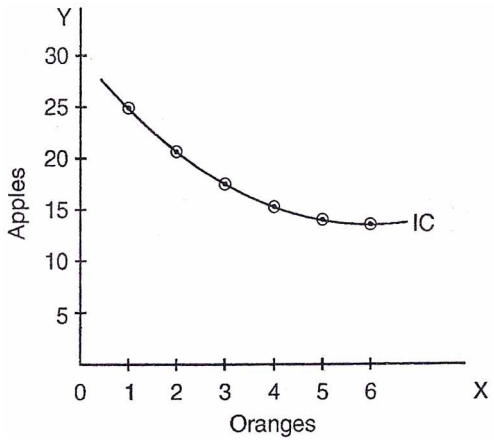
Following indifference schedule 3.1 - explains the concept of indifference curve. The indifference schedule shows the various combinations of two goods oranges and apples. Consumer is willing- to buy the various combinations of oranges and apples with his limited income. While he is buying the two goods; he makes 6 combinations, which give him equal satisfaction. These combinations are as 1+30,2+25,3+21,4+18, 5+16, and 6+15 oranges and apples.

T - 3.1

Combination	Oranges	Apples
1	1	30
2	2	25
3	3	21
4	4	18
5	5	16
6	6	15

While making these combinations, he substitutes oranges for Apples, in the ratio of 1:5, 1:4, 1:3, 1:2 and 1:1. It means that at every combination he increases 1 orange and gives up apples as 5, 4, 3, 2 and 1 in descending order. Whatever satisfaction is lost by giving up the units of apples, is compensated by purchasing one more unit of orange, to every combinations, so that total satisfaction remains the same.

When this indifference schedule is translated into diagram 3.1, it shows the indifference curve, as below :



Fig, 3.1

IC is the indifference curve. It shows various combinations of two goods apples and oranges as A, B, C, D, E, F, which show equal satisfactions.

Indifference Map : When there are many indifference curves tied together in a group, It shows higher and lower satisfaction. Such group of indifference curves is called indifference map. There are four indifference curves, $1C_1$, $1C_2$, IC_3 and IC_4 they show various levels of .satisfaction. IC, curve shows lowest satisfaction and IC_4 curve shows highest satisfaction. In this map $1C_1$, $1C_2$, IC_3 and IC_4 curves shows highest satisfaction in ascending order and they show lowest satisfaction in descending order.

It means, that right hand curves show highest satisfaction and left hand curves show lowest satisfaction, as shown in figure 3.2.

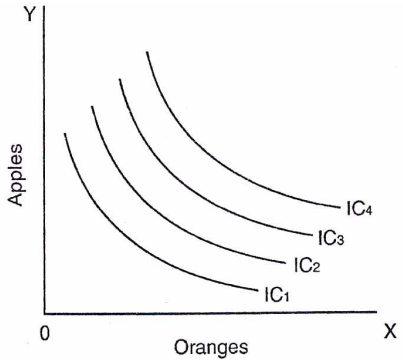


Fig. 3.2

3.2.2 The Diminishing marginal Rate of substitution : MRS

The indifference curve analysis is based on the diminishing marginal rate of substitution. it is the decreasing rate of exchange between the two commodities. It means that a quantity of a commodity that a consumer is willing to sacrifice for an additional unit of another commodity goes on decreasing. When he goes on substituting one commodity for another. The diminishing MRS is explained with the following table 3.2.

T-3.2

Combination	Oranges	Apples	MRSOA
1	1	30	-
2	2	25	1 : 5
3	3	21	1 : 4
4	4	18	1 : 3
5	5	16	1 : 2
6	6	15	1 : 1

The table T-3.2 reveals six combinations of oranges and apples. Which he buys wish his limited income. While making these combinations, he attempts to keep the equal level of satisfaction from each combination. Therefore he substitutes oranges for apples. He makes these combinations as 1+30, 2+25,3+21,4+18,5+16,6+15 oranges and apples respectively.

The ratio of exchange between oranges and apples is 1:5, 1 :4, 1:3,1:2 and 1:1 respectively to the six combinations, it means that at every combination he purchases 1. more orange and gives up 5, 4, 3, 2 and 1 apple in descending order. Whatever

satisfaction is lost him by sacrificing the units of apples is compensated by purchasing the one more unit of orange, at every combination. So that total satisfaction remains the same. In other words, it can be stated as he gets more and more oranges, he is willing to give up less and less apples for each extra orange. As the quantity of oranges goes on increase it's utility to consumer goes on decreasing in terms of apples. So he gives up less and less apples to oranges. So the rate of substitution between oranges and apples is found diminishing. Hence it is called the dininishing marginal rate of substitution. It can be shown graphically as follow in fig. 3.3.

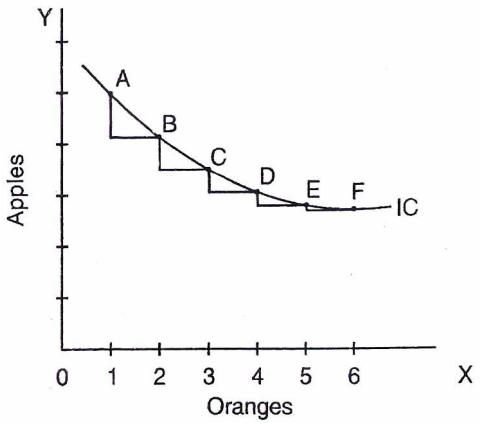


Fig. 3.3

IC is the indifference curve falling from left to right. The points A, B, C, D, E and F are lied on it. These points show the rate of substitution between oranges and apples with small triangles adhering to Ic curve below. The height of each triangle goes on diminishing and the length of base remains constant.

It shows the falling marginal rate of substitution. The slope of the IC curve is falling towards right. It reveals negative marginal rate of substitution. Symbolically it is expressed as follow.

$$MRSoA = \frac{\Delta A}{\Delta O}$$

where, ΔA = change in the quantity of apples.

ΔO = change in the quantity of Oranges,

It means that increase in each unit of Orange causes the units of apples exchanged less and less in number. Thus, MRS is always negative.

3.2.3 Properties of Indifference curve :

Indifference curves possess some properties. We can use it to know the nature

of indifference curve. They are derived from it's assumptions. These properties are as follows.

1) Indifference curves slope downwards from left to right, i.e. negatively slopped

Indifference curves slope downwards from left to right, because while consumer makes various combinations of two goods which derives equal satisfaction. He substitutes one commodity for another with the diminishing rate of marginal substitution. When he increases the units of oranges at the same time he decreases the units of apples in his purchase. He can do so because of his limited income. Therefore curve slopes downwards to the right. As depicted in following diagram. 3.4.

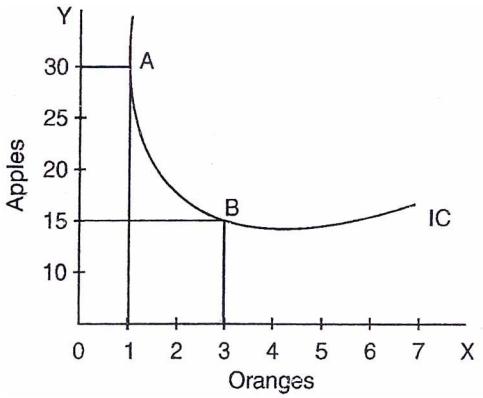


Fig. 3.4

Ic is a downward slopping indifference curve when consumer moves from point A to B, he decreases the units of apples from 30 to 21 and increases the units of oranges from 1 to 3. It means, while shifting from combination A to B he purchases more units Oranges and gives up the units of apples with a diminishing marginal rate, so Ic curve is negatively slopped.

Indifference curves are not parallel to X and Y axes, also they are not rising up from left to right as shown in diagrams. 3.5.

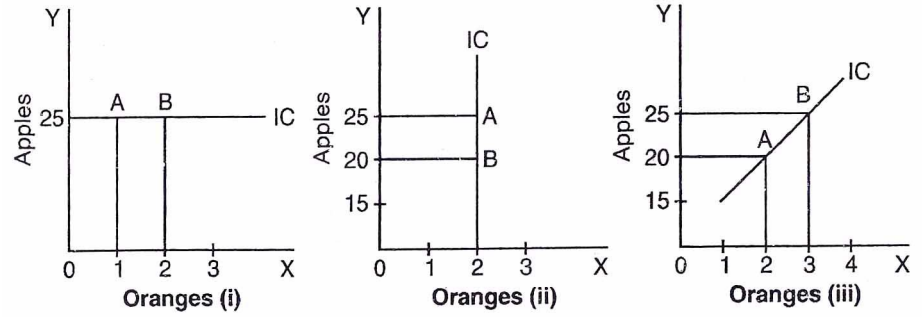


Fig. 3.5

IC curve is not parallel to X-axis or it is not horizontal as shown in figure (i). If Ic curve is parallel to X-axis it means that while making the different combinations of two goods apples and oranges as consumer moves from point A to B, he purchases more units of oranges and keeps constant the units of apples if he does so, the satisfaction can't remain same but it goes on increasing. This is against the principle of indifference curve because call the points (combinations) on Ic curve reveals equal satisfaction. Therefore Ic curve is not parallel to X axis.

As shown in figure (ii), Ic curve is not vertical or parallel to Y axis also. Because of points A and B on Ic curve reveal that as consumer moves from point A to B, he increases the units of apples by keeping constant the units of oranges. So point B gives more satisfaction than point A. It is also the against the principle of Ic curve. So Ic curve is not vertical or parallel to Y-axis.

Also, IC curve is not rising upwards from left to right. As depicted in figure (iii) if it is rises upwards from left to right consumer. Purchases more and more units of both commodities, so total satisfaction goes on increasing. This is absurd situation. So Ic curve can't slope upwards to the right.

It clearly means that IC curve is not-horizontal nor vertical or neither slopes upwards to the right, Therefore IC curve must be slopping downwards to the right.

2) Indifference curves are convex to origin :

Indifference curves are convex to the origin, because IC curve is based on the diminishing marginal rate of substitution. When consumer purchases more units of Oranges, at the same time he gives up less and less units of apples. Therefore IC curve becomes convex to the origin, as shown below.

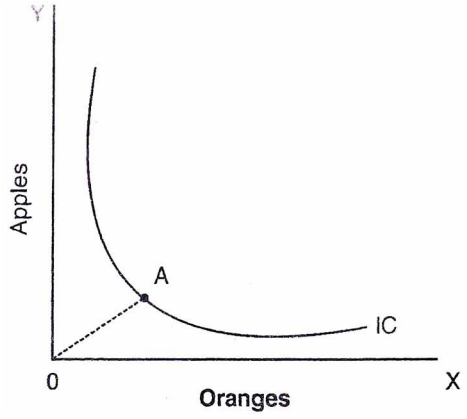


Fig. 3.6

Indifference curve is based on diminishing marginal rate of substitution. IC curve shows the dininnishing marginal rate of substitution so, It reveals the convexity at the point A. Which exhibits that IC curve is convex to the origin.

3) Two indifference curves cannot intersect to each other :

Indifference curve is a locus of points which shows the equal satisfaction. This is the basic principle on which Indifference curve analysis is relied. When two IC curves intersect each other this principle can't be fulfilled. So two Ic curves can't intersect each other.

Suppose two IC curves have cut each other. What absurdity will be followed is explained with the help of diagram 3.7.

Suppose that IC_1 curve cuts IC_2 curve at point 'C'. At the right hand side of this intersection point c, IC_2 curve falls below the IC_1 curve. So IC_1 curve lies at the upper level of IC_2 curve. The. point A lies on IC_2 curve and point B on the IC_1, curve. So, point B on IC_1 curve shows higher satisfaction as compared to point A on IC_2 curve.

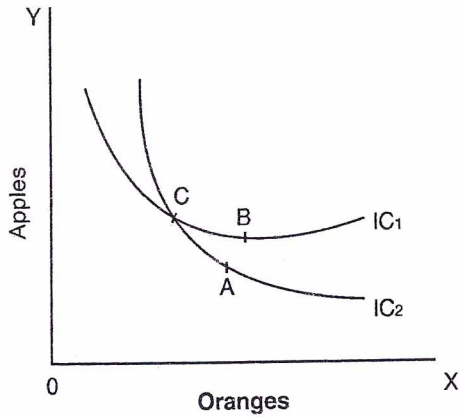


Fig. 3.7

At the point of intersection C both curves are showing equal satisfaction. Because of point C lied on IC_1 curve as well as on IC_2 curve. It is a common point lied on both curves. When we consider point C on IC_1 curve it shows equal satisfaction to the another point A lied on IC_2 curve. Which shows lower satisfaction.

It means that when we consider the intersection point C with point A, it reveals lower satisfaction, and when it is considered with point B, it reveals higher satisfaction. So, the point C is such point which shows higher satisfaction at one time and lower satisfaction at another time. It is not possible that the point which shows the different levels of satisfaction can exist on the same indifference curve. It is the absurd situation prevails when two IC curves intersect each other. So two IC curves can't intersect to each other.

4) Higher Indifference Curves show higher satisfaction and Lower indifference curves show Lower satisfaction :

Indifference map shows the bunch of IC curves, In this map higher Ic curves

show higher satisfaction and lower IC curves show lowest satisfaction.

As consumer's income rises, he purchases more units of both commodities and makes such combinations of two goods, which reveal higher level of satisfaction. On the contrary, if consumer's income falls be buys less units of both goods. So, combinations of two goods made by him show lower level of satisfaction. As income rises, he goes on higher Ic curve sand vice-versa.

It can be explained with the following diagram.

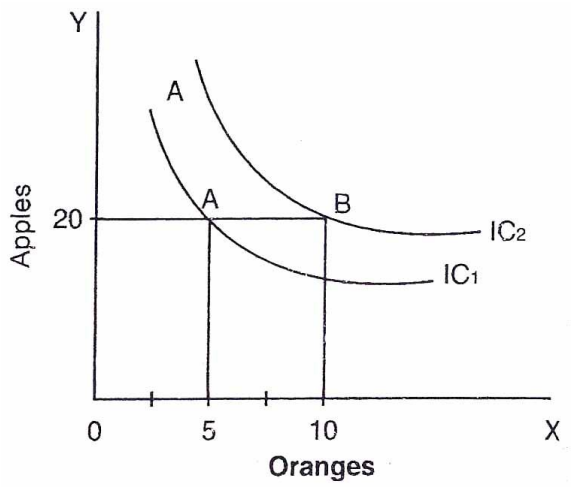


Fig. 3.8

IC_1 curve falls below the IC_2, curve. Point A lies on IC_1 curve and B on IC_2 curve. The point A shows a combination of 5 oranges+20 apples and point B shows a combination of Oranges + 20 apples. It means that point B on IC_1 curve shows 5 more units of 10 oranges that point A lied on higher IC_2 curve and point A on lower IC_1 curve. Therefore, IC_2 curve shows higher satisfaction than IC_1 curve so, it is said that higher indifference curve shows higher satisfaction and lower indifference curve shows lower satisfaction.

5) Indifference curves are not parallel to each other :

Indifference curves are not parallel to each other. Because of different IC curves reveal different marginal rate substitution. Their Marginal rate of substitution is not similar. So IC curves are not parallel to each other, as shown in fig. 3.9.

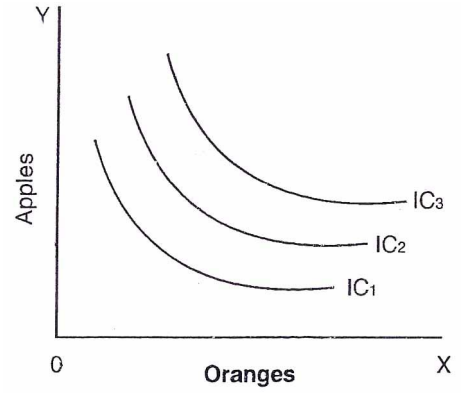


Fig. 3.9

6) Indifference curve can't touch either axis :

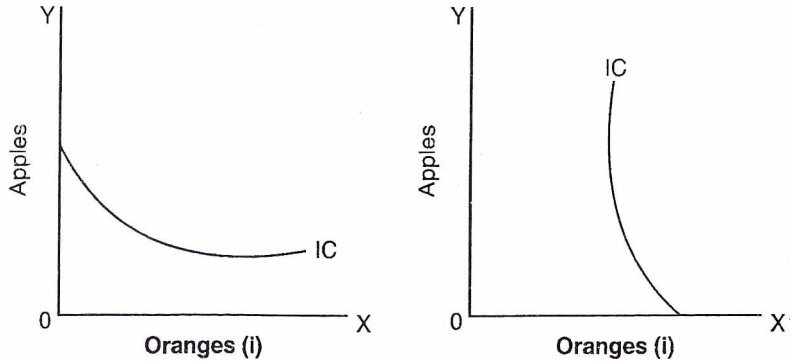


Fig. 3.10

Let us assume that IC curve touches to Y-axis as shown in figure (i). It means the consumer doesn't buy the apples and only buys the units of Oranges. This is absurd, situation, which can't follow the principle behind Indifference curve.

When IC curve touches to X-axis as in figure (ii). It means that consumer purchases the units of apples and doesn't purchase the units of Oranges. This is also absurd state which can't fulfill the conditions of indifference curve analysis. Hence IC curves can't touch either axis.

3.2.4 Budget line: (Budgetary constraint) :

Consumer possesses the limited income, he purchases various units of two goods with his limited income and maximizes his satisfaction. Consumer's limited income sets a limit to which he can maximise his satisfaction. His limited income acts as a budget constraint. This is referred as 'budget line'. This is also known as 'Price line', or 'total outlay Curve.'

Budget line shows that with his limited income, how many units of each commodity

are to be purchased by the consumer or which combinations of the two commodities, are to be purchased by him ? The consumer is able to purchase those combinations of the two goods which are lied on budget line. Thus, budget line shows consumer's maximum possible combinations of the two goods, which he is going to purchase.

The concept of budget line can be explained with the help of table below 3.3.

T - 3.3

Combination	Oranges		Apples
1	5	+	0
2	4	+	2
3	3	+	4
4	2	+	6
5	1	+	8
6	0	+	10

Suppose consumer's income is Rs. 10. He has to buy apples and Oranges. Prices prevailing in market are as 1 apple for Rs. 2. and 1 Orange for Rs. 1.

Following these prices and with this budgtary constraint consumer buys the six combinations as 5 +0, 4+2, 3+4, 2+6,1+8 and 0+10, apples and oranges. He can purchase all combinations lies between 5 apples,+ 0 oranges and 0 apples + 10 Oranges.

When this table is plotted on graph, it reveals budget line as below.

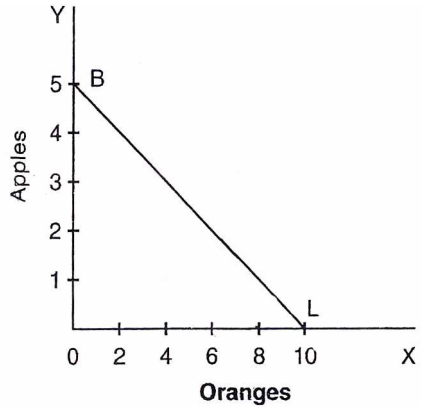


Fig. 3.11

'BL' is a budget line. The point B on that line shows the total number units of

apples are to be purchased by consumer with his income Rs. 10. The point L on budget line reveals the total number of units of oranges, consumer can purchase with his income Rs. 10. At the point B he purchases 0+5 units of oranges and apples respectively.

At. the point L, he purchases 10+0 units of oranges and apples respectively. If these two points B and L, are joined BL budget line will get. Which reveals that consumer can purchase all the combinations of oranges and apples lied on this budget line. Thus BL is a budget line. Consumer can't go beyond this line due to his budget constraint.

If consumer's income rises, budget line also shifts upwards from left to right. It shows that as consumer income rises, he buys more and more units of two goods, apples and Oranges, as shown in figure below 3.12.

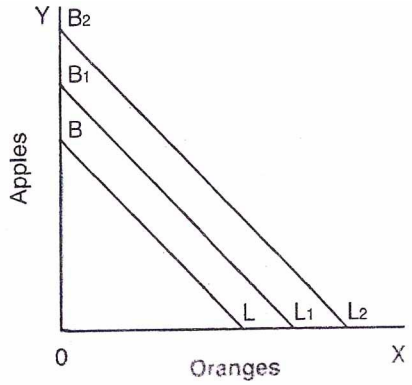


Fig. 3.12

Suppose income of consumer rises from Rs.10 to Rs. 20, 30, the budget line BL shifts upwards as BL_1, BL_2. It shows the rising quantities of both goods, apples and oranges, are to be purchased by the consumer as his income increases.

3.2.5 Consumer's Equilibrium :

Consumer's equilibrium means the state of achieving the maximum satisfaction. When consumer obtains the maximum satisfaction from his market behaviour is called the consumer's equilibrium. Consumer's equilibrium is shown with the help of indifference curve and budget line as follow :

Suppose consumer has an indifference curve map IC_1, IC_2 and IC_3 and BL is a budget line.

The BL budget line shows that how many units of Oranges and Apples that consumer can purchase with his money income. Indifference curve map reveals that upper indifference curve shows higher satisfaction and lower indifference curve shows lower satisfaction.

Consumer spends his income on different commodities so as to obtain maximum

satisfaction from his purchase of two commodities oranges and apples. Consumer's equilibrium is explained with the help of diagram shown above 3.13.

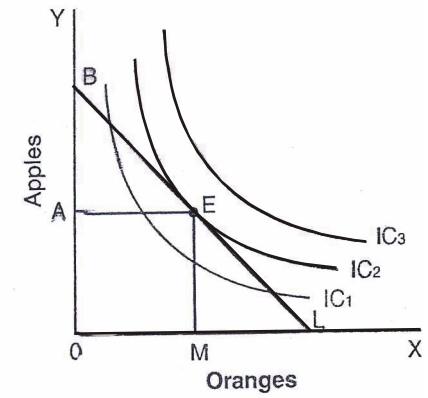


Fig. 3.13

In the Diagram BL is a price line or budget line. IC_1, IC_2 and IC_3 are three indifference curves IC_3 curve shows the highest satisfaction and IC_1 curve shows the lowest satisfaction. BL price line reveals various combinations of two goods that can be purchased by consumer with his income. All combinations on 'BL' price line, can be purchased by consumer with his income.

IC_1 is an indifference curve, which is lied below the price line BL. It shows the Lower satisfaction than other indifference curves. Consumer can purchase all combinations of two goods lied on IC_1 curve with his income. Still his some income remains in his hand. So consumer can buy more units of two goods than the combinations lied on IC_1 curve. In order to obtain more satisfaction he goes on higher indifference curve, instead of remaining On IC_1, curve. Thus, IC_1 is a curve which shows lower satisfaction than others. So consumer doesn't buy any combinations of two goods lied on IC_1 curve. IC_3 is another indifference curve which reveals highest satisfaction and lied above the price line BL This situation shows that consumer is unable to purchase combinations of two goods lied on IC_3, due to his budget constraint.

Now IC_2 is an indifference curve, where price line BL is the tangent to it at the point E. At the point E both price line and IC_2 indifference curve are tangent to each other. So consumer is in equilibrium at point E. Hence the point E is an equilibrium point. Where the slope of price line equals the slope of IC_2, curve. The point E lies both on price line BL and IC_2 curve. So, the consumer is able to buy the combination of two goods lied at point E, with his money income and obtains maximum satisfaction. Therefore, consumer is in equilibrium at the point E and gets maximum satisfaction at this point. Hence 'E' is the point of consumer's equilibrium.

The state of consumer's equilibrium mathematically shown as :

Consumers equilibrium = Slope of Indifference curve = Slope of Price line

$$= \frac{\Delta X}{\Delta Y} = \frac{MU_x}{MU_y} = MRS_{xy} = \frac{OM}{OA} = \frac{P_x}{P_y}$$

$$E = MRS_{xy} = \frac{P_x}{P_y}$$

3.3 Income Effect :

Income effect shows the effect of change in income oh consumer's equilibrium, by assuming the price of goods remains constant. Income effect is the effect on the quantity demanded only as a result of change in consumer's income. When income increases, consumption of goods also 'increases and vice versa. Therefore the satisfaction derived to consumers from higher consumption may also increase. This type of change is described as income effect. Income effect can be explained with the help of following diagram 3.14.

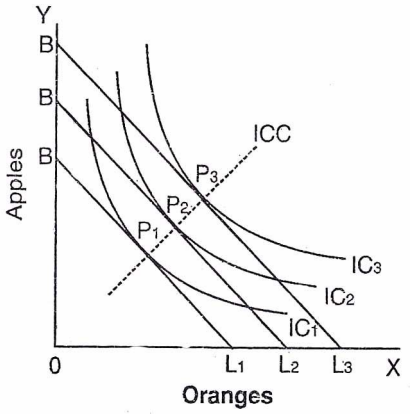


Fig. 3.14

BL_1 is the original price line which is tangent to IC_1 curve at point P_1 so, Consumer is in equilibrium at point P_1.

Suppose, now consumers income is increased, so the price line BL, shifts upwards and it becomes BL_1. This new BL_2 price lines is tangent to IC_2 curve at point P_2 Therefore, new equilibrium is achieved at point P_2. This new equilibrium shows the higher level of consumption of both goods, as well as higher level of satisfaction than previous equilibrium point P_1.

Again consumer's income is increased, it results in to the upward shift of price line from BL_2 to BL_3. This new price line is tangent to the indifference curve IC_3.

Therefore new point of equilibrium is P_3. It shows the higher level of consumption as well as satisfaction.

Thus P_1, P_2, P_3 are various point of equilibrium at different levels of income. If these points P_1, P_2, P_3 are joined together, we get the income consumption curve (ICC). The income consumption curve shows the rising consumption of both goods oranges and apples, as a result of rise in income of consumer, when prices remaining constant. So it called as income effect.

3.4 Substitution Effect

When consumer's income remains constant and relative prices of commodities can change, it leads to substitution effect. In other words substitution effect may be defined as, The change in consumer's equilibrium as a result of change in relative prices of goods, by remaining consumer's income constant."

Substitution effect is a part of the price effect, which is the result of change (Rise or Fall) in price of a commodity. Substitution effect is always mixed with income effect. When there is price change it causes substitution effect as well as income effect. In order to separate the substitution effect from income effect, Hicks-Alien may keep consumer's real income constant, and find out the change in amount demanded with change in relative prices of goods.

The Hicks-Alien method of tracing the Substitution effect is that they keep consumers real income constant after the change in price of a good. So,, consumer is neither better off nor worse off than before. When price of a good falls, it results into the increase in real income of a consumer. The substitution effect and income effect both may occur simultaneously. Therefore to separate the Substitution effect and income effect whatever real income of consumer is increased due to tali in relative price of a good, it is to be reduced to that extent, the consumer would be neither better off nor worse off than before or he could remain on the same indifference curve. Substitution effect is explained with the help of diagram as shown below 3.15.

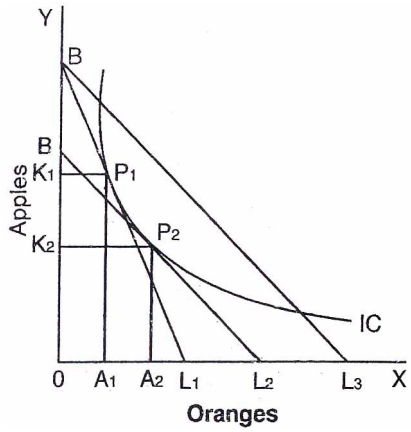


Fig. 3.15

BL_1 is the initial price Line. The consumer's is in equilibrium at point P_1. At this point P_1, he buys OA_1 units of Oranges and OK_1 units of apples. Suppose the price of Oranges falls, consumer's real income in terms of Oranges increases. So that he buys the more units of Oranges as a result price line BL, becomes BL_2. It shows that consumer now buys more units of oranges.

It results into Substitution effect as well as income effect. In order to find out the Substitution effect from income effect the price line BL_3 should be shifted parallel towards the left hand side until it touches the indifference curve IC at point P_2. The position of the price line now becomes BL_2. Now P_2 becomes new equilibrium point. It shows $OA_2 + OK_2$ units of Oranges and apples respectively. At the new equilibrium point consumer buys K_1K_2 less units of apples and A_1A_2 more units of Oranges. !t means that he substitutes more Oranges for apple. Thus, the shift in consumer's equilibrium from point P_1 to P_2 is called substitution effect.

3.5 Price-Effect :

Price effect shows the shift in consumers equilibrium due to change in the price of one of the goods, while the price of another good and consumer's income remains the same.

Suppose there are two goods apples and Oranges. With given market prices and consumer possesses fixed income, if price of oranges falls by remaining the price of apples constant as a result there is shift in consumer's equilibrium, it shows price effect. It is described with the help of figure as below 3.16.

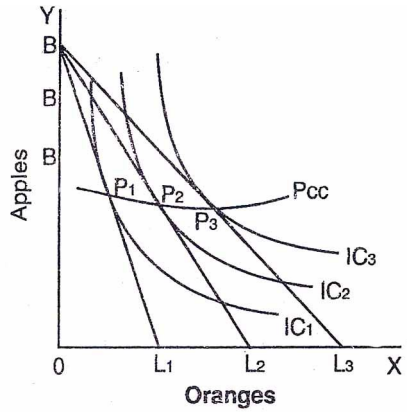


Fig.3.16

Suppose the price of apples remains constant and the price of oranges the price line BL_1 becomes BL_2 and BL_3 when price fails the new BL, price line is tangent to IC_2 indifference curve. The new point of equilibrium is P_2. At this equilibrium point P_2, consumer purchases more units of oranges. If the price of oranges falls further BL_2

price line becomes BL_3 It is tangent to the higher indifference curve IC_3 at point P_3. So consumer's new equilibrium point will be P_3. At this new equilibrium point P_3 consumer buys more units of organes than before. When all the points P_1, P_2, P_3 are joined together we have the price consumption curve of the consumer for oranges, it shows price effect.

The price effect has two components as 1) Income effect and 2) Substitution effect. As the price of oranges falls, consumers real income rises interms of oranges. So he buys more units of oranges, it causes income effect.

As the price of oranges falls, it becomes cheaper than apples so, consumer substitutes more units oranges for apples,. So he buyes more units of oranges and reduces the purchase of apples. It results into substitution effect. Thus, the price effect causes the income effect as well as substitution effect.

Hence,

Price effect = Income effect + Substitution effect.

3.6 Revealed Theory

This Theory is given by 'Prof. Samuelson'. It is behaviouristic ordinal utility analysis. Revealed preference theory is called the third root of the logical theory of demand. Samuelson given this theory in order to have a scientific expianation of consumer behaviour. Both Marshallian utility analysis and Hicks-Aliens' Indifference curve analysis have their own limitations. Viz, introspectiveness and subjectiveness as well as unrealistic and restrictrive assumptions. Therefore, Prof. Samuelson' built up the theory of demand from observed behaviour of consumer. This theory analyses consumer's preference for a combination of goods on the basis of observed consumer behviour in market in various price income situations.

Revealed preference theory is based on the presumption that "Choice reveals preference." Keeping this in mind consumer buys a combination of two goods because of he likes this combination as compared to others or it is cheaper than others. Either of one reasons, consumer buys this combination instead of other combinations. Suppose there are many combinations viz. A, B, C, D, E, F, etc. as shown in diagram. Suppose he prefers combination A rather than combination B, C, D, E or F. It means that he reveals his preference to combination A. There are two reasons for showing his preference to combination A. They are as, 1) Combination A may be cheaper than other combinations B, C, D, E and F. or 2) Combination A likes him more than other combinations even though it is dearer. Thus, It is said that A is revealed preferred to other combinations B, C, D, E and F. Or other combinations B, C, D, E, F are revealed inferior to A.

This theory is explained with the help of diagram 3.17.

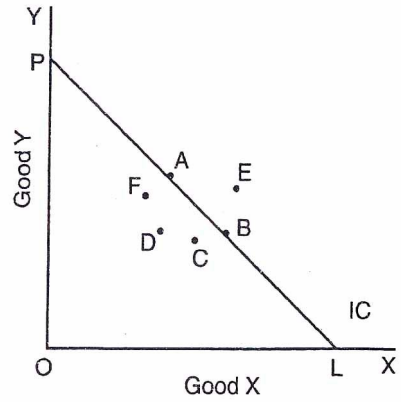


Fig. 3.17

PL is price line. Consumer's income and prices of two goods are given. Consumer can buy any combinations of X any Y lied in the area of triangle OPL, with the help of his pL price income line. 'It means that consumer can choose any combinations from A, B, C, D, F which are lied below or on the line pL. But he can't choose combination E, because it is lied above price-income line pL. So it is dearer and beyond the reach of consumer. When he chooses A to B combination. A is revealed preferred to B, because of he likes A more than B. Other combinations C, D, F lies below the price line pL So they are inferior to A. Thus the combinations A is revealed preferred to other combinations. B, C, D and F.

Assumptions :

This theory is based on following assumptions :

1) It assumes strong ordering : This hypothesis is based on strong ordering on the part of the consumer. It assumes that consumer is in a position to tell that which combinations he prefers to the other. So, there is no possibility of indifference between two combinations.
2) The consumer's tastes remain constant.
3) Consumer's choice reveals his preference to the combination.
4) Consumer chooses only one combination.
5) More goods combination is always preferred to less goods combination in any situation.
6) Consistency Assumption: This theory assumes that there is consistency in consumer behaviour. If A is preferred to B in one situation, B can't be preferred to A in any other situation.

7) Transitivity assumption : It refers three term consistency. When A is preferred to B and B to G, then A must be preferred to C.

8) Assumption of positive income-elasticity: This theory assumes positive income elasticity of demand. As consumer's income increases it causes to rise in demand for a commodity and vice versa.

Derivation of Demand Theorem :

The derivation of demand theorem from revealed preference theory is the study of samuelson's "Fundamental Theorem of Consumption Theory. Samuelson stated it as", any good (Simple or composite) that is known always to increase in demand when money income alone rises must definitely shrink in demand when its price alone rises." It means that when income elasticity of demand is positive, price elasticity of demand is negative, i.e. there is positive correlation between income arid demand for commodity and inverse relationship between price and demand for commodity, in regards to change in income demand curve slopes positively, and with regards to price change it slopes negatively.

In order to prove demand theorem, it is divided into two parts as

1) Demand theorem for price rise

2) Demand theorem for price fall

1) Demand theorem for price rise :

Suppose that consumer spends his total income on two commodities oranges and apples PL, is original price line as shown in figure 3.18.

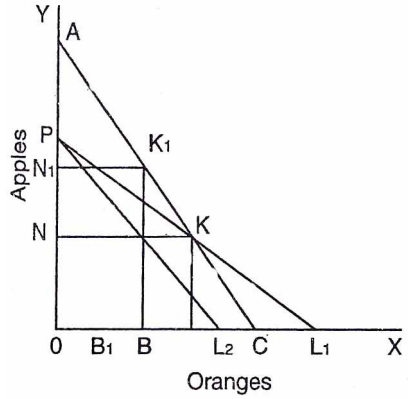


Fig. 3.18

Suppose that PL_1 is an Original price line. So, OPL_1, triangle is a consumer's choice triangle. It means that consumer can purchase any combinations lied in this triangle as well as lied on PL, price line. Suppose consumer has preferred combination

lied at point K. It means he revealed his preference to OB quantity of oranges and ON quantity of apples lied at Point K.

Now, the price of apples remains the same and price of oranges is risen. It causes the shift of price line PL_1 to PL_2. It shows the shrink in quantity of Oranges demanded. Therefore now consumer is not able to purchase the combination of two goods lied at point K.

In order to get consumer able to purchase the same combination at point K consumer's money income should be raised to that amount equal to his fall in real income due to rise in price of Oranges. So a parallel line AC is drawn to the PL, price line. Which passes through point K. AC price line shows a slew triangle of Choice OAC. Now consumer is able to choose all combinations lied in or on this triangle OAC.

The point K on original price PL is preferred by him to any other points on that price-line. So all points lying below K would not be preferred by him. (i.e. consistency assumption) Therefore, all the points lying below the point K should not be preferred to the point K lying on KL_1, line i.e. he rejects ail the points below point K.

Now consumer will choose combination either at point K or above the K, which are lied on the part KA of new price line AC. in this situation consumer will choose any combinations lied on KA line, which reveals less quantity of oranges and more of apples. It means that when price of oranges rises, consumer will choose the combination at point K or above the point K. Suppose he has chosen the combination lied at point K_1, it shows. ON, apples and OB, oranges, i.e. he buys BB, less quantity of oranges due to rise in it's price. Hence, It is clear from the above discussion that as price of Oranges due to rise in it's price. Hence, It is clear from the above discussion that as price of Oranges rises, it's demand falls. It shows the inverse relationship between price and demand of a commodity. So, demand curve is negatively slopped.

2) Demand theorem for price fall :

When price of a commodity falls it results into rise in demand. It shows inverse relationship between price and demand of a commodity. It can be explained with the help of diagram 3.19. PL_1 is original price line. Consumer reveals his preference to the combination of two goods lied at point K. At point K he prefers ON apples and OB oranges. Triangle OPL, is his choice triangle. It means that consumer buys any combinations lied in and above the line PL_1 of this triangle. Suppose that price of oranges is fallen, so that price line PL_1 becomes PL_2.

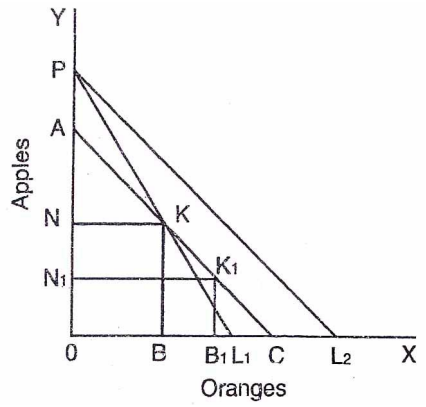


Fig. 3.19

It shows the consumer buys more quantity of oranges, how OPL_2, is new triangle of consumer's choice. It reveals that consumer can buy any, combination lied on PL_2 price line.

Suppose, if consumer has to buy previous combination of apples and oranges lied at point, K. Consumer's money income could be reduced to that amount equal to his rise in real income due to the fall in price of oranges. In order to do 5 so a parallel line AC is drawn to the PL_2 price line. Which passes through the point K. Price line AC shows a new triangle of choice OAC.

Now consumer can purchase all combinations lying in or on this triangle OAC. Since consumer has revealed his preference to point K on the original price line PL_1. So all points lying on KP segment will not be preferred by him. (i.e. consistency assumption). So, he rejects ali points on segment KP. Because they reveal less quantity of oranges as price is fallen. Therefore, consumer will either choose point K or any other combination below the point K on segment KC of the price line AC. Suppose consumer has choosen the combination at point K_1, it shows ON_1 apples and OB_1 oranges, i.e. he buys BB, more quantity of oranges due to fall in its price. Thus, it is clear that as price of oranges falls, demand for it rises. It shows the inverse relationship between price and demand of a commodity. Therefore demand e curve slopes downward from left to right. It proves that when income elasticity is positive, price elasticity is negative. .

Criticisms :

This theory is criticized on the following grounds.

1) This theory can't consider indifference in the consumer behaviour :

It is based on strong ordering. In actual practice, when consumer chooses a point on price line, there are some points in the vincinity of that point, which consumer can choose. These points are very close to the choosen point of combination. Consumer

is indifference in respect of these points. If this criticism is accepted the Samuelson's demand theorem breaks down immediately.

2) This theory is based on positive income elasticities,-doesn't distinguish between income and substitution effect :

This theory assumes positives income elasticity and negative price elasticity of demand. Income effect reveals that rise in demand due to the fali in price of a commodity. But price effect also comprises the income effect. It doesn't say how many demand is risen due to income effect and how many is due to substitution effect. It only says about the rise in total demand.

3) This theory doesn't explain the demand for Giffen goods :

Samuelson assumes the positive income elasticity of demand. It means that as income rises, demand for goods also rises and vice versa. But it doesn't say about the negative income elasticity of Giffen goods. Why demand for Giffen goods falls, as income rises.

This theory doesn't say any thing about the failure of reciprocal relationship between price and demand for Giffen goods.

4) It doesn't explains the market demand :

Samuelson's revealed preference theory gives explanation about the individual demand of a consumer, but say any thing about market demand.

5) This Theory is based on the principle that "Choice reveals preference.

This theory says that consumers choice reveals his preference. But when there are risks and uncertainties in commodity choice, consumer applies strategies like game theory. In this situation his behaviour is not normal and consistent. So, this theory doesn't give explanation of such types of behaviour. Therefore, the principle choice reveals preference doesn't found to be true. .

3.7 Theory of consumer's choice under risk

This theory is called the modern utility analysis. Which explains consumer's behaviour among risky and uncertain choices. This theory states that for making a choice among risky and uncertain alternatives cardinal measurement of utility is necessary. This theory is also known as Bernoullian utility theory. Daniel Bernolli was a Swiss mathematician, who was interested in the problem known as "St. Petersburg Paradox" He provided hypothesis to solve this problem. This problem refers to "why people are unwilling to make bets at better than 50-50 odds when their mathematical expectation of winning money in a particular kind of .gamble are greater the more money they bet.

Because of diminishing marginal utility of money income, a rational individual will never purchase a lottery ticket or participate in any other kind of gambling.

Also, Von Neumann and Morgenstern studied individual's behaviour under the situations of risk and uncertainty as in betting, or gambling. They stressed on that in risky and uncertain situation the outcomes of the alternatives choices are known only in probability form. They go beyond ordinal ranking of the various alternatives and constructed cardinal utility measure (i.e. N.M. Index) for ranking of various risky and uncertain alternatives.

3.7.1 The ST. Petersburg Paradox :

Daniel Bernoulli a Swiss mathematician was interested in the problem of ST. Petersburg Paradox and attempted to resolve it. This Paradox refers to the problem "Why people are unwilling to make bets at better than 50-50 odds when their mathematical exceptions of winning money in gamble are greater than more money they bet. The game in this Paradox is one that requires the tossing of a coin till it falls heads up, then a payment equal to 2A is made. Where A is the number of times tossing is done to get a head, in this game there is uncertainty, so the rational individual will not play the game.

In regards to such uncertain game, Bernoulli has provided the explanation about individual's rational behaviour. He says that a rational individual can take decisions under risky and uncertain conditions on the basis of expected utility rather than expected monetary value. !t means that in such a risky and uncertain situations, he considers the expected utility of money but not thinks about the expected value of money, .because expected utility of money to individual declines as his money income increases, if he wins in a game and having extra money income the marginal utility of money declines to him. Therefore, rational individual will not play the game or he will not make a bet. If he wins the game his money income increases, So, expected marginal utility to him decrease but if he loses the game, his money income decreases. So he gets more marginal utility of the same money, it means that he compares the gain and loss of marginal utility while playing risky game.. So, marginal utility of loss is more than the marginal utility of gain of the same amount as he lose or win the game. Therefore rational .individual doesn't play risky game.

3.7.2 Neumann - Moregenstem Statistical Theory

Neumann-Morgenstern has supported the Neo-classical's view of cardinal utility in recent years. The demand theory, given by them is applicable to the situation involving cardinally measurable risk. This theory is based on number of observations, so it is statistical theory.

On the basis of cardinal utility index rational decisions are taken by the individuals under risky situation. Neumann Morgenstern constructed utility index, called N-M utility

index. It shows the marginal utility of money which a person gets from additional money income. This index gives numbers to utility gained or lossed. The choice of an individual under risky and uncertain situations depends upon this N-M Index, i.e. expected numerical utility, and also on his change in money income.

This method is based on following assumptions.

1) Individual possesses a scale of preferences, which is comprehensive.
2) Individual can prefer on event to another or remain indifferent between two alternatives, he judges it with the help of probability calculations.
3) Individuals choices are consistent, i.e. when he prefers A to B and B to C. Then in any situation he prefers A to C.

Following steps are to be taken while formulating this theory.

Firstly, utility of money is measured by assigning numerical probabilities of uncertain events of getting additional money, e.g. Suppose an individual purchases a lottery ticket it's odds are 70:30, i.e. probability of winning is 0:7 and losing is 0:3 Such numerical values are assigned.

Secondly, then the expected utility from monetary gain is measured in numbers, by assigning the numbers to utility.

Thirdly, in order to evaluate the utility of a certain sum of money. Certainty equivalent is used. Certainty equivalent means the sure sum of money. Individual is indifferent between certainty equivalent and probable amoutn of money in an uncertain and risky situation. In this way N-M Index is prepared at different income levels.

Thus, Neumann Morgenstern method of measurement of utility is different from Neo-classical cardinalists. Neo classicals measure utility in the sense of psychic feelings of individual towards goods and commodities. But this method doesn't measure utility in the sense of individuals strength of feelings towards goods and commodities but measures the utility of money in regards to predict how an individual will make choices in risky and uncertain situations. Thus N-M index is cardinal, which is used for making predictions. Consumer is expected to evaluate his prospects with statistical probability, by judging over a large number of cases, to maximize stastically expected value of his utility.

3.7.3 Freldman Savage Hypothesis :

Bernoulli in his analysis explained that due to the diminishing marginal utility of money individuals can't make fair bets or don't participate in gambling. Then a problem is not answered that if the marginal utility of money is always diminishing. Then why gambling is found among people ? or why people prefer to make choices under risky and uncertain situations, as gambling or race ? The answer of this question is given by Milton Freidman and L.J. Savage by putting a hypothesis, which explains why the same

people buy insurance and also engaged in gambling. By purchasing insurance they try to avoid risk and engaged in gambling they take risk. Bernoullian hypothesis could not explain such contradictory behaviour of the people, but Freidman Savage through their hypothesis explained such behaviour by giving up the Bernoullian assumption that marginal utility of money income decreases up to a certain level of money income, it increases from that level to a certain higher level of money income and then beyond that it again decreases. With this hypothesis they explained both type of behaviour of purchasing insurance to avoid risk and participating in gambling and there by take risks.

This Hypothesis is illustrated with the help of diagram 3.20 as follow.

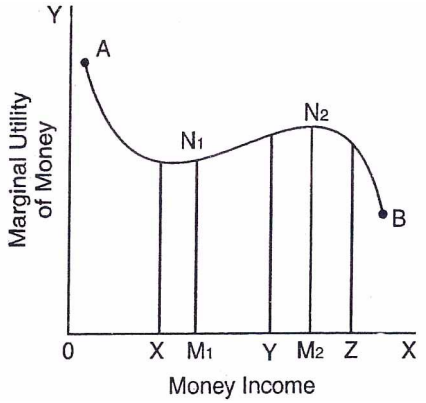


Fig. 3.20

AB is a marginal utility curve of money income. It has three segments.

AN_1 is a segment where marginal utility of money income decreases. N_1 N_2 is a segment where marginal utility of money income rises and N_2B is a segment. Where marginal utility of money again declines. These segments reveal lower, middle and higher levels of money income.

When individual has income OX. Which lies in the first segment of AB curve. Here, individual prefers to buy insurance and avoids risk. The payment of insurance is small as compared to loss of utility of money income, i.e. loss of marginal utility of money income is higher to the left of point X. So, individual is not willing to take risks in gambling or involve risky investments. In this segment gain in utility from income is smaller than loss of utility from risky investments. So he doesn't participate in gambling.

Suppose, individuals income is OY lies in the segment N_1N_2 of AB curve. Here marginal utility of money income is increasing. So, he is willing to participate in gambling and involves in risky investments. Here gain in utility from money income is greater than loss of utility from small payment for gambling.

Individual enjoys high income beyond the point M_2 of income level. Therefore marginal utility of money income is decreasing. So he is unwilling to take risks in gambling or investments.

According to Freidman - Savage marginal utility curve of money income shows the behaviour of people in various Socio-economic groups. Some persons show great preference and others reveal less preference to gambling and risky investments.

3.7.4 The Markowitz Hypothesis :

Prof. Markowitz criticized the hypothesis of Freidman - Savage on the ground that it considers very poor and very rich persons. They don't willing to take risk and therefore they can't participate in gambling, like risky games, or risky investments. Further it states that only persons in the middle income group participate and take risks. Prof. Markowitz says that marginal utility of money income not related with the absolute level of income but it depends upon the changes in the level of money income. On this. ground Markowitz, explained that why many people buy, insurance and participate in gambling. He says in this hypothesis that small increases in income from present level causes rise in marginal utility .of money income, but large increases in money income causes diminishing- marginal utility of money, on the contrary small decreases in income cause rise in -marginal utility of money, and large decreases in income causes fall in marginal utility of money.

When the income of people increases in small amounts the marginal utility of money increases and large change in income level results into decrease in marginal utility of money. In this situation people are making small bets but not willing to take large risks. On the other hand if income decreases in small amount it results into increase in marginal utility of money. On the contrary, as income increases in 'large amount it gives rise to diminishing marginal utility of money and small decrease in income level gives rise to increase in marginal utility of money, in such situation people are eager to take insurance of small losses also.

Thus, Markowitz attached the change in income level of people to their taking risks and making bets in regards to the investments. .

3.8 Demand Forecasting

In Managerial Economics information about the future demand, costs and capital budgetting is necessary to the business manager in decision making. They are determinant variables of decision making. Therefore demand forecasting is an important factor according to the business manager. A rough estimate of future demand helps to business firms in solving the problems of forecasting the demand for their products.

Demand forecasting means an estimate of future demand for the product of a business firm. Demand forecasting is defined by various economists as follow :

According to 'D. Gopa! Krishna', "forecasting means to know the .trend or behaviour after a period of time.

Another definition states that "demand forecasting refers to an estimate of future demand for the product", or "It is an objective assessment of the future course of demand.

These definitions means that demand forecasting is an estimate of future demand in order to find out the future trend of demand for product. With the help of these estimates firms can determine the volume of it's future production, cost of production as well as capital budgetting decisions. Thus, demand forecasting is usefu! to business manager in decision making,

3.8.1 Kinds of Demand forecasting :

There are two main kinds of demand forecasting. It is classified on the basis of time period and planning requirements of firms. They are classified as :

1) Short term demand forecasting 2) Long term demand forecasting

1) Short term demand forecasting :

This type of demand forecasting is a short period forecasting of demand, for the product of a business firm. They are generally made for the period of one year. It is related with sales, Inputs, price and finances of the business firm. Short term forecasting are essential for the formulation of suitable price policy, cost policy, sales policy, and financial policy of a business firm. If business manager expects a rise in input prices, he could buy it as early as possible. Also he can adopt a policy, which reduces the cost of production and helps to increase the sale of his product. Such policy also provides prior information about production and sales, which is necessary to raise the future capital. Thus, short term demand forecasting means the short period estimates of demand for a product of business firm.

2) Long-term Demand forecasting :

Every manager of business firm is interested in long term business forecasts of demand. These forecasts are made for the period of 5 years, 10 years, 20 years or more than that period. These forecasts are necessary for the expansion of the firm. Total demand for product of business firm can be estimated with the help of long term demand forecasts. Planning for a new plant and expansion of an existing plant depends upon long-term demand forecasting.

Long term demand forecasts are difficult to predic! the demand, costs/sales, prices and competition. Because of very long time period. Various changes take place in economic variables. So, the forecasts made in one time can't be proved true in another time in long run.

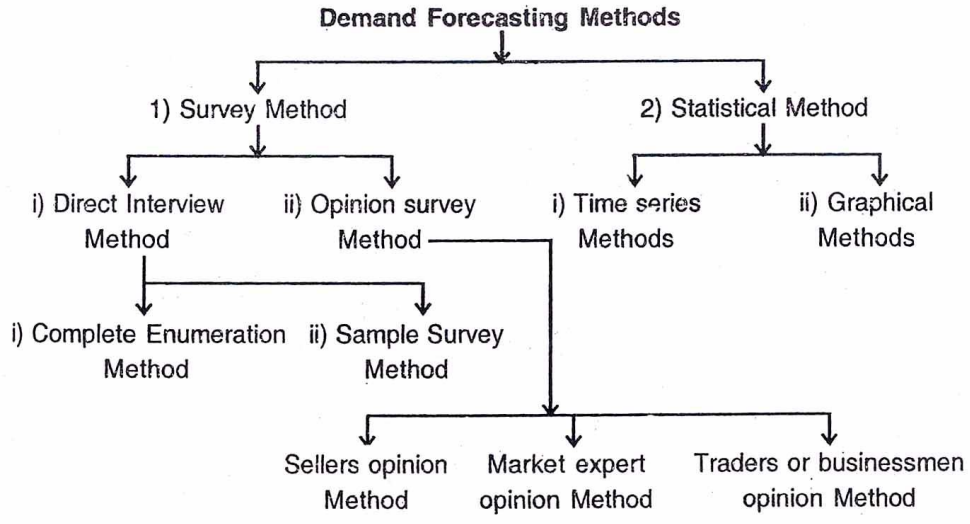
3.8.2 Features of Scientific demand forecasts :

Following things are essential to predict more scientific, ideal and more correct demand forecasts.

1) The object of demand forecasts should be clearly stated. It would clearly mention the purpose of demand forecasting.
2) In order to make correct demand forecasts, there should be suitable method's for demand forecasting. Appropriate methods are to be applied for the demand forecasting.
3) Information (Data) in respect of determinants of market demand is to be collected.
4) Collected data should be analysed with the help of various statistical methods to determine the interrelationship between various factors, affecting the market demand.
5) By analysis of the data, the inferences are drawn and demand forecasts are to be made.

3.8.3 Methods of Demand Forecasting :

There are two main methods of demand forecasting. They constitute various sub-methods as shown in following Chart.



1) Survey Method :

This method is used for the short term demand forecasting. In this method the desires and opinions of the consumers, market experts, sellers, businessmen etc. are collected. It is divided into three parts as i) Consumer's interview method if) Market experts, traders, businessmen opinion survey method and iii) Sellers survey method.

i) Consumer's interview method :

This method stresses on consumers interview. Contacts with. consumers are made questionnaire interviewed personally. Enumerator provides questonaire or asks oral questions to the consumers in respect of his product. He asks about their preferences, purchases, quality and future demand for product. Also consumers are to be asked about the proportion in which they may intend to buy. With the help of information collected from the consumer's. interview Enumerator can forecast the demand. This method is most ideal method of demand a forecasting. It gives first hand information about the demand for product.

This method has some limitations. They are as follows. This is very costly and difficulty method. Because of the consumer's are numerious and scattered in all over the economy, So this method is expensive and not useful in practice. All consumers are interviewed, in this method so it is known as "complete enumeration method,' Also it is known as comprehensive interview method. On the contrary when only few selected consumer's or representative are interviewed by this method it is known as "sample survey method." Sample survey is of two types, i) Random sampling ii) Stratified sampling. Sampling method is easy, less costly and very useful. On the otherhand complete enumeration method is not very; useful in practice, because of the consumers plentyness and scatterdness.

ii) Opinion survey method :

It is another method, of assessment of the short term demand for a product. Under this method the opinions of the sales representatives, professional experts, market experts and consultants etc. are collected. These-are the persons who have the market knowledge, from which information is collected firm asks it's sales representatives to assess the demand for the product in various areas, regions and cities. Sales representatives to assess the demand for the product in various areas, regions and cities. Sales' representatives meet to these persons, they are close to the customers so, they provide the approximate information in respect of future demand for the product. The estimates of demand provided by the salesman from the different regions, areas and cities are added together, the probable demand for a product is computed.

Sometimes, firm can gather information from the professional market consultants and experts. These persons are experienced and experts in respect of market conditions. Through their experience and knowledge they can predict the future demand for a product of a firm. By using this method firm gathers the information in regards to its product and makes future estimate of the product demand. This method is also known as opinion poll method.

This method is easy and simple to collect the information about the demand for firm's product. But it has some-limitations, as firstly, information provided by salesmen

and market experts is not fully reliable. It is reliable to that extent of their skill. Secondly, the opinions are subjective and biased, so they are not satisfactory, and reliable. Thirdly, these estimates having equal weightage to good and bad estimates over estimation and under estimation both opinions are equally treated.

2) Statistical Methods :

In order to predict the long-term demand forecasts, the statistical methods are used, this method statistical and mathematical techniques .are used for the long term estimation, of demand. These methods are relied on past data and future trends are traced out. Statistical methods are often used for making demand projections. They are: i) Trend projection method and ii) Regression method. Again two methods are used to project the trends, as follows.

1) Graphical Method

2) Time series method Or Trend Projection Method

1) Graphical Methods :

Under the Graphical method, annual data on sales of a product is collected. This data is plotted on graph. The predication about the demand forecasts are made, with the help of trends in graph. Following example explains the graphical method for demand forecasts.

e.g.

Years :	1990	1991	1992	1993	1994	1995	1996
Demand :	1000	1500	2000	2500	3000	3500	4000

What will be the volume of demand in the year 1997 ?

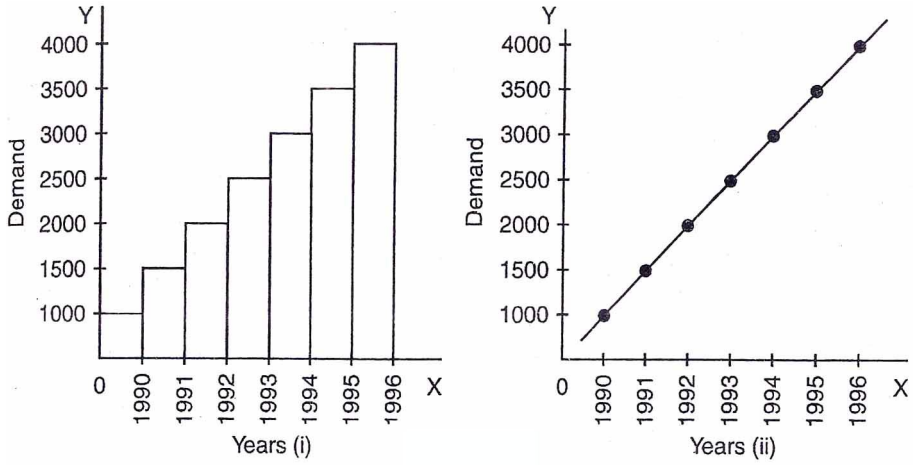


Fig. 2.21

Fig. (i) shows bar diagrams. When this method of bar diagrams is used in graphs the heights of each bar reveals the trend of future demand. In the figure (i) height of each bar looks increasing successively. Hence the demand for a product shows rising trend in study period, since 1990 to 1996. So it is judged as the demand will be rising during the future years also. These inferences are drawn with the help of figure (i).

The statistics of demand during the years 1990 to 1996 is plotted on a graph in figure (ii) Various points are drawn by plotting the demand to it's respective years. When we join these points, we will get a curve, which slopes upward from left to right. It shows the rising trend of demand during the years 1990 to 1996. Hence the inferences are made as the demand for firm's product will rise in future years. Such projection is made with the help of graphical method.

2) Time series Method :

In order to predict the trend of future demand time series analysis is used, in statistics. In this method past data is used to forecast the future demand. This method assumes that past data is useful to predict the future demand. Those factors determine the past trend of demand can determine the future trend in demand. Therefore, study of past data is useful in demand forecasting. Time series analysis comprises the four determinant factors, which are responsible for the changes in demand for a product these factors are as follows.

1) Secular trends
2) Seasonal components.
3) Cyclical changes
4) Irregular changes

First, kind of changes i.e. Secular trends are the regular changes in demand. They are regular rise or fall in demand for the product. This is general tendency to change. These changes are caused due to weather conditions like rain, winter and summer. These are the seasonal components affecting the demand for a product. Third type of changes are related with the cyclical components like economic prosperity and economic depression. When the changes in demand are associated with natural calamities like floods, famine, earth quakes etc. Which are unexpected calamities. Therefore, they are called unpredictable or irregular components. According to the time series analysis, above four types of changes are responsible for the changes in demand. Time series analysis states that changes in demand are caused due to the multiplication or addition of these four variables. So this analysis has developed the multiplication model as well as summation model in respect of these variables.

Multiplication model is stated as.

$$Y = T \times S \times C \times I$$

Summation model is states as

$$Y = T + S + C + 1$$

Where,

Y = Time series .

T = Secular changes

S = Seasonal changes

C = Cyclical changes . .

I = Irregular changes

In time series analysis there is no any good method to calculate the seasonal, cyclical and irregular changes. Only secular changes are measured with the help of statistical methods. These methods are as follows.

1) Method of Freehand curve.
2) Method of Moving averages.
3) Method of Semi averages.
4) Least square Method.

1) Method of Freehand curve :

Under this method, annual data on sales are collected, and analysed to determine the nature of existing trend. Then this data is protected to show the future trend, results are drawn and forecasts are made. The data is presented in tabular form.

The tabular data is used to plot a graph. The data related to a period of time, so fluctuations may occur as a general tendency.

In this method past data of different years is used for drawing a graph. The points are connected and time series curve is drawn. Then a free hand line is so drawn as the total distance between the freehand line and the time series curve remain minimum. This is illustrated with the help of table below.

T.3.4

Demand for Wheat

Years	Demand (Lacks Tonnes)
1971	50
1972	60
1973	55
1974	70
1975	65

The tabular data is plotted on graph by takine years on X-axis and demand for wheat on Y, axis, A free hand curve is drawn. AB time series curve is drawn to show the demand for wheat during the years, 1971 to 1975.

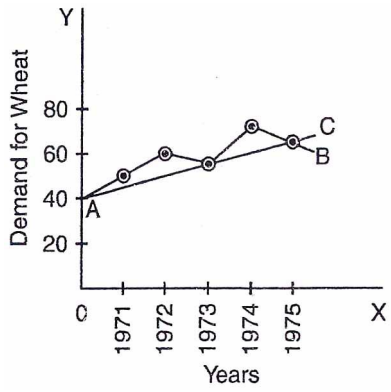


Fig. 3.22

Through these various scattered points a trend line AC is drawn so that it keeps the total distance between the freehand line AC and the various points on AB curve minimum. The trend line AC shows the upward trend, so freehand that past trend of demand for wheat is increasing. Hence the future trend of demand for wheat will be rising. In this way the time series analysis forecasts the future demand for firm's product.

2) Least Square method :

In order fit the trend line in to a equation least square method is used. With the help of this method we can find out the nature and magnitude of the trend. The trend line is fitted by developing an equation of line. The method used to construct the line of best fit is least square method. While constructing the line of the best fit trend assumed is to be liner. Sometimes this trend may be curvilinear or parabolic also.

In simple linear equation, the relationship between dependent and independent variables i.e. X and Y is represented in the form of straight line. The equation of this line is as,

$$Y = a + bx$$

where, Y = dependent variable

a = intercept

b = Demand forecast or impact of the independent variable.

In this equation a and b are constants or parameters.

b shows the change in annual demand. The a and b coefficients are. calculated by solving the following equations.

$$\sum y = na + b\sum x \quad \text{..... (1)}$$

$$\sum xy = a\sum x + b\sum x^2 \quad \text{..... (2)}$$

In this equations Y is independent variable, it is sales to be forecast. Sales is assumed to vary with time i.e. year by year. So year (time period) is independent variable x, a is intercept and b is slope of the line are to be calculated with the help of above equations (1)1 and (2).

The values of variables and parameters included in equations (1) and (2) are calculated with the help of table below. Which shows time series data on sales.

T - 3.4

Years	Sale of TV (000)
1992	25
1993	30
1994	40
1995	35
1996	50

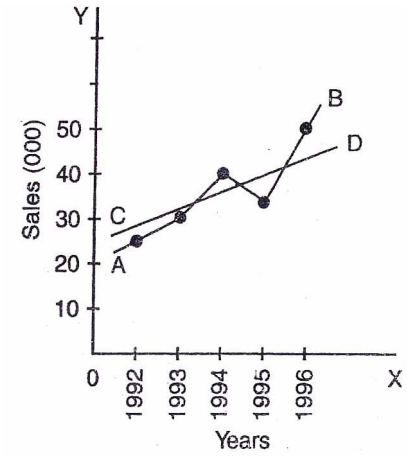


Fig. 3.23

By plotting this data on a graph various points of sales related to each year are drawn. By joining these points AB line (or curve) is drawn. Which is Zick-Zack shaped. Another line CD is drawn through these scattered points on AB curve. The distance between the line CD and various points on the line AB is minimum. The trend line shows the upward trend. This trend line is fitted in equation to find out nature and magnitude of this trend as follows. The trend line is linear. So the equation of this line

is Y = a + bx. In this equation x = years (i.e. independent variable) y = sales (i.e. dependent variable).

a = intercept and b is rise in annual sales, i.e. both are parameters. Their values are to be calculated with the help of following equations.

$\sum y = na + b\sum x$ ..... (1)

$\sum xy = a\sum x + b\sum x^2$ ..... (2)

In order to solve these equations (1) & (2) the above table is represented as follow.

T - 3.6

Years	Sales Y	X	X^2	Xy
2005	25	1	1	25
2006	30	2	4	60
2007	40	3	9	120
2008	35	4	16	140
2009	50	5	25	250
n = 5	$\sum y$ =180	$\sum x$ =15	$\sum x^2$ = 55	$\sum xy$ = 595

$\sum y$	=	na	+	$b\sum x$	..... (1)
$\sum xy$	=	$a\sum x$	+	$b\sum x^2$	..... (2)
180	=	15a	+	15b	..... (3)
595	=	15a	+	55b	..... (4)

In order solve them, the Equation (1) multiplied it by 3, we get,

= 3 x 180 = 5a+ 15b ..... (5)

= 595 = 15a + 55b ..... (6)

Substract eq. (6) from eq. (5)

= 540 = 15a + 45b

= 595 = 15a + 55b

– 55 = – 10b

= 10b = 55

∴ b = **5.5**

Keep b = 5.5 in equation (3)

	180	= 5a	+	15 x 5.5
=	180	= 5a	+	82.5
=	180	– 82.5	=	5a
		97.50	=	5a
		5a	=	97.50
		a	=	97.50 / 5
		a	=	**19.50**

The equation of the line of the best fit is represented as

y = 19.50 + 5.5 x

The year 2010 is the 6th year in above data. So, keep X = 6 and solve the equation,

Y = 19.50 + 5.5 x

Y = 19.50 +5.5 x 6

Y = 19.50 + 33

T = 52.50

Thus with the help of past years data forecast about the sales fot the year 2010 will be made as 52.50 thousands of TV. Sets.

3.8.4 Regression and Correlation Method :

Regression and correlation methods are used in demand forecasting. These methods combines economic theory and statistical techniques together to forecasts the demand. The determinants of demand for a product are specified with the help of economic theory. The relationship between these determinants and demand for a product is specified by the economic theory. Thus general form of demand function is determined by the economic theory. The statistical theories are used to estimate the values of constants i.e. parameters. In these methods past data is used to reveal the future trend. When there is one or more variables, and the functional relationship between these variables is analysed, it is called imple correlation. When the relationship is analysed between demand and many variables, it is called multiple correlation. In correlation analysis we analyse, the nature of relationship between variables while in regression the extent of relation between variables is analysed. The results are drawn in mathematical form.

In regression analysis, of demand forecasting, demand function for a product is estimated. There are two types of variables, dependent and independent variables.

Quantity of demand to forecast is dependent variable and the factors affecting the demand or determine the demand are the independent variables.

e.g. Demand for TV sets depends upon the income and population residing in a city. Here demand for TV sets is dependent variable and income and population are the independent variables affecting the demand for TV sets. .

Demand function is single variable or multi-variable demand function. When a demand for commodity is affected by one variable only, It is called single variable demand function, e.g suppose demand for rice is only determined by the city population. It is single variable Function i.e. D = f (p). When demand for rice is dependent on number of variables like price, population, income, prices of its substitutes etc. it is multi-variable function i.e.

D = f (P, I, Pr, Sp.....n) :

D = Demand

f = Function

P = Population

I = Income

Pr = Price

Sp = Prices of Substitutes

n = Number of variables.

For single variable function, simple regression equation is used for demand forecasting.

3.8.4 (A) Simple regression :

In simple regression analysis a single independent variable is used to estimate the value of the dependent variable i.e. whose value is to forecasts. This technique is similar to the fitting of trend line. the difference between the trend and regression technique is only that in trend fitting time is independent variable. Where as in regression equation independent variable is most significant determinant of the demand.

In order to explain this method consider the following tabular data.

T - 3.7

Year	Population (crs)	Sale of TV sets (000)
2001	5	25
2002	7	30
2003	10	40
2004	8	35
2005	15	50

Suppose that we have to forecasts the demand for TV sets for the year 2006, with the a help of this tabular past data. It is forecasted by estimating a regression equation of the form.

$Y = a + bx$

Where,

Y = Sale of TV sets

X = Population

a and b = Constants or Parameters

The values of a and b constants are calculated with the help of folloiwng equations.

$$\sum y = na + b\sum x \quad \text{.....(1)}$$

$$\sum xy = \sum xa + b\sum x^2 \quad \text{..... (2)}$$

In order to calculate the values of a and b above table is presented in the form as follows :

T-3.8

Year	Population (X)	Sale of TV sets (Y)	X^2	XY
2001	5	25	25	125
2002	7	30	49	210
2003	10	40	100	400
2004	8	35	64	280
2005	15	50	225	750
$\sum n = 5$	$\sum x = 55$	$\sum y = 180$	$\sum x^2 = 463$	$\sum xy = 1765$

Put these values in equations (1) and (2).

$\sum y = na + b\sum x$ ..... (1)

$\sum xy = \sum xa + b\sum x^2$ ..... (2)

180 = 5.a + b.55 ..... (1)

1765 = 55.a + b.463 ..... (2)

Multiply eq. (1) by 11 and subtract if from eq. (2) and solve the equations.

180 = 5.a + 55.b (1) x 11

1765 = 55a + 463.b (2)

1980 = 55.a + 605.b (1)

1765 = 55.a + 463.b (2)

0215 = 142.b

: 142 b = 215

= b = 215/142

b = 1.514

Keep this value

b = 1.5 in equation (1)

180 = 5.a + 55 x b

180 = 5.a + 55 x 1.5

180 = 5a + 82.5

180 - 82.5 = 5a

97.5 = 5a

5a = 97.5

a = 97.5/5

a = 19.5

Put these values a = 19.5, and b = 1.5 in equation.

Y = 1 + bx

Y = 19.5 + 1.5x

Suppose population increase for the year 2006 will be 20 crores. Therefore X = 20 for the year 2006. Hence the demand for TV sets for the year 1997 may be computed as'

Y = 19.5 +1.5x20

Y = 19.5 +30

Y = 49.5 Thousands of TV sets.

3.8.4 (B) Muiti-variate Regression :

When a demand function is dependent upon number of variables, it is called the multi-variate regression, or when number of variables is greater than one.

While calculating the multi-variate regression analysis first step is to specification of variables, which are responsible for the change in demand.

These variables are generally choosen from the determinants of demand. They are price, income, consumer's tastes and preferences, prices of substitutes etc. while estimating the demand for durable goods like, house, car, TV, refrigerators etc. various variables like availability of/credit, interest rate, are to be considered.

When the goods are capital goods, like machinery and equipments variables like corporate investment, depreciation rate, cost of capita! goods, input costs, rate of interest, etc variables are considered. These variables are the independent variables.

Once the independent variables are traced out, the second step is the collection of data for time series in regards to the independent variables.

Third step is to specify the form of equation, which describes the relationship between dependent and independent variables.

The last step is the estimation of the parameters in the specified equation, with the help of statistical methods.

Specifying the form of Equation :

Demand forecasts are dependent on the form of equation and the consistency of the dependent variables n the demand function for their reliability. The greater the degree of consistency, higher will be the reliability of the demand forecasts and vice versa. So, equation is carefully specified. Following are the some kinds of demand functions, illustrated as :

Linear Function :

This is most common form of equation used for demand forecasting. In this equation the relationship between demand and its determinant variables is linear, i.e. straight line, It is stated as

$$Y = a + bx + Cy + dPs + eA \quad \ldots (1)$$

where,

Y = quantity demanded

x = Price of commodity

y = Consumer's Income

Ps = Price of Substitute

A = Advertisement Expenditure

a is constant and b, c, d, e and J are the parameters. They express the relationships between demand and the variables X, Y, Ps and A respectively.

In this linear demand function, quantity demanded is assumed to change at a constant rate with change in independent variables X, Y, Ps and A. The value of parameters is estimated by using least square method. After the estimation of the values of parameters, the forecasts of demand can easily be made on the available data. For independent variables. ... . .

Suppose, the estimated equation for the TV sets takes the following form as :

Q =a + bP + CY + dPs + eA

Let us assume that

b = 0.5, c= 0.75, d=1, and

e =s 1.5.

Changes in independent variables are as

P = 1%, Y=2%, Ps=3% and A=4%. . ... .

Q = 0.5 x 1 + 0.75 x 2 + 1 x 3 + 1.5 x 4

= 0.5 + 1.5 + 3 + 6.0

= 11%

Thus aggregate change in demand is 11%.

Power Function :

In linear equation the marginal effect of independent variables on demand is assumed to be constant, and independent of change in each variable, e.g. !S assumes that the marginal effect of change in price is independent of change in income, or other independent variables and so on.

But changes in variables are nor independent, neither constant. They are acting and reacting on each other. So they are interrelated with each other. Therefore, in order to consider these changes multiplicative form of equation for the demand function is considered to forecast the demand. It is expressed in the form of power functions as:

$Q = aP^b Y^c P^d A^J$

This algerbraic form of multiplicative equation can be transformed into logarithmic form and which is linear as :

Log Q = log a + b log P + C log Y + d log Ps + J log A.

This log linear demand function is estimated by the least square method. The estimated function yields the intercept a and the values of coefficients b, c, d, and J. After estimation of these coefficients, the data for independent variables is obtained to demand forecasts.

3.9 Importance of demand forecasting :

Forecasting of demand is very necessary process in managerial decision making. These forecasts are important to the enterpreneurs, producers, firms and industries. It is important in regards to the following points.

1) To under stand future quantitative demand :

By analysing the past data we can find out the future demand in quantity. So it is essential for future planning to the firms and industries.

2) To predict supply of commodities :

Demand forecasting shows the approximate future demand for a commodity in physical quantity. With the help of this future demand producer can decide future supply and production of his product.

3) To Predict the price of commodity :

Demand forecasting helps to firm or producer to understand the future price of his product. With the rise and fall in future demand, he can forecast in respect of future price.

4) Useful for capital budgetting :

Demand forecasting is also useful in capital budgetting. With the help of demand forecasts, producer gets the idea in respect of future demand for his product. If future demand remains high he forecasts that more capital is required to fulfill it. So tie tries to search the different sources of capital accumulation.

5) Useful in resource Planning :

Demand forecasting is useful to producer or firm in resource planning, i.e. in capitals budgetting as well as in personnel planning.

6) Firm can determine the sales targets :

Demand forecasting also helps in determining the sales targets to the firm; Demands forecasts provides rough estimates of future demand. By using, it firm can determine the target of future sales for it's product.

7) Useful in inventory management :

It Is useful to producer in inventory management. With the help of demand forecasts firm can decide the stock of raw material to fulfill the future demand, larger the future demand larger will be the demand for stock of raw material and vice versa.

8) Useful to industrial expansion :

Demand forecasting helps to the firm and industry to take the decision in regards to the expansion or contraction of their business. Higher future demand for firm's product leads to the expansion of it's business and vice versa.

3.10 Summary

Demand analysis shows that how the demand for a product is affected by the charge in price of a commodity. Marshallian utility analysis is a first version of demand analysis but it having various defects. These defects are described by Hicks and Allen and given second improved version of demand analysis, called as Indifference curve. It is based on ordinal measurement of utility. Indifference curve is a locus of points which show equal satisfaction. Consumer has limited income, he purchases the combination of two goods which gives him highest satisfaction. While making combination of two goods when the units of one goods is purchased more at the same time he purchases less goods of another commodity. Therefore, Indifference curve falls from left to right below. A group of Indifference curve is called indifference curve map.

There are various properties of Indifference curve. It also shows Income effect, substitution effect and price effect.

Prof. Samuelson has given the third root of demand analysis called Revealed preference theory. By avoiding the defects in Indifference curve Prof. Samuelson has given this superior version of demand theorem. With the help of this theory Prof. Samuelson shown the inverse relationship between price and demand of a commodity.

The consumer's choice under risk explains the behaviour of consumer under the conditions of risk and uncertainty. How consumer's behaviour takes place under risky situation is explained by various economists as St. Petersburg Paradox, Neumann-Moregenstern statistical theory, Freidman-Savage hypothesis and the Markowitz Hypothesis.

Demand forecasting means prediction of future demand. It is the most important function of business manager. It is of two types, short run and long run demand forecasting. There are main two methods of estimation of future demand as (1) survey method and (2) statistical methods. Under these two methods there are again many sub-methods of demand forecasting.

Demand forecasting is useful to business manager in various ways, viz. to take decision regarding production, to predict supply of goods, to predit price. In capital budgeting, in resource planning, to determine sales target for industrial management.

3.11 Questions For Self Study

A) Fill in the blanks.

1. Indifference curve analysis is given by .....
2. Consumer's income is .....
3. Indifference curve is of ..... nature.
4. Indifference is ..... to origin.
5. Budget line is also called ..... line.

Ans. : 1) R.G.D. Allen and J.R. Hicks
2) Limited
3) Falling
4) Convex
5) Price

B) State True and False.

1. Two indifference curves can intersect to each other.
2. Where the indifference curve is tangent to price line, at that point consumer's equilibrium is achieved.
3. Revealed preference theory is given by Prof. Samuelson.
4. Substitution effect is given by Hicks and Slutsky.
5. Demand forecasting means estimation of past demand.

Ans. : 1) False 2) True 3) True 4) True 5) False

3.12 (A) Questions for Practice

1. What is indifference curve and state it's properties.
2. Explain the consumer's equilibrium with the help of Indifference curve.
3. State Income effect, substitution effect and price effect.
4. Explain the Revealed preference theory.
5. Elucidate the theory of consumer's choice under risks.
6. What is demand forecasting ? State it's methods of estimation in brief.
7. State Least-square method of demand forecasting.
8. Explain the survey methods of demand forecasting.

(B) Short Notes

1. Diminishing marginal rate of substitution.
2. BUdget line
3. Indifference curve map
4. Income effect, substitution effect and price effect
5. St. Petersburg Paradox
6. Neumann-Morgestern Statistical theory
7. Freidman-Savage Hypothesis
8. The Markowitz Hypothesis

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Unit 4

PRODUCTION THEORY

4.0 Objectives

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

- The concept of production function.
- Analysis of short-run and long-run production function.
- Cobb-Douglas production Function
- Emperical evidences of cost curves
- The concept of break-even point analysis.

4.1 Introduction

Production and consumption are the two important concepts used in managerial economics. A country;s overall progress depends on these two terms. Production is the process which leads to the various forces of an economy i.e. demand, supply, profit, loss, economic growth etc. We have seen the consumer's attitude towards the demand for a commodity in the previous Unit No. 3. We have also considered the methods of demand forecasting in it. Here, we have to consider the production theory in this particular unit. We will also get the information about production function concept, economies of scale, different cost concepts and break-even point analysis in this particular Unit No. 4.

4.2 Analysis of the Unit

Production function is an important part of managerial economics. The term production function denotes the functional relationship between the inputs used for the production process and the output. Every producer in modern times, always considers production cost, demand and other many factor while taking decisions regarding production. The detail information in respect of production function and other related terms is as under.

4.2.1 Production Function

Production function reveals the relationship between input and output under the given technology. The concept of production function is summarised an explanation of technological possibilities.

Westbrook and Tybout has given the definition of production function in 1993 as under - "the relationship between input and output flows in manufacturing is determined by the technology employed and the economic behaviour of the producer". We can explain the concept of production with the help of following mathematical formula -

X = f (LKRSVY)

Here,

X = Output

f = Functional relationship

L = Labour

K = Capital

R = Raw material

S = Land

V = Returns to scale

Y = Efficiency parameters.

Thus, according to A. Koutsoyiannis, a production function is purely technical relationship between input factors and the output.

Nature of Production Function :

A production function is a flow concept. It relates to the flow of inputs and resulting flows of output of a commodity during a period of time. Thus the time element is an important attribute of a concept production function. We can classify this concept by the two types based on time element.

The Short-run Production Function :

The short-run production function depects the relationship of input factors to the output within a short-run period. In the short-run period of time, fixed factors of input can not be changed. This types of production function includes fixed and variable components of inputs. When we change one input factor in the production function, the output results are of three types i.e. increasing returns, decreasing returns and lastly negatively reurns.

According to Paul Samuelson, “an increase in some inputs in a given state of technology, the cause output will be increase for some time and then it decreases.”

We can explain this short production function with the help of following example.

Suppose land is a fixed factor and labour is a variable factor. We can not increase the supply of land. When we change (increase) the quantity (number) of variable input (labour) in a production process, at the initial stage the production increases, then it decreases and at last it becomes negatively. We can explain short run production function with the help of production schedule shown in the Table No. 4.1.

Table No. 4.1

Short-run Production Function

(Production in Quintal)

Fixed Factor (Land)	Variable Factor (Labour)	Total Production	Average Production	Marginal Production	Stage
5 Acare	1	5	5	5	(I) Increasing
5 Acare	2	12	6	7	Returns
5 Acare	3	21	7	9	
5 Acare	4	28	7	7	(II)Decreasing
5 Acare	5	30	6	2	Returns
5 Acare	6	30	5	0	
5 Acare	7	28	4	– 2	(III) Negative
5 Acare	8	24	3	– 4	Returns

Table No. 4.1 reveals the relationship between the change input factor (Labour) and the output. The table also shows us the change in a variable factor of labour to the changes in total, average and marginal production. The detail explanation of this table can be given with the help of following 3 stages.

Stage First : Increasing Returns

In the first stage is called the stage of increasing returns. The Table No. 4.1 shows us that the total, average and marginal production increases upto the appointment of 3rd labour. This is happens due to the proper utilisation of fixed factor i.e. land in the production process.

Stage Second : Decreasing Returns

In the 2nd stage of short-run function is of the decreasing returns stage. In this stage, the total production increases upto 30 quintal and then becomes constant, average production decreases from 7 to 5 quintal and marginal production decreases from 7 to 0 quintals. This is happening due to the scarcity of fixed factor (land) as compared to the variable factor i.e. labour.

Stage Third : Negative Returns

In short-run production function, the third stage is of negative return stage. In this particular stage, as per increase in variable factor i.e. labour, the total and average production decreases from 28 to 24 and 4 to 3 quintal respectively. But one most important thing happens in this stage i.e. the negative returns of marginal production from – 2 to – 4 quintal. In this stage, fixed factor becomes inadequate in relation to variable factors i.e. labour. So that excess quantity of variable factor, the sign of negative returns have been seen in the production process.

Thus, short-run production function reveals the relationship between inputs and output in short-run period. It also gives us practical significance of agricultural sector situation.

Now we shall clear this short-run production function with the help of figure no. 4.1.

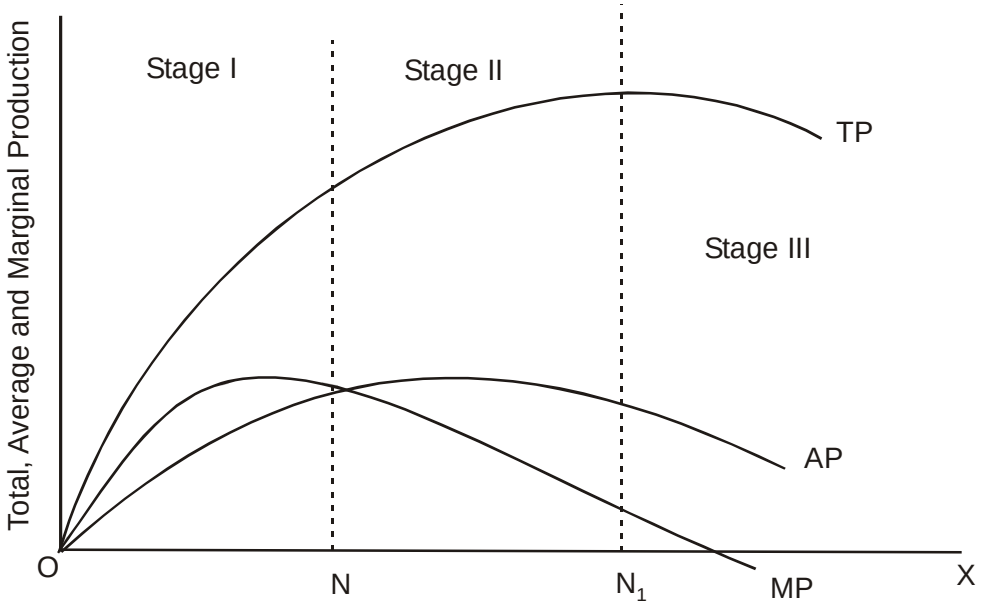


Fig. 4.1 : Short-run Production Function

Figure No. 1.4 shows us the 3 usual stages in the operation of short-run production function. Ist stage is upto the units of labour ON, second stage is from On to ON_1 and the 3rd stage is beyond ON_1. TP, AP and MP denotes the total, average and marginal production respectively.

Assumptions of Short-run Production Function

The short-run production function is based on the following assumptions.

a) The stage of technology is constant.

b) The input factor labour is variable and other factors are fixed.

c) The combination of fixed and variable factors is fixed within the short-run period.

d) The prices of variable factors are fixed within the period.

In this way, short-run production function implies the restricted set of choice which can be varied only by changing the variable factors in the production process.

4.2.3 Long-run Production Function

In the long-run period, all factors of production becomes variable. So that the relationship between input factors and production level will be differ from the short run period. Thus the long-run production function denotes the changing nature of inputs and out-put in the production process. When we increase the size of inputs, the level of production will of three main stages. i.e. increasing returns, constant returns and decreasing returns.

Explanation of Long-run Production Function :

We can explain the long-run production and the stages of it with a numerical example given below. Suppose land and labour are the two variable factors used in the production process by the organisor. When these two input factors used in the production by 1:2 ratio, the changes in the total and marginal production should be as under, shown in the Table No. 4.2

Table No. 4.2

Long-Run Production Function

Land (Acre)	Labour	Total Production (Quintals)	Marginal Production (Quintals)	Stage of Function
2	1	5	5	Increasing
4	2	11	6	Returns
6	3	18	7	
8	4	26	8	Constant
10	5	34	8	Returns
12	6	41	7	Decreasing
14	7	47	6	Returns
16	8	52	5	

Analysis of the table : The three stages shown in the Table No. 4.2 can be explained as follows.

A) Increasing Returns Stage :

In the first phase of long-run production function, we experience that as per increase in the inputs of labour and land in the 1 : 2 ratio, the total and marginal production increases by 5 quintal to 18 quintals and 5 quintals to 7 quintals respectively. This increasing trend of marginal and total production is caused by the proper use of inputs and due to the economies of scale.

B) Constant Returns Stage :

The second stage of long-run production function is of constants return stage. In this stage, when the input factors of labour and land will be increased propotionately, the marginal production becomes constant i.e. 8 quintals. The basic cause of constant returns is the ideal combination of inputs and output as well as optimum economies of scale in the production process.

C) Decreasing Return Stage :

In the third stage of long-run production function is of decreasing returns stage. In this particular stage, when inputs increases in the ratio 1 : 2, total production increases slowly from 41 quintals to 52 quintals but marginal production decreases from 7 quintals to 5 quintals. This is happens due to the diseconomies of scale in the production process. We can realise the long-run production function with help of Figure No. 4.2 given below.

Figure No. 4.2 : "Long Run Production Function'

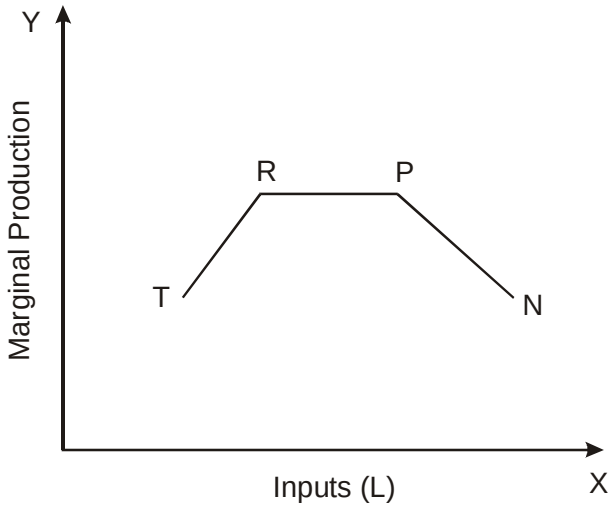


Figure No. 4.2 shows use the trends in total and marginal production as per change

in the input factors of land and labour propotionately. The curve TN clears the trends in marginal production. Here we find the increasing trend upto R point. R to P point denotes the constant returns situation and P to N stage is the third stage which is known as decreasing returns stage. In this way, long-run production function shows the relationship between inputs and output.

Thus, short-run and long-run production function is related with the relationship between input and output. This concept is always useful for industrialists and enterpreneurs while taking decisions in respect of factors of production for the production process.

4.2.4.0 Introduction :

Production is a tranformation process where physical inputs are converted in physical output. In other words inputs are changed in output in the production process. For ex : Sugarcane is input for the sugar factory and this Sugarance is converted into sugar. Thus Sugarcane is input and sugar is output. But this production takes place with the help of factors of production. The specific combination of these factors of production is required for the specific output. The output depends upon input. The functional relationship between physical input and physical output is production function.

In the last subunit of this chapter you have understand short-run production function and long run production function. In this subunit we are to discuss Cobb-Douglas Production Function, and are to understand. Assumption diagramic representation and extension of Cobb-Douglas Production Function.

4.2.4.1 Cobb-Douglas emperial Study :

This production function was proposed by knut wicksell (1851-1926). It was tested against empirical statistical evidence of American manufacturing industry by charles Cobb and Paul Douglas in between 1899-1922. It is a linear homogeneous production function of first degree. The two inputs labour and Capital were taken into account. It was found 75% increase in manufacturing production was beacuse of labour input and remaining 25% was due to capital input.

4.2.4.2 Formula :

The mathematical fermula of Cobb-Douglas is given below,

$$P(L, K) = bL^{\alpha} K^{\beta}$$

where : ʙ P = total productin (the monetary value of all goods produced in a year)

ʙ L = labor input (the total number of person-hours worked in a year)

ʙ K = capital input (the monetary worth of all machinery, equipment and buildings)

- b = total factor productivity

- a and b are the output elasticities of labour and capital, respectively. These values are constants determined by available technology.

Output elasticity measures the responsiveness of output to a change in levels of either labour or capital used in production, ceteris paribus. For example if $a = 0.15$, a 1% increase in labour would lead to approximately a 0.15% increase in output.

Further, if :

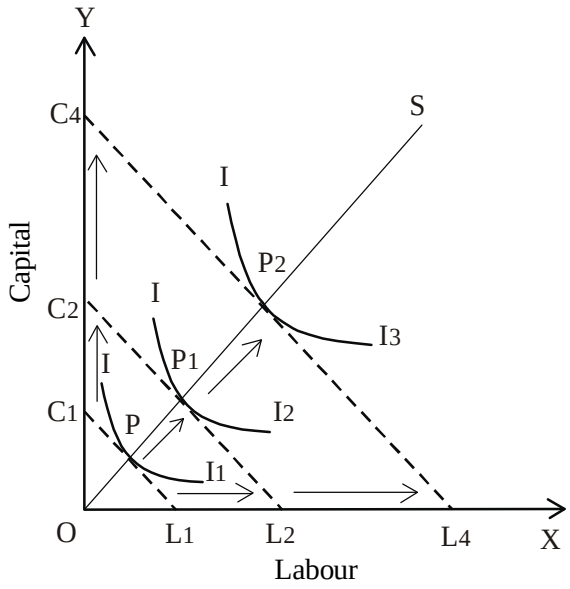
$$a + b = 1,$$

the production function has constant returns to scale. That is, if L and K are each increased by 20%, then P increases by 20%.

Thus output will increase in the same proportion. It is constant returns to scale.

4.2.4.3 Diagramic Representation :

Cobb-Douglas Production Function can be explained with following diagram.



Input cambitation	output IIQ curve
OL_1 Labour + OC_1 Capital =	II_1
OL_2 Labour + OC_2 Capital =	II_2
OL_4 Labour + OC_4 Capital =	II_3

In the above diagram Labour inputs are measured on ox axis and capital inputs are measured on oy axis. OL_1 units of labour and OC_1 units of capital are producing 50 units of output. If the output is to be increased twice, i. e. 100 units then both inputs labour and capital have to be increased two time i. e. OL_2 and OC_2. Thus L_1,C_1 factor combination gives II_1, Isoquant of 50 units of output and OL_2OC_2 factor combination gives increased II_2 Isoquant of 100 units of output. When OS is scale line the Isoquants II_1, II_2 Isoquants are on equal distance. i.e. on OS scale line $OP = PP_1$. In brief the increase in labour and capital results in proportionate increase in output.

4.2.4.4 An Example :

Economic Data of American Economy used for analysis is given below in Table No. 1.

Table No. 1 : Economic Data of American Economy

Year	1899	1900	1901	1902	1903	1904	1905	...	1917	1918	1919	1920
P	100	101	112	122	124	122	143	...	227	223	218	231
L	100	105	110	117	122	121	125	...	198	201	196	194
K	100	107	114	122	131	138	149	...	335	366	387	407

Table No. 1 : Economic data of the American economy during the period 1899-1920 (1). Portions not shown for the sake of brevity.

Using the economic data published by the government, Cobb and Douglas took the year 1899 as a baseline and *P, L* and *K* for 1899 were each assigned the value 100. The values for other years were expressed as percentages of the 1899 figures. The result is Table No. 1.

Next, Cobb and Douglas used the method of least squares to fit the data of Table 1 to the function :

$$P(L, K) = 1.01 (L^{0.75}) (K^{0.25})$$

For example, if the values for the years 1904 and 1920 were plugged in :

$$P(121, 138) = 1.01 (121^{0.75}) (138^{0.25}) \approx 126.3$$

$$P(194, 407) = 1.01 (194^{0.75}) (407^{0.25}) \approx 235.8$$

which are quite close to the actual values, 122 and 231 respectively.

The production function $P(L, K) = bL^a K^b$ has subsequently been used in many settings, ranging from individual firms to global economic questions. It has become known as the **Cobb-Douglas production function.** Its domain is $\{(L, K) : L \underline{h}\ O, K \underline{h}\ O\}$ beacuse *L* and *K* represent labour and capital and are therefore never negative.

4.2.4.5 Assumptions :

The assumptions taken by Cobb and Douglas are as follows :

1. If either labor or capital vanishes, then so will production.
2. The marginal productivity of labour is proportional to the amount of production per unit of labor.

3. The marginal productivity of capital is proportional to the amount of production per unit of capital.

4.2.4.6 Properties of Cobb-Douglas Production Function :

For emperical research the several properties of Cobb-Douglas Production Function are helpful which are discussed below.

B The multiplicative form of the power function can be changed in to log-linear form as below.

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

B The degree of homogenity is determined by the sum of the exponents a and b. If a+b = 1, it implies hamogenous production function of First degree and constant returns to scale.

B a and b represents the elasticity of co-efficient (E) of altput for inputs K and L respectivy. This Co-efficient is proportional change in output to a given change in input either K or L.

$$E_K = \frac{-Q / Q}{-K / K} = \frac{-Q}{-K} \cdot \frac{K}{Q}$$

$$E_L = \frac{-Q / Q}{-L / L} = \frac{-Q}{-L} \cdot \frac{L}{Q}$$

B Contant a and b represent the relative distributive share of inputs K and L in total output Q. Which can be obtained as.

$$\frac{-Q}{-L} \cdot K \frac{1}{Q} = \frac{aAK^{a-1}L^{b}.K}{AK^{a}L^{b}} = a$$

B In its general form Cobb-Dauglas Production function implies at zero cost there will be zero production.

4.2.4.7 Cobb-Douglas Production Function in the extended form :

This Production Function can be extended to more than two factors. In agriculture along with labour and capital other inputs like Irrigation, fartilisers, land are used. So the Cobb-Douglas Production Function in extended form can be represented in following formula.

$$Q = AL^{a}K^{b1}D^{b2}G^{b3}F^{b4}$$

Whre Q stands for output, L and K stands for labour and Capital respectively, a and b are exponents of labour and capital respectively, D stands for land G stands for irrigation, F stands for fertiliers and b2, b3, b4 are exponents of land, irrigation and fertilisers respectively.

4.2.4.8 Criticisms on Cobb-Douglas Production Function :

Economist like Arrow, Chenery Minhas and Solow have criticised the Cobb-Douglas Production Function.

1) C-D Production function takes into account only two inputs - labour and capital.
2) It has taken into account full use of available capital which is made in unrealistic situation of full employment.
3) It implies constant returns to scale which is not found. Instead there is either increasing or decreasing returns to scale.
4) This function has taken the unrealistic assumption of perfect competition.
5) This function has neglected complementarity of factors and assumed substitutability of factors.
6) The major problem with this production function is of aggregation. This function has been applied to entire industry. In reality there will be many production functions in different firms, industries.

Despite these criticism, the Cobb-Douglas production function has been widely used in emperical studies of manaufacturing industries and far compartive studies.

4.2.5 Empirical Evidences of Cost Curves

Introduction :

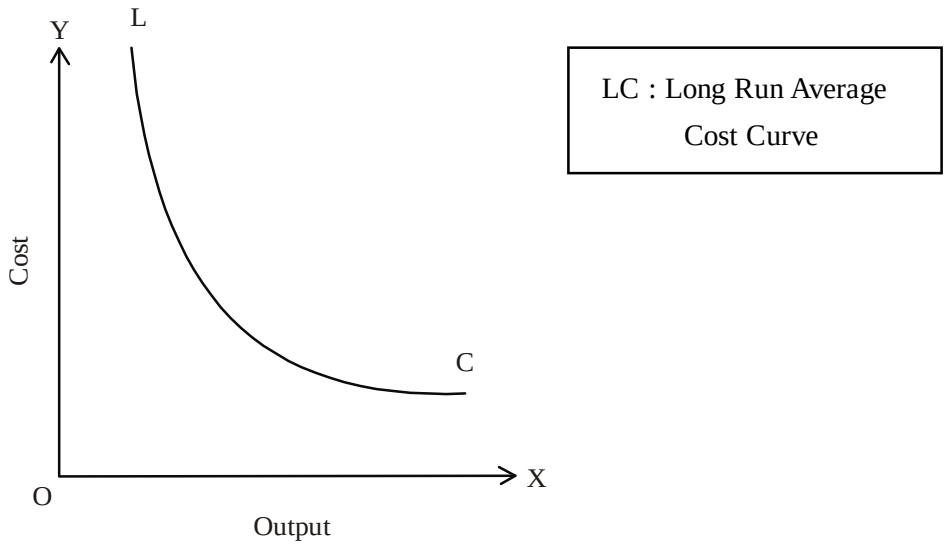
Production Cost is one of the aspeect which determines the supply of goods and services. The cost of the Production changes with the change in the output of the firm. For profit maximisation every firm chooses least cost combination of factors.

L - Shaped Long Run Average Cost Curve :

In the cost theory, thre is recent development that, the long run average cost curve is L - shaped instead of U - shaped. It means that when a firm increases its output its cost per unit decreases because of economies of scale. The long run average cost curve not rises eventhough there is increase in production. It remains constant or slightly falls. The managerial cost per unit of output may increase at a very large scale of production but the technical economies more than offset the managerial diseconomies. Therefore the total long-run average cost does not rise. So in recent years the economists are of the opinion that U - shape in the longrun average cost curve does not occur. Empirical evidence indicates that the long-run average cost rapidly decreases but after a point it remains flat through out or at its right-hand end it may downward sloping.

The L - shaped long run average cost curve is shown in the following diagram

L - shaped Long-Run Average Cost



There is contradiction between traditional economic theory and modern economic theory. Traditional economic theory states that Long-Run Average Cost Curve is U - shaped and the modern economic theory explains that Long-Run Average Cost Curve is L - shaped. Two reasons are given for the explanation of L - shape of Long run average cost curve. First reason is that a firm continues to enjoy some technical economies even after a minimum optimal scale is reached. Second reason is that the modern developments in managerial science ensuring optimal managerial set up for a Larger scale of production prevents the longrun average cost to rise.

4.5.2 L - Shaped Lon Run Average Cost Curve and Empirical Evidences :

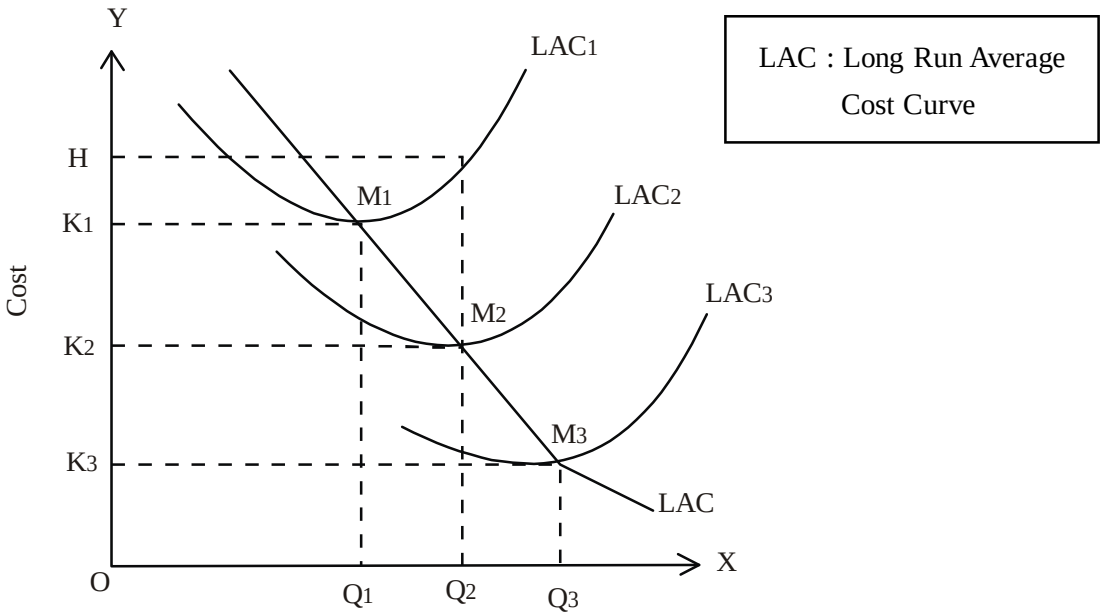
The following two explanations have been provided for the occurance of L - shaped longrun cost curve.

1) Technical Progress :

Traditional economic theory assumes that there is no change in technological progress but in real sense technological progress takes place over a period of time. Due to this, long run average cost curve shifts downward.

This is shown in the following diagram

Downward Slopirn Long Run Average Cost Curve



In the above diagram it is shown that initially the firm is producing output OQ_1 at average cost OK_1 and the long run average cost curve is LAC_1. If the demand of firms product increases, then the firm increase its output upto OQ_2 then in the context of unchanged technology the firm will expand production along LAC_1 and will produce OQ_2 output at average cost OH. If the technological progress has taken place, with new technology the firm will produce on the new curve LAC_2 with output OQ_2 at OK_2 cost per unit which is less then both OK_1 and OH. Further if the firm increases output to OQ_2 and meanwhile the technology might have advanced then the firm produces OQ_3 at OK_3 cost per unit which is less than OK_2. After joining the minimum points M_1, M_2, M_3 of long run cost curves i. e. LAC_1, LAC_2, LAC_3 we can get a curve LAC (Long Run Average Cost Curve) which is downward sloping due to technological progress whereas with unchanged technology long run average cost curves LAC_1, LAC_2 and LAC_3 are U - shaped.

Therefore, empirical studies made by modern economists suggests that with an unchanged technology, long - run average cost curves are U - shaped and due to technological progress long - run average cost curve is L - shaped.

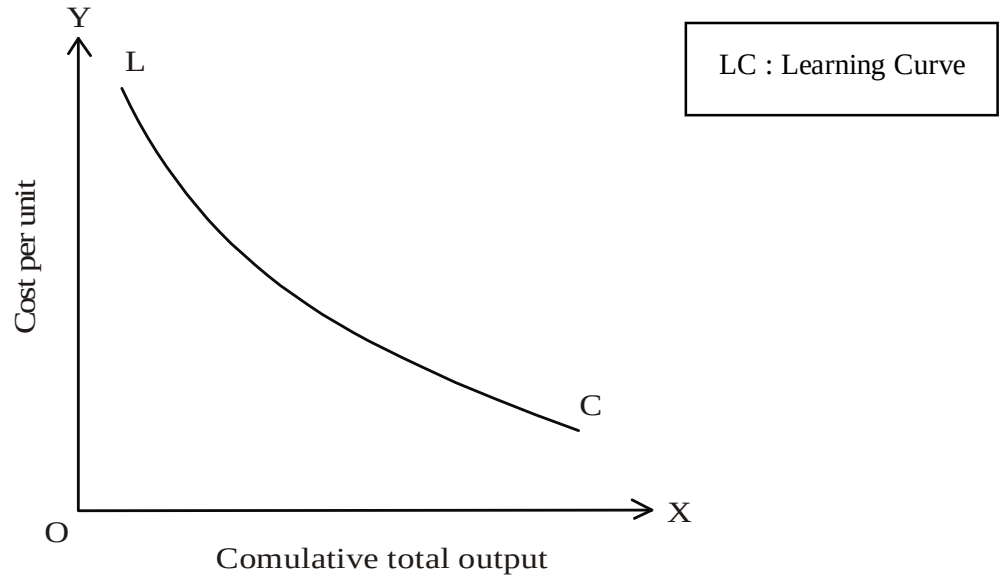
2) Learning by Doing :

The another reason of downward long-run average cost curve is learning by doing. When a firm increases its output overtime, it learns to produce it more efficiently because greater the experience, the firm produces its output in a better way than before and thus the cost per unit decreases.

Empirical evidence proves that the firm's production cost not-only depends upon the amount of output of a commodity it produces but also on the aggregate amount of that commodity produced since the time it started its production. This is because the aggregate output by a firm determines the degree of learning it has acquired and the efficiency gained by it.

The learning curve is shown in the following diagram

Learning curve



In the above diagram on the X - axis cumulative total output over successive periods of time and on the Y - axis cost per unit of output are measured. The above diagram shows that the learning curve slopes downward, it means cost per unit of output decreases as cumulative output increases over a time and the firm learns from its wok experience.

Thus as the aggregate amount of output produced bya firm increases over time, the cost per unit goes on decreasing. This is because when the firm produces more production, it learns to produce it more efficiently so the cost per unit decreases. It should be noted that with the increase in aggregate production of a commodity overtime, learning gained by a firm is not only in rrespect of improvement in efficency in the production but also in respect of improving the organisation of the firm.

Thus, technological progress and learning are the reasons why the long-run average cost curve is L - shaped rather than U - shaped.

4.2.6 Break Even Analysis

The concept of break even analysis or point is important for the stabilisation of business now-a-days. Break even analysis is a technique which shows the relationship between the production cost and revenue of a firm with its volume. Now-a-days every firm or businessman uses this technique for the maximisation of output with a least costs for getting maximum profit. The break even analysis also indicates the level of output or sale and the revenue earned by a firm. When a businessman has become successful to make ideal combination or equilibrium between the costs, revenue and output at higher level, the position will be most profitable to him. Thus break even point analysis is used for the optimum level of production and sales of a firm. The formula of break even point or analysis is as under

$$BEP = \frac{TFC}{P - AVC}$$

where, BEP = Break Even Point

TFC = Total Fixed Cost

P = Selling Price of a Commodity

AVC = Average Variable Cost

P – AVC = Profit margin per unit

Now we will see the concept of break even analysis with the help of following Figure No. 4.4.

Figure No. 4.4

"Break Even Point Analysis"

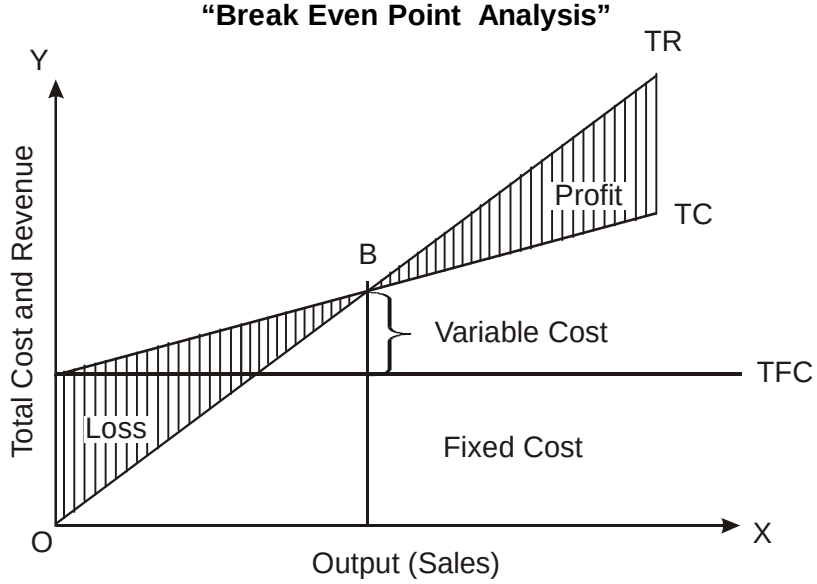


Figure No. 4.4 shows us the break even point. OX axis clears the output or sale sof a firm whereas OY axis depects total cost and total revenue. 'B' is the point at which total revenue and total cost are equal whichis known as no profit no loss i.e. break even point. Here we also find that, before point 'B', a firm or business is in losses and beyond 'B' point represents the profit of the firm. Thus 'B' point (break even point) is an excellent instrument for the guidance to the business manager in the determination of profitable output and how to control the business.

4.3 Summary

Production, consumption and costs are the important concepts used in managerial economics for the determination of pricing policy. The term production function denotes the functional relationship between the inputs used for the production process and the output of a firm. The formula of production function is :

$$X = f (LKRSVX)$$

The production function is a flow concept. Time element is an important part of this concept. There are two types of production function in Economics i.e. short-run production function and long-run production function. The law of variable proportion is applicable for short-run production function. Increasing returns, decreasing returns and negative returns are the 3 stages of short-run production function. The long-run production function, we apply the laws of returns to scale which as also 3 stages i.e. increasing, constant and decreasing returns. These two types of production function theories clears the input and output relations in short and long-run period.

Cobb-Douglas production function implies the functional relationship between two inputs (labour and capital) and output. It is based on the emperial study of manufacturing sector in American economy. The emperical evidence of cost curves represents the L shaped longrun cost curve in stead of U shaped longrun cost curves.

The last concept of this particular unit, is of break even analysis. Break even analysis is a technique which indicates the relationship between production cost and revenue of a firm with its volume. Now-a-days every manager of a business firm has to use this concepts for getting optimum output and profit margin. The formula of break even point or analysis is as under.

$$BEP = \frac{TFC}{P - AVC}$$

Break even analysis gives us the guidelines for production and pricing policy.

4.4 Glossary

- **Production Function -** The functional relationship between physical input and physical output is production function.

- **Linear homogeneous production function -** The increase in input leads to proportionate increase in output.
- **Censtant returns to scale -** Increase in output in same proportion with increase in input is called constant returns to scale.
- **Break Even Analysis :** Break even analysis is a technique which indicates the relationship between production cost and revenue of a firm with its volume.

4.5 Objectives Questions.

A) Rewrite the following sentences by choosing correct alternatives.

1. Production function is the relationship between ..... and output within the given technology.

   (a) input (b) income

   (c) interest (d) raw-material

2. Laws of variable proportion denotes ..... production function.

   (a) short-run (b) fixed

   (c) long-run (d) leaner

3. Long-run production function has ..... stages.

   (a) 2 (b) 3

   (c) 4 (d) 6

4. Break even analysis is important for increasing ..... margin of a business.

   (a) interest (b) profit

   (c) employment (d) production cost

B) Answer in one sentence only.

1. How many stages are there in a short-run production function ?
2. What is the shape of short-run average cost ?
3. State the formula of break even analysis.
4. In which country Cobb-Douglas have made emperical study.
5. With reference to which sector Cobb-Douglas have carried out their emperial study.
6. What is the slope of Long Run Average Cost Curve is stated by traditional economic theory?
7. Due to which reasons Long Run Average Cost Curve is L - shaped?

4.6 Answer to the objective type questions.

A) Rewrite the following sentences by choosing correct alternatives.

1) Production function is the relationship between **input** and output within the given technology.

2) **External** economies of scale are enjoyed by all firms located in a area.

3) Break even analysis is important for increasing **profit** margin of a business.

4) America,

5) Manufacturing

6) The shape of Long Run Average Cost Curve stated by traditional economic theory is U - shaped.

7) Due to technical progress and learning by doing Long Run Average Cost Curve is L - Shaped.

4.7 Self Assessment Questions

A) Write short notes on -

a) Production Function

b) Break Even Analysis

c) L shaped long run Average cost curve

B) Essay type or Broad Questions.

1. What do you mean by production function ? Explain short-run production function in detail.
2. Explain briefly Cobb-Douglas production function.
3. State the relationship between short run and long-run cost curves.
4. Critically examine the concept of 'Break Even Analysis'.
5. Explain Govdwin theory of trade cycle.
6. What is the learning curve? What are the factors that bring about learning curve effect?

4.8 Books for Further Readings.

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Semester-II
Unit 1
PRICE DETERMINATION UNDER DIFFERENT MARKET CONDITIONS

1.0 Objectives

After the studying this unit we would be able to understand following things.

- Meaning, features and price determination under perfect competition
- Features and price determination under monopoly market
- Features and price determination under Monopolistic Competition
- Features and pricing under Oligopoly Market

1.1 Introduction

Exchange is a very fundamental department of economics. It occupies a pivotal position in the modern economy. As a matter of fact, it is market where exchange takes place. Market is generally understood to mean a particular place or locality where goods are sold and purchased. However, in economics, by the term market we do not mean any particular place or locality in which goods are bought and sold. The idea of a particular locality or geographical place is not necessary to the concept of the market. What is required for the market to exist is the contact between the sellers and buyers

so that transaction at an agreed price can take place between them. According to Cournot, "Economists understand by the term market not any particular market place in which things are bought and sold but the whole of any region in which buyers and sellers are in such free intercourse with one another that the price of the same good tends to equality easily and quickly". Term Market is classified on the basis of three main elements. A) the number of firms producing a product, b) the nature the product produced by the firms and c) the ease with which new firms can enter the industry or price elasticity of demand. In present unit you will be familiarized with the term market, its different forms and price determination under different market forms.

1.2 Subject Matter

There are three main forms of market i.e. Perfect competition, Imperfect competition (Monopolistic competition, pure Oligopoly and Differentiated Oligopoly) and Monopoly. In this unit we will try to understand the meaning, features and price determination under different markets with different conditions

1.2.1 Perfect Competition

Perfect competition is said to prevail there is a large number of producers producing a homogeneous product. The maximum output which in individual firm can produce is very small relatively to the total demand of the industry product so that a firm cannot affect the price by varying its supply of output. Perfect competition is a condition of market in which there exist very large number of buyers and sellers of a homogeneous product having no control over price. According to Mrs. Joan Robinson, "Perfect competition prevails when the demand for the output of each producer is perfectly elastic." This clears, first, that the number of sellers is large so that the output of any one seller is negligibly small proportion of the total output of the commodity and the second that the products of various sellers are homogeneous from the viewpoint of consumers.

Characteristic features of Perfect Competition:

1. Number of buyers : The number of buyers is very large, so large that no single buyer, by his individual or collective action with other buyers, can influence market price by changing demand. This is because the demand of a single buyer is very very small part of the total demand in the market. The analogy of an atom can be used to indicate this share. Hence, it is beyond the power of a single buyer to influence market price. Consequently, he has to accept the market price as given and adjust his demand to it. The buyer is a price taker in this market.

2. Number of Sellers : The number of sellers also is very large, so large that no single seller, by his individual or collective action with other sellers, can influence market price by changing supply. This is because the supply of a single seller is very very small part of the total supply in the market. The analogy of an atom can be used to

indicate this share. Hence, it is beyond the power or a single seller to influence market price. Consequently, he also has to accept the market price as given and adjust his supply to it. The seller is a price taker in this market.

3. Homogeneous Products : The important feature of perfect competition is that, the products produced by all firms in the industry are fully homogeneous and identical. It means that the products of various firms are indistinguishable from each other; they are perfect substitute to one another. So the buyer cannot distinguish between the output of one firm and that of another and so is indifferent as to the particular firm from which he or she buys.

4. Free Entry and Exit : There is a free entry in the market for newcomers. The reason is simple. As the share of each seller in the market is too small, any addition to the supply by a newcomer firm would also ne too small to effect any price change. Since, in the short run firms can neither change the size of their plants, nor new firms can enter or old ones can leave the industry, the condition of free entry and exit therefore applies only to the long-run equilibrium under perfect competition. In the event of super normal profit, the firms used to enter the industry and may leave the industry when losses are inescapable.

5. Knowledge of the Market : Resource owners, sellers and buyers possess perfect knowledge of as to the present and future prices, costs and economic opportunities in general. Thus consumers will not pay a higher price than necessary for the commodity. Price differences are quickly eliminated and a single price will prevail throughout the market for the commodity.

6. Absence of Selling and Transport cost : There is a absence of selling and transport costs in the perfect competition. An individual firm is merely a price-taker; it can sell whatever quantity of the product it likes, at the prevailing price-level. It is further presumed that there is no transport cost under perfect competition and hence there is uniformity in the price level throughout the market.

7. Nature of Demand Curve : The firm is able to sell any quantity at the given market price. Therefore, its demand curve is perfectly elastic at the level of going market price.

8. Other Factors : There is no government intervention in the market; there is perfect mobility of factors of production. In sum, perfect competition is an ideal condition of market and hence normally it does not exist in reality.

Price and Output Determination under Perfect Competition:

A) Short Run Equilibrium of A Firm :

An individual firm cannot influence the market price in the perfect competition because, of the existence of a large number of firms, homogeneous products and free

entry and exit of firms. What an individual firm can, however, do is to take the price determined at the market as given and adjust its own supply according to that price. At the existing price, the firm can sell any amount of its product. Marginal Revenue (MR) is equal to Marginal Cost (MC) is the condition of equilibrium in this market. There are three possible situations are in the market. A) P>ATC: excess profit, B) P=ATC: normal profit and C) P<ATC: losses

These situations are shown below diagrammatically. For this, we use the family of short run cost curves which represents the firm's supply position and add to them the demand curve as seen by the seller. It is perfectly elastic; it is also a price line, AR curve and MR curve. In the perfect competition twin conditions of firm's equilibrium are:

1. MC =MR = Price
2. MC curve must be rising at the point of equilibrium

But, the fulfillment of the above two conditions does not guarantee that the profits will be earned by the firm. In order to know whether the firm is making profits or losses and how much of them, average curve cost must be introduced in the figure.

A) P>ATC: Excess Profit :

Equilibrium of the firm : P > ATC

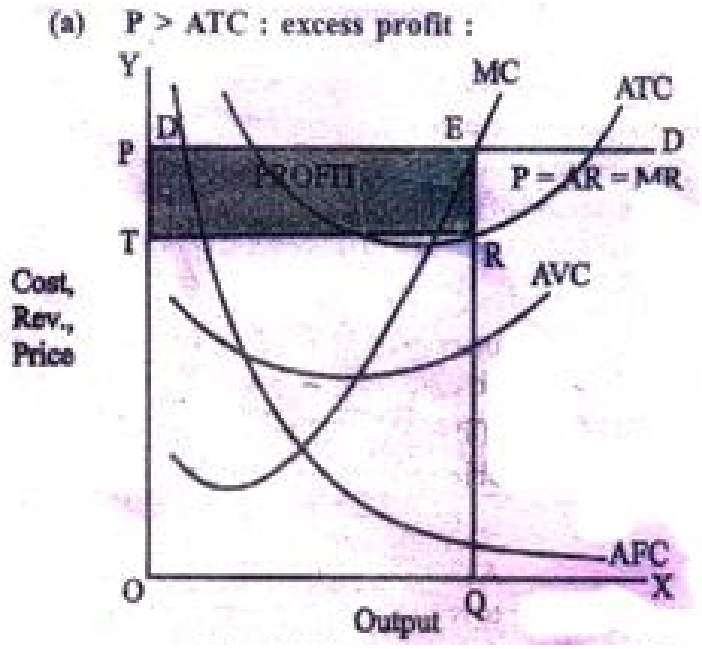

Diagram No 1.1

In above diagram DD is the demand curve,

E = Equilibrium (MR=MC),

OQ = Output,

OP (EQ) = Price,

RQ = ATC,

So, P>ATC,

ER = Profit per unit

PERT = Total profit (Excess profit) Thus, total profit will be equal to the area PERT. Because normal profits are included in average cost, the area PERT indicates super normal profit.

Excess profit is the profit which the firm gets over and above the normal profit. The firm aims at maximizing excess profit.

B) P = ATC : Normal Profit

Demand curve or average revenue curve of the firm is horizontal straight line at the level of the prevailing price. Since perfectly competitive firm sells additional units of output at the same price, marginal revenue curve coincides with the average revenue curve. Marginal cost curve, as usual, is U-shaped. At the normal profit level marginal revenue is the same as price or average revenue under perfect competition, the firm will equalize marginal cost with price to attain equilibrium output.

Equilibrium of the firm : P = ATC

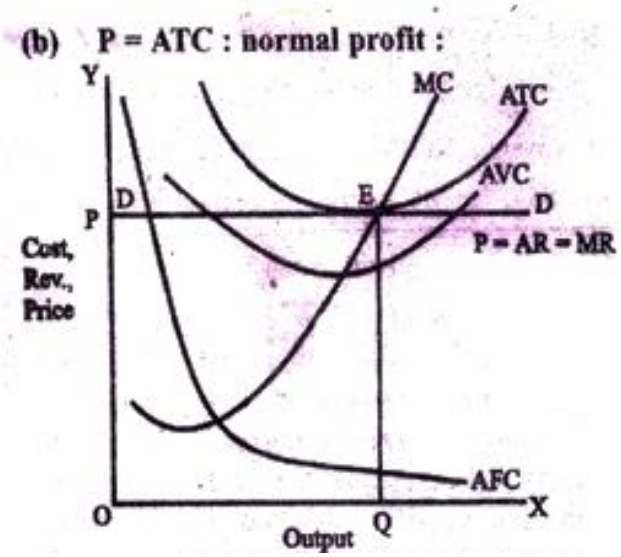

Diagram No 1.2

DD = Demand curve is tangent to ATC curve at its lowest point.

E= Equilibrium (MR=MC)

OQ = output

OP = (EQ)= Price

So, P = ATC (Normal Profit)

Normal profit is the minimum expected profit of the form to remain in business. IT may be, say, 10%. It is added to the cost of production as reward for the organizational function. Hence, it forms part of the ATC. As such, when P=ATC, the firm is said to be getting normal profit. IT is described, in other words, as no loss-no profit situation in formal terms. The firm stays in business.

C) P<ATC: Losses

Now suppose that the prevailing market price of the product is such that the price line or average and marginal revenue curve lies below average cost curve throughout .This case illustrated in the figure below.

Equilibrium of the firm : P < ATC

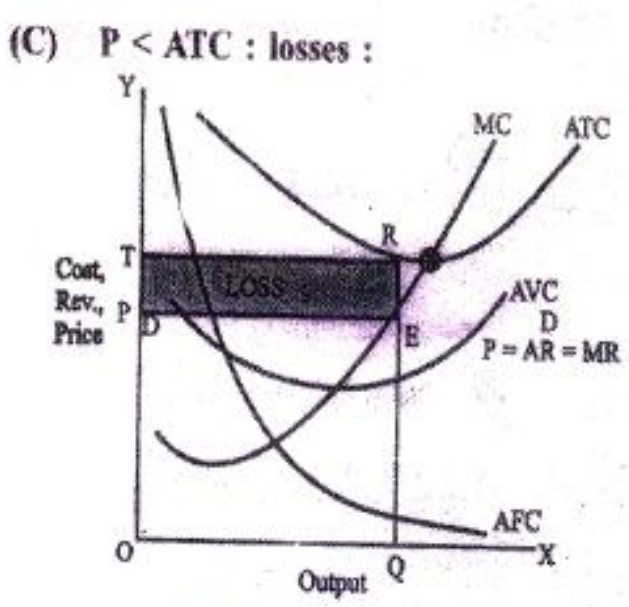

Diagram No. 1.3

DD = Demand curve is between ATC and AVC

E = Equilibrium

OQ = Output

OP (EQ) = Price

RQ = ATC

So, P<ATC

RE = loss per unit

PERT = total loss. In this case, the firm covers AVC fully and AFC partially. So, it continues in business during short period.

Shut-down Point :

Now an important question is why a firm should continue operating when it is incurring losses. The answer lies in the concept of fixed costs which have to be borne by the firm even if it stops production in the short run. Therefore, in the analysis of firm's decision to continue operating or to shut down in the short run, the difference between variable costs and fixed costs is important. In the short run, the firm can continue in production with losses of at least variable cost is covered. If, price is equal to Average variable cost, the firm covers all its variable cost but nothing of the fixed cost. Hence, Total loss is equal to Total Fixed Cost. As a result, the firm has two options a) to continue production, b) to shut down the plant for some time. Because of the second option, this point S (where P=AVC) with output OQ is called the shut-down point. It implies that if price falls below OP, the firm does not cover even its variable cost and, therefore, it prefers to shut down. This situation we can explain as per the following diagram.

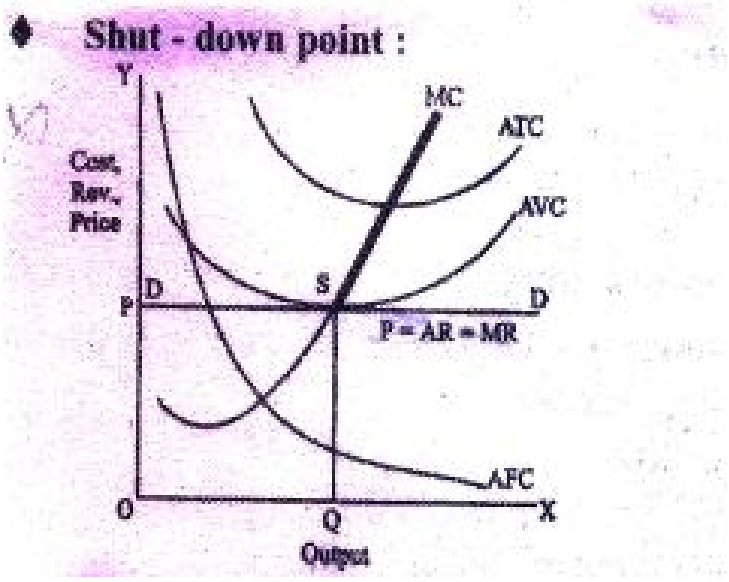

Diagram 1.4 : Shut-down point and supply curve of a firm

Short -run equilibrium if the Industry: In the short run only existing firms can make adjustment in their output while the number of firms remains the same, that is, no new firms can enter the industry, nor any existing firms can leave it. Thus, the industry is in short run equilibrium when the short-run demand for and supply of the industry's product are equal and all the firms in it are in equilibrium. In the short-run equilibrium of the industry, though all firms must be in equilibrium, they all may be making supernormal profits or all may be having losses depending upon the demand conditions of the industry's product.

Short-run equilibrium

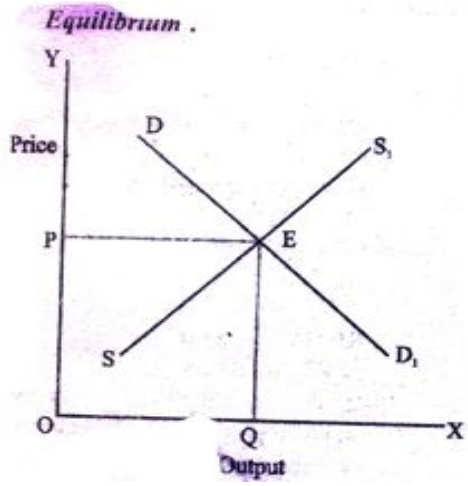

Diagram No 1.5

Long-run Equilibrium of the Firm under Perfect Competition:

The long-run is a period of time long enough to permit changes in the variable as well as in the fixed factors. In the long run, accordingly, all factors are variable. Thus, in the long-run, firms can change their output by increasing their fixed equipment. They can enlarge the old plants or replace them by new plants or add new plants. Moreover, in the long-run, new firms can also enter the industry. On the contrary, if the situation to demands in the long- run, firms can diminish their fixed equipments by allowing them to wear out without replacement and the existing firms can leave the industry. Hence, the long-run equilibrium will refer to a situation where free and full scope for adjustment has been allowed to economic forces.

In the long-run for a perfectly competitive firm to be in equilibrium, besides marginal cost being equal to price, price must also be equal to average cost. If the price is greater than the average cost, the firms will be making supernormal profits. Lured by these supernormal profits new firms will be entering the industry and these extra profits will be compacted away. When the new firms enter the industry, the supply of output of

the industry will increase and hence the price of the output will be forced down. The new firms will keep coming in the industry until the price is depressed down to average cost, and all firms are earning only normal profit. On the other hand, if the price happens to be below the average cost, the firms will be incurring losses. Some of the existing firms will quit the industry. As a result, the output of the industry decrease and the price will rise to equal the average cost so that the firms remaining in the industry are making normal profits. So, in the long run, firms need not to be forced to produce at a loss since they can leave the industry, if they are having losses.

Condition of Equilibrium:

1. MR = MC and 2. AR = AC

Long run : firm equilibrium

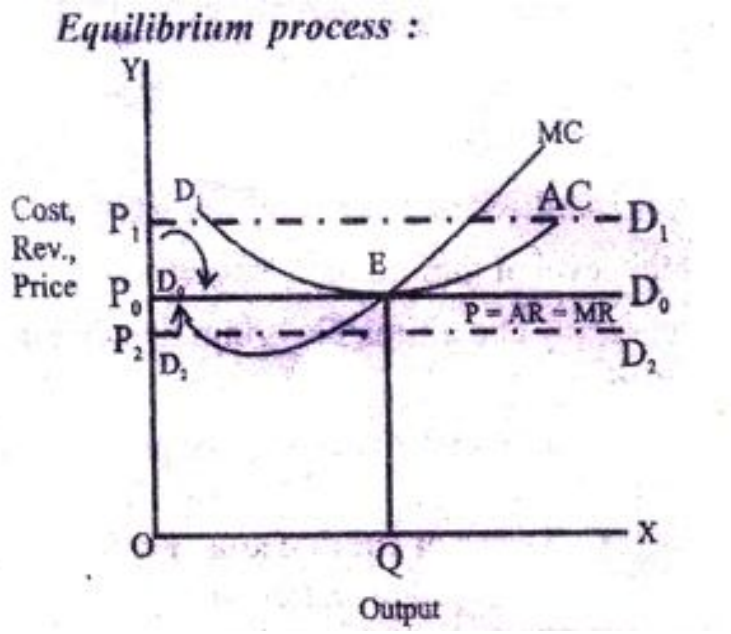

Diagram No. 1.6

1) If Price > Average Cost :

If market price is more than Average Cost of the firms in the industry:

OP = Price

D1D1 = Demand Curve

As P>AC, firms get excess profit. So, new firms will enter in the industry. They will start the production. Hence, the supply of goods is increasing and automatically the price of commodity will fall. As a effect of this situation the profit ratio of the firms may decreasing. This process will continue till sufficient firms enter the industry to bring the price down to the level of Average Cost.

P = Average cost (that is, minimum AC, as the demand curve is tangent to AC curve). So, every firm is getting normal profit.

2) If Price < Average Cost :

If market price is less than Average cost of the firm in the industry.

OP = Price

D2D2 = Demand Curve

As P>AC, firms facing this situation will be making losses. Loss making firms exit from the industry so, supply of commodities is decrease and autometically the price of commodities is increases and loss is decreasing. This process will continue till sufficient firms go out of the industry to raise the price upto the level of AC.

P= AC (Normal profit to every firm).

3) At Equilibrium Level :

Demand curve is tangent to AC curve at its minimum point.

Therefore, P = AR =AC.

E is the tangency point.

At E point, MC cuts the MR curve. Therefore, MR = MC.

Thus, long-run equilibrium of a firm under perfect competition is reached at the minimum point of the AC curve, so that, P = AR = AC = MR = MC

Equilibrium Price = OPo

Equilibrium output = OQ

Normal profit to every firm.

Long-run Equilibrium of the Industry under Perfect Competition :

The industry is in long-run equilibrium when in addition to the equality of supply of and demand for the industry's product, all firms are in equilibrium and also there is neither a tendency for the new firms to enter the industry, not for the existing firms to leave it. The long run equilibrium of the industry is depicted in the following figure.

Long-run Adjustment and Equilibrium of the Perfectly Competitive Industry

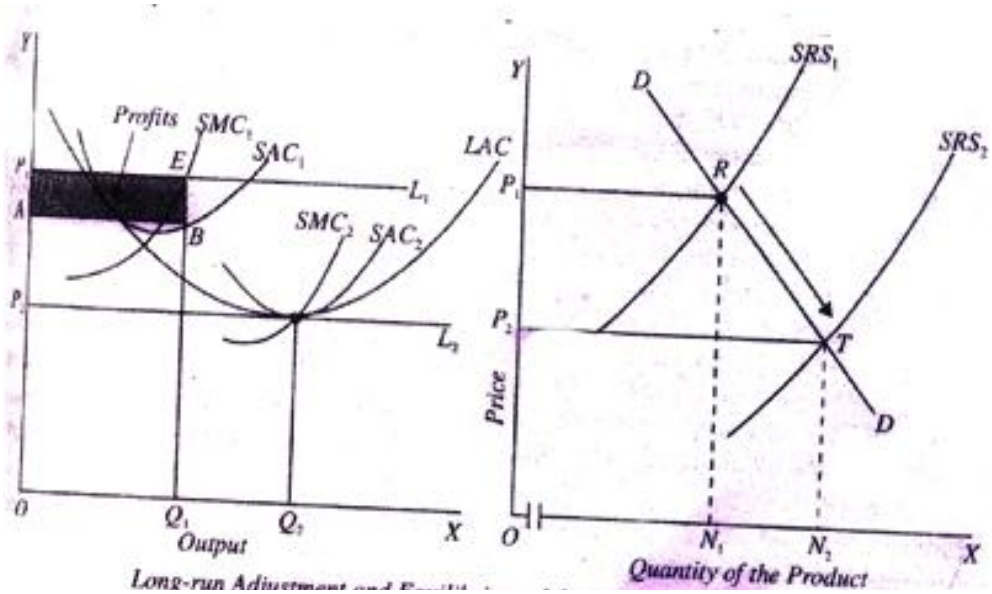

Diagram No. 1.7

In the right hand panel, demand and short-run supply curve of the industry are shown which intersect at point R and thereby determine the price OP1. It will be seen from left-side panel of the figure that with price OP1, the firm is in equilibrium at point E and producing OQ1 output and making supernormal profits. As explained above, with the expansion of scale of production by the existing firms and entry of new firms in the long run, the short-run supply curve of the industry will continue shifting to the right until it intersects the demand curve DD at point T at which price Op2 is determined. It will be seen from the left-hand panel of the figure that price OP2 is equal to the minimum long-run average cost curve LAC and the firm is making only normal profits. Since all firms have identical cost conditions, all firms in the industry will be making only profits. Under these circumstances, there will be no tendency for the firms to enter or leave the industry. We therefore arrive at the following conditions for the rong-run equilibrium of the industry.

1. The number of firms in the industry is stabilized through entry or exit of firms.
2. Output of each firm is stabilized at the level of minimum average cost.
3. Entry of new firms, increases market supply and ultimately brings the price down to the level of minimum Average Cost of every firm
4. Exit of firms decreases market supply and ultimately pushes up the price to the level of minimum Average Cost of every firm. This implies that all firms in the industry well be earning only normal profits in the long-run.

1.2.2 Monopoly :

Monopoly is a market situation in which a single seller controls the entire output of a particular good or service. The seller is then able to set the price and output of the good entirely in his own interests. It is implicit in this definition that the monopolist is faced by a large number of competing buyers. Obviously, there is no difference between firm and industry under monopoly. The average revenue curve (AR) or the demand curve always slopes downwards to the right as in monopoly competition, but it is less elastic in monopoly then in monopolistic competition. In monopoly, there is no need to differentiate products because no close substitute is available. It is one product, homogeneous and completely under the control of the monopolist.

It is necessary to take into consideration the following conditions regarding the meaning of Monopoly. One possible variant of monopoly that can be conceived is 'pure monopoly'. If there is only one producer of a commodity, the situation is described as a monopoly. A) There should be only one firm producing the commodity, B) There should be no substitute for the commodity, C) The above two conditions ensure that there is no direct competition. But as producers of all commodities are placing a claim on the limited income of the consumers, they are indirectly competing with one another. Absence of even this indirect competition is necessary for the purity of monopoly. This, therefore, becomes the third condition of pure monopoly. In this way under pure monopoly, whatever the level of output of the monopolist firm, the firm is powerful enough to divert all the income of all the consumers to it. The Average Revenue Curve or Demand Curve faced by a firm under pure monopoly is a rectangular hyperbola. Such a curve indicates elastic demand and the elasticity is equal to unity.

Characteristic Features of Monopoly: There are different forms of monopoly itself. However, in the present context, simple monopoly will be taken into consideration. Different features of monopoly are as under:

1. Large Number of Buyers : The number of buyers is very large, so large that no single buyer, by his individual or collective action with other buyers, can influence market price by changing demand. This is because the demand of a single buyer is a very small part of the total demand in the market. The analogy of an atom can be used to indicate his share. Hence, it is beyond the power of single buyer to influence market price. The buyer is the price taker in this market.

2. Single Seller : Under Monopoly, one firm is the sole producer or seller of a product. The single producer may be in the form of an individual owner of a single partnership or a joint stock company. Whatever be the constitution, it implies 'control over supply'. It is through this the monopolist gets a power to control market price of his product. Therefore, a monopolist is a price-maker.

3. Nature of the Commodity : The commodity is homogeneous, that is, identical

in all respects. There is no close substitute for the product of that firm should be available. However, remote substitutes may be there. Cross elasticity of demand for the commodity is not zero. Moreover price discrimination is ruled out and hence the monopolist charges the same price from all buyers for the same product.

4. Entry in the Market : For the newcomer firm's entry in monopoly market is difficult. The monopolist restricts the entry of new firms by following legal protections like patents, copy rights, sole operation etc. or by barriers like price-cutting, forming cartel, huge capital investment etc. Entry of new firms leads to strong competition which the monopolists would like to avoid.

5. Demand Curve : The entire demand curve of the consumers for a product faces the monopolist. The monopolists face a downward sloping demand curve since the demand curve of the consumers for a product slopes downward. If he wants to increase the sales, he must lower the price. He can raise the price if he is prepared to sacrifice some falls.

Demand curve under monopoly

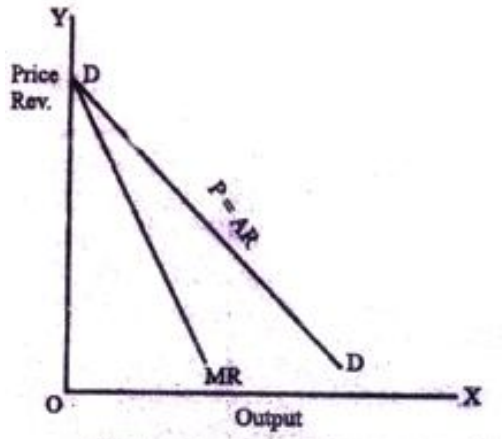

Diagram No. 1.8

Price-Output Determination under Monopoly:

Price-output analysis in the case of a monopoly is also an analysis of the equilibrium of the firm and industry under monopoly. Since in a monopoly, a single firm constitutes the whole industry, there is no need for a separate analysis of the equilibrium of the firm and of the industry.

Short-run equilibrium: In the short-run, it should be carefully noted that the monopolists has to keep an eye on the variable costs. His price must not go below his average variable cost, otherwise he will stop producing. There is a condition for the equilibrium in the monopoly i.e. Output at which Marginal Revenue (MR) should be

equal to Marginal Cost (MC), there is a maximum profit.

In the short run, a monopoly firm would be in equilibrium under any of the following three situations:

A) P>ATC : excess profit

B) P=ATC : normal profit

C) P<ATC : losses

A) P>ATC : excess profit :

The aim of the monopolist, like every other producer, is to maximize his total money profit. Therefore, he will produce up to a point and charge a price which gives him the maximum money profits. In other words, he will be in equilibrium at that price-output level at which his profits are the maximum. He will go on producing so long as additional units add more to the revenue than to the cost. He will stop at that point beyond which additional units of production add more to cost than to revenue. That is, he will continue producing so long as marginal revenue exceeds marginal cost. At the point where marginal revenue is equal to marginal cost, the profit will be the maximized, and here he stops. This situation of excess profit we can show with the help of diagram:

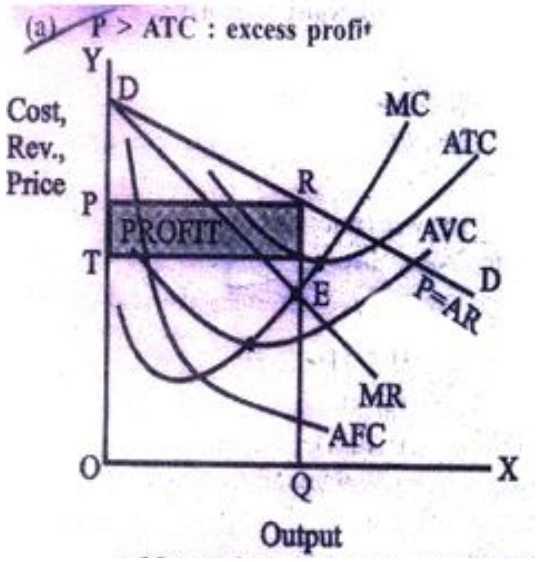

Diagram No. 1.9

B) P=ATC: Normal Profit:

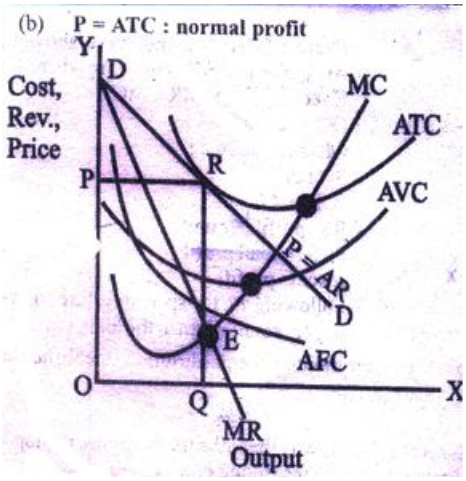

Diagram No. 1.10

E = Equilibrium (MR=MC)

OQ - Output

OP (RQ) = price

RQ : ATC (here demand curve is tangent to ATC curve, tangency point is R

So, P = ATC (normal profit)

C) P<ATC: Losses :

It is rare that a monopolist may be incurring losses. This is possible only when a firm is new, and product is still in its introductory phase. People may not know about the product. Even a monopolist may incur losses when the costs are more and the demand is lower. This situation we will explain with the help of the diagram.

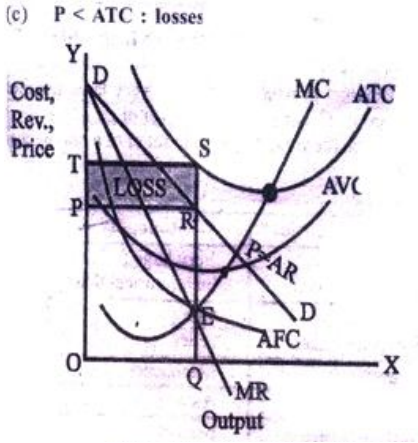

Diagram No. 1.11

In the diagram no 1.11,

E = Equilibrium

OQ = Output

OP (RQ) = Price

SQ = ATC

So, P < ATC

SR = Loss per unit

PRST = total loss. It is possible only in the short-run but in the long run it may disappear.

Note : In monopoly market wheher it may be a short run or long run period monopolist is a single producer so, he can't get normal profit or loss. Therefore short run and long run price determination is monopoly market is similar.

Long-run Equilibrium :

In order to show the price-output determination of a monopoly firm in the long run, we use long run cost curves and add to that the demand curve as seen by the monopolist. Rest of the producer is similar to the one described for short-run equilibrium. In the long-run the entry of new firms is blocked in several ways. The monopolists may be in control of some essential raw materials or he may hold some patents or the marker may be too limited to give scope for profit to more firms. If the monopolist is incurring a loss in the short-run and there is no plant size that can earn profit, then in the long-run the monopolist will go out of business. If he is already making a profit, then in the long run, he will try to see if he can increase his profit by varying the size of the plant. A multi-plant monopolist will, in the long run, adjust the number of plants to attain a long-run equilibrium.

Condition of equilibrium: Marginal Revenue = Marginal Cost = Maximum profit

Monopoly equilibrium : P > AC

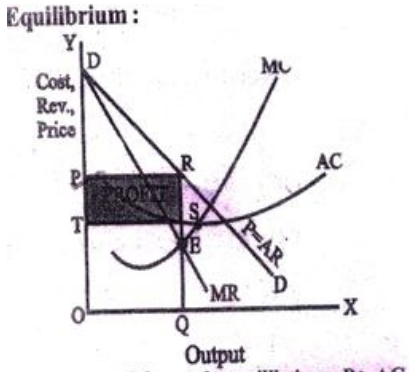

Diagram No. 1.12

E = Equilibrium

OQ = Output

OP = (RQ) = Price

SQ: AC

So, P>AC

RS = profit per unit

PRST: total profit (excess profit)

There are some important features of monopoly equilibrium in the long-run.

a) Because of restrictions of entry of new firms, the monopoly equilibrium is established at a point left to the minimum AC.

b) P>AC

c) Therefore, the monopolist gets excess profit. That is why the firms try to acquire monopoly power in the market and after that try to retain it by restricting entry of newcomers.

d) The monopolist produces in that zone of the demand curve where price elasticity is greater than one. This zone is the portion of the demand curve left to its mid-point.

Price Discrimination under Monopoly:

Price discrimination is charging different prices for different groups of buyers for the homogeneous product by the monopolist. A seller makes price discrimination between different buyers when it is both possible and profitable for him to do so. For example, the seller of washing machine of a given variety sells it at Rs. 10,000 to one buyer and at Rs. 12,000 to another buyer (all conditions of sale and delivery being the same in two cases), he is practicing price discrimination.

Price discrimination, as defined above, is not a very common phenomenon. It is very difficult to charge different prices for the identical product from the different buyers. The concept of price discrimination can be broadened to include the slae of the various varieties of the same good at prices which are not proportional of their marginal costs. According to Prof. Stigler "Price discrimination as the sales of technically similar products at prices which are not proportional to marginal cost". On this definition, a seller is doing price discrimination when he is charging different prices from different buyers for the different varieties of the same good if the differences in prices are not the same as or proportional to the differences in the costs of producing them.

Types of price discrimination :

Price discrimination may be a) Personal discrimination, b) Trade discrimination, c) Spatial discrimination. It is personal when, the monopolist can discriminate among individual customers while providing personal services. For example Doctor. It is local or spatial when the price varies according to locality. Domestically, petrol, Diesel, cooking gas are supplies at different prices in different regions of the country. And also with foodgrain. Discrimination is according to use when different prices are charged according to the uses to which the commodity. For example, State Electricity Board supplies electricity for agriculture, domestic use, industrial use with different prices. For admission to professional courses, there is a dual fee structure, one for 'free seats' and the other for 'paying seats'.

Degrees price Discrimination :

According to Prof. A.C.Piogue, there are three degrees of discrimination as under:-

1. Price discrimination of the first degree involves maximum possible exploitation of each buyer in the interest of a seller's profits. Price discrimination of the first degree is called perfect price discrimination. Monopolist charges a different price for each unit of the commodity sold. He charges the maximum that each buyer is able and willing to pay, leaving him to consumer's surplus.
2. Price discrimination of second degree would occur when a monopolist is able to charge separate prices for different blocks or quantities of a commodity from buyers and in this way he takes away a part, but not all of consumer surplus from them. In the second degree, the buyers are divided into groups and from each group a different price is charged, which is lowest demand price for that group.
3. In the third degree discrimination, the monopolist splits the entire market into a few sub-markets and charges a different price in each sub-market.

Conditions for Price Discrimination : Two fundamental conditions are essentials for the price discrimination to become possible. First, price discrimination can occur only it is not possible to transfer any unit of the product from one market to another market. Second is, it should not be possible for the buyers in the dearer market to transfer themselves into the cheaper market to buy the product or service at the lower price.

Price discrimination is profitable only if elasticity of demand is one market is different from elasticity of demand in the other. Then the monopolist can go on dividing and sub-dividing his market till no two buyers with different elasticities are put in the same group, or till in each market the elasticity of demand is the same.

Equilibrium under price discrimination : Under simple monopoly, a single price is charged for the whole output; but under price discrimination the monopolist will

charge different prices in different sub-markets. First of all therefore, the monopolist has to divide his total market into various sub markets on the basis of differences in price elasticity of demand in them. The monopolist can divide his total market into several sub-markets according to the differences in demand elasticity, but for the sake of making our analysis simple we shall explain the case when the total market is divided into two sub-markets.

The discriminating monopolist will compare the marginal revenue with the marginal cost of the output. But he has to find out first the aggregate marginal revenue of the two sub-markets taken together and then compare this aggregate marginal revenue with the marginal cost of the total output. Aggregate marginal revenue curve is obtained by summing up laterally the marginal revenue curves of the sub-markets.

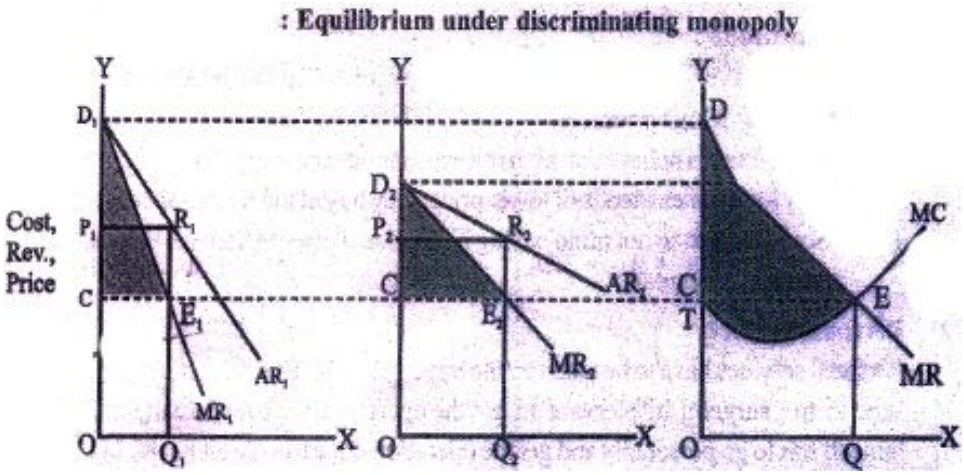

Diagram No. 1.13

Market 1	**Market 2**	**Monopoly Firm**
Inelastic Demand	Elastic Demand	MR = MR1+MR2
E1 = equilibrium (MR1 = MC)	E2 = equilibrium (MR2 = MC)	E = equilibrium (MR = MC)
OQ1 : Output	OQ2 = output (OQ2>OQ1)	OQ = output (OQ1 + OQ2)
OP1 : price charged	Op2 : price charged (OP2< OP1)	DET : total profit (D1E1C + D2E2C)
D1E1C : total profit (D1E1C> D2E2C)	D2E2C : total profit	

Market 1 : Demand being inelastic, the monopolist supplies less quantity and charges higher prices. As a result, he reaps higher profit.

Market 2 : Demand being elastic, the monopolist supplies more quantity and charges lower price. But his profit is lower.

With the above diagram we can explain the equilibrium situation. There are two markets where seller selling the particular commodity with different prices. The elasticity of demand for commodity is different in the two markets. The monopoly firm has its MC curve. The monopoly firm's MR curve is a summation of the MR curves in the two markets; that is MR = MR1 + MR2. The monopoly equilibrium decides the firms total output; this will be distributed in the two markets. The level of firm's MC at equilibrium (E) is transferred to the diagrams showing the two markets by a horizontal dotted line. Intersection of the MC line with the MR curve of each market will describe price, output, profit situations in each market. To show all these details, we have drawn three diagrams side-by-side; first and second for the two markets and the third for the monopoly firm.

When Price Discrimination is Possible ?

Simply having monopoly power is not enough to enable the monopolist to follow price discrimination. Monopoly is necessary condition, but not a sufficient one. If price discrimination is to be possible, the following conditions should be satisfied.

1. It should not be possible to transfer any unit of the commodity from one sub-market to another. That is, the goods sold in the cheaper market cannot be resold in the dearer market; otherwise monopolist's purpose will be defected.
2. Monopolist should keep his sub markers separate to successfully practice price discrimination is possible.
3. When consumes have certain preferences or prejudices in that case monopolist can discriminate the price.
4. When the nature of the good is such as makes it possible for the monopolist to charge different prices.
5. When consumers are separated by distance or tariff barriers, the monopolist can charge different prices.
6. Sometimes, the price discrimination occurs when the government rules and regulations permit.
7. Monopolists also take advantage of the ignorance of the customers or of their disinclination to take the trouble of comparing prices.

1.2.3 Monopolistic Competition

The concept of imperfect competition is closely associated with the name of Mrs.

John Robinson. As a matter of fact, perfect competition and perfect monopoly are the two extreme market forms. Though these two extremes are theoretically important, in practice, they do not actually exist. The realistic market model lie somewhere in between these two extreme market forms. However, the cases lying in between these two extremes differ from each other in relative strength of monopoly and competitive elements, or in other words, in degrees of imperfection.

Monopolistic competition signifies a market situation in which there is a large number of firms whose outputs are close but not perfect substitutes. Product differentiation is the main feature of monopolistic competition. Every producer under this market tries to maximize his sales by incurring more and more selling costs. Different firms are having independent price policies. In other words we can say, "Monopolistic Competition is condition of market in which there exist many sellers of differentiated but close substitute products having no control over price".

Characteristic features of Monopolistic Competition :

1. Large Number of Firms : Under monopolistic competition, the number of firms is fairly large. Large number is suggestive of the fact that the contribution of an individual firm with regard to the total demand for the commodity is not very significant. Because of product differentiation, each firm follows, to some extent, independent price-output policy. Each seller shares only a small part of the market supply. Given these features, no single seller can influence the market price by changing his supply. Therefore, seller is a price-taker.

2. Number of Buyers : The number of buyers is vary large, so large that no single buyer, by his individual or collective action with other buyers, can influence market price by changing demand. This is because the demand of a single buyer is a very small part of the total demand in the market. The analogy of an atom can be used to indicate this share. Hence, it is beyond the power of a single buyer to influence market price. Consequently, he has to accept the market price as given and adjust his demand to it. The buyer is a price-taker in this market.

3. Product Differentiation : Under Monopolistic competition, the products of different sellers are differentiated on the basis of brands. These brands are generally so much advertised that a consumer starts associating the brand with a particular manufacture and type of brand loyalty is developed. Product differentiation gives rise to an element of monopoly to the producer over the competing product. As such, the producer of an individual brand can raise the price of his product knowing that he will not lose all the customers to other brands because of absence of perfect substitutability. Since, however, all the brands are close substitutes of one another, the seller will lose some of his customers to his competitors. Thus this market is a blend of monopoly and perfect competition.

4. Knowledge of Market : Both the buyers and sellers have imperfect knowledge of the market because of attachment to the specific brands and to the specific sellers. Buyers do not bother to know about the substitute brands as well as other sellers even next door.

5. Non-price competition : In this marker, sellers try to compete on the basis of other than price, as for example aggressive advertisement, product development, better distribution arrangements, efficient after-sales service, and so on. A key base of non-price competition is a deliberate policy of product differentiation. Sellers attempts to promote their products not by cutting prices but by incurring high expenditure on publicity and advertisement and other sale promoting techniques mentioned above.

6. Freedom for Entry and Exit : The firms can easily enter or leave the monopolistically competitive industry without any entrance or leave the monopolistically competitive industry without any difficult I the long run.

7. Slope of Demand Curve : Under monopolistic competition, because of product differentiation, the seller has some degree of control over the price he charges and thus faces a negatively sloped demand curve. However, the existence of many close substitutes severely limits the sellers 'monopoly' power and results in a highly elastic demand curve.

Monopolistic competition

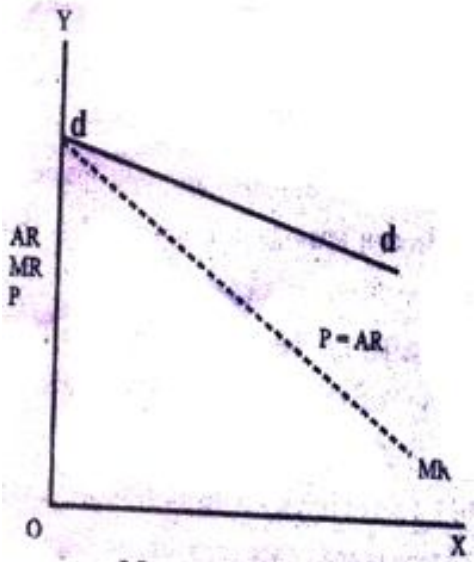

Diagram No. 1.14

The demand curve is highly elastic at the level of going market price. It is negatively sloping and represents price and AR. MR Curve lies below it.

Price and Output Determination under Monopolistic Competition :

Under the monopolistic competition, individual firm's market is isolated to a certain degree from those of its rivals with the results that its sales are limited and depend upon its price, the nature of its product and the advertising outlay it makes. Thus, the firm under monopolistic competition has to confront a more complicated problem than the perfectly competitive firm. The demand curve as seen on the monopolistic competition is negatively sloping. Since the various firms under this market produce products which are close substitutes of each other, the position and elasticity of the demand curve for the product of any the them depends upon the availability of the competition substitutes and their prices. Profits will be maximized when marginal revenue (MR) is equal to marginal cost (MC). So long as the marginal revenue is greater than the marginal cost, the seller will find it profitable to expand his output; and if the marginal revenue is less than the marginal cost, obviously it is to his advantage of reduce his output to the point where marginal revenue is equal to marginal cost.

Short-run Equilibrium : In the short-run, therefore, the firm will be in equilibrium when it is maximizing its profits, i.e., when MR = MC.

Short-run Equilibrium

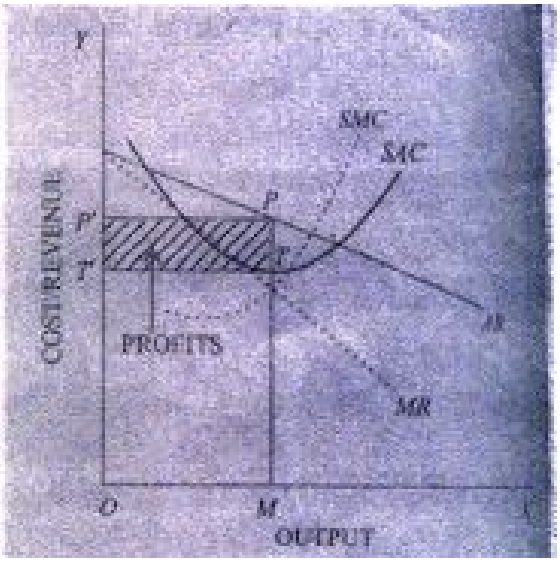

Diagram No. 1.15

In the above diagram,

AR = Average Revenue

MR = Marginal Revenue

SAC = Short-run Average Cost Curve

SMC = Short-run Marginal Cost Curve

MR and SMC intersect each other at the output OM at which price is OP1 (=MP), because P is point on AR i.e. price.

The firm is earning supernormal profits. Supernormal profit per unit of output is the difference between average revenue and average cost at the equilibrium point.

Here, MP = Average Revenue

MT = Average Cost

PT = profit per unit

So, PTT1P1 = Total profit (Output multiplied by profit per unit of output)

Competition : Short-run (with Losses)

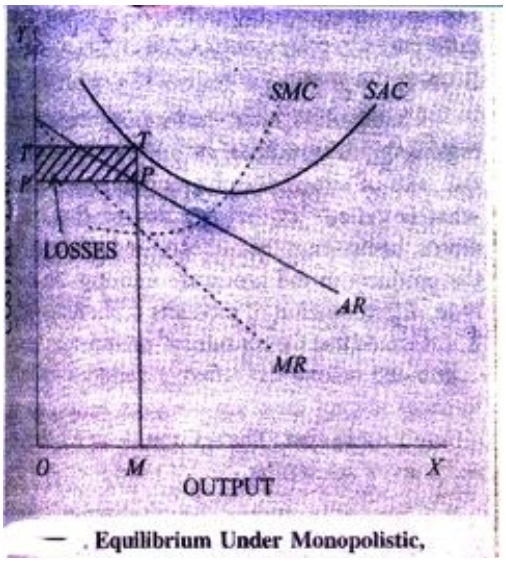

Diagram No 1.16

In the above diagram,

AR = Average Revenue

MR = Marginal Revenue

SAC = Short-run Average Cost Curve

SMC = Short-run Marginal Cost Curve

MR and SMC intersect each other at the output OM at which price is OP1 (=MP), because P is point on AR i.e. price

Here, OP1 = Price (=MP)

OP1< MT (Price < Average Cost)

TP = loss per unit of the output OM (=PP1)

Hence, TPP1T1 = Total loss

Long-run Equilibrium of Firm and Group Equilibrium:

We have now to explain how the equilibrium adjustment of prices and outputs of firms whose products are close substitutes comes about. Each firm within a group has monopoly of its own particular products, yet its market is interwoven with those of his competitors who produce closely related products. The price and output decisions of a firm will affect his rival firms who may in turn revise their price and output policies. This dependence of the various producers upon one another is a prominent feature of monopolistic competition. When the new firms enter in the industry and start production, supply will increase and the price will fall. So, average revenue curve faced by the firm will shift to the left, and, therefore, the supernormal profit will be competed away and the firms will be earning only normal profits. If, in the short-run, firms are realizing losses, then, in the long-run, some firms will leave the industry so that the remaining firms will be earning normal profits.

In the long-run, AR curve will be more elastic, since large number of substitutes will be available in the long run. Therefore, in the long-run,equilibrium is established when firms are earning only normal profits.

Condition of Equilibrium:

Output at which MR = MC and AR = AC

Monopolistic Competition : Long-run

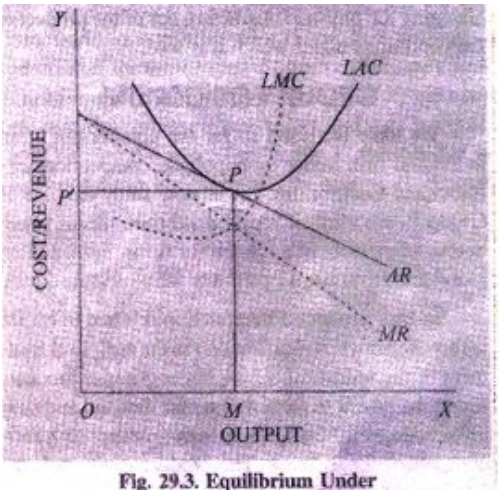

Fig. 29.3. Equilibrium Under

Diagram No. 1.17

In the above diagram,

AR = Average Revenue curve which is tangent to the average cost curve (LAC) at P.

Therefore, the equilibrium output in the long run is OM.

OP1 (=MP) = Price

P = Equilibrium point where Average cost is MP and so is average revenue.

Therefore, there are no supernormal profits; there are only the normal profits which form part of the cost of production.

Non- Price Competition and Equilibrium :

Non-price competition is an important feature of monopolistic competition. There are two main factors for the non-price competition, firm can compete with a) product differentiation and b) Selling cost.

A) Product Differentiation :

Though in the long run a firm under monopolistic competition gets normal profit, it has to continuously make efforts to maximize its profit. In the short run, the firm has chances to get excess profit. For this, the firm adopts the course of 'product differentiation'. The firm in reality rarely uses price as a means of market competition. Rather, it finds that non-price factors, which helps in differentiating the product, are more useful and revenue generating. "Product differentiation refers to the measures adopted be sellers under monopolistic competition to create demand for their product".

Let suppose that the price is determined at the market and the firm accepts it as such. But a firm under monopolistic competition does have a freedom to vary the quality or the design of the product. A firm my therefore try to increase and to maximize its profits through product differentiation. Seller can differentiate the product with various methods, those methods are as follow:

1. Product improvement : The qualitative improvement in the product is one of the measures to improve the product. This is done by using better material, improvement in workmanship, increased utility and efficiency of the machines, new uses of the product, systematic and attractive packing, and making available smaller sized packs and so on. Such measures help in increasing product demand.

2. Product distinction : In order to create a distinct image of the prodct in the eyes of the prospective customers, every firm resorts to various measures of superficial nature. Producer can differentiate their product with different colors, new facilities in the products, new contents in the products, better performance of the product etc. Similarly, we get attached to specific sellers due to services and facilities given by them.

3. Advertisement : This measure is very extensively used method of product differentiation. Products are widely advertised through newspapers, magazines, radio and television, sponsorship of various events, street hoarding, and exhibitions and so on. However advertisements fall in two categories. a) Informative advertisement, which provide information regarding the availability, quality, improvements, utility of the products. b) Persuasive advertisement. To make customers impressive and fruitful, very often the advertisements are framed around personalities like cricketers and film stars and other who can be impressive.

B) Selling Cost : The cost incurred on advertisement, publicity and statesmanship are known as selling costs. In other words, Selling cost is the cost incurred by a seller under monopolistic competition for creating demand for his product through product differentiation. Selling cost includes expenses on advertisement, salary of salesmen, expenses of sales cell, cost of display of the product, exhibition expenses, discount and commissions offered to special dealers, cost of gift materials, expenses on facilities like free home delivery, etc. As we know, selling costs are an addition to the costs of production. Chamberlin while drawing the distinction between production cost and selling costs writes that these costs which are 'made to adapt the product to the demand are costs of production; those made to adapt the demand to the product are costs of selling'. As a result of sales promotion, the buyers preferences for the product will be stronger and the demand curve will therefore be less steeper and it will shift to the right and away from the point of origin. At the same time, since selling costs are added to the costs of production, the new average cost curves will shift upwards.

Effect of selling cost on AC curve

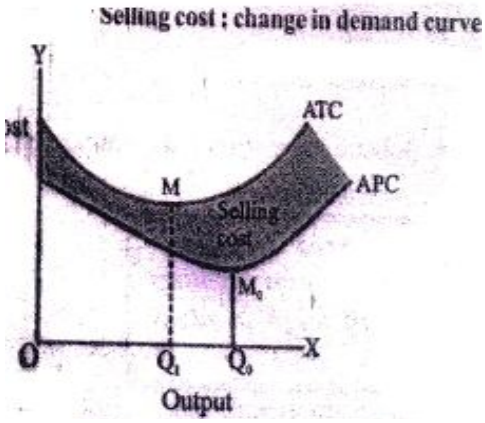

Diagram No 1.18

In above diagram,

APC = AC curve without selling costs (production cost only)

OQ0 = minimum AC output without selling cost

Selling cost gets added to the production cost, so the AC curves shifts upwards (ATC)

ATC = Production cost + Selling cost

ATC = Final AC curve of the firm with selling cost

OQ1 = Minimum AC output with selling cost

OQ1 < OQ0 = Minimum AC output with selling cost is less than without selling cost.

Excess profit with selling cost :

Generally, various measures for demand creation have a short-run orientation. The structure of measures undergoes a change over time as it depends on market situation. Therefore, effect of selling cost on price and output levels of the firm is considered from the point of view of short-run and that too for maximization of short-run excess profit.

Excess profit with selling cost

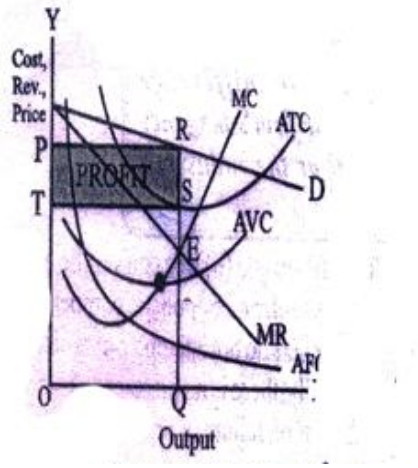

Diagram No. 1.19

In above diagram,

E= Equilibrium

OQ = Output

OP (=RQ) = price

SQ: ATC

So, P > ATC

RS =profit per unit

PRST = total profit (excess profit)

Effects of Selling Cost on Demand Curve :

Selling cost has more use in monopolistic competition, as there are many sellers and many buyers with heterogeneous goods, the level of competition directly varies with the amount of advertising as well as other means of selling cost and promotional measures. The sellers are interested in maximizing this excess profit by increasing their selling cost from time to time. Higher the selling cost more can be the profit. This has resulted in very often the increase in the sale of the product. In short, with more selling cost, demand increases and so output increases and as a final result profit increases. This effect is shown in the following diagram.

Effect of selling cost on demand

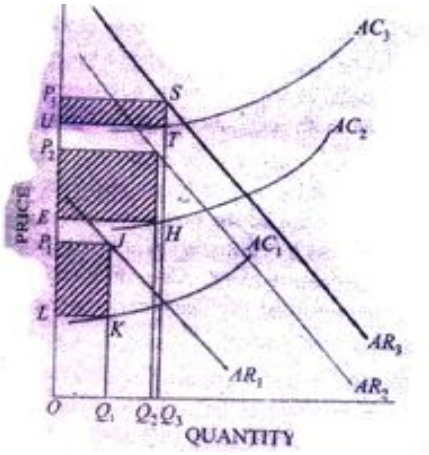

Diagram No. 1.20

In the above diagram a firm with its initial expenditure (for example Rs. 1 lakh) on advertising is able to make profit to tune of P1JKL. AR is the demand curve, the firm is producing OQ1 quantity and making profit of P1JKL. As the advertisement (selling cost) increased due to this AC1 shifts to AC2 and due to this the demand curve increases more, that is upto AR2 and the said firm producing OQ2 and it is making enormous amount of profit P2GHE. In the third case if you further increase your advertisement or selling cost this increases the cost of AC3 the demand curve shifts to AR3. The firm is selling OQ3 output and making profit to the amount of P3STV. The following table gives the complete picture of the relationship between selling cost, increase in demand curve and the total profit.

Selling Cost	AC	Demand Curve	Price	Output	Excess Profit
Rs. 1 lakh	AC1	AR1	OP1	OQ1	P1JKL
Rs. 2 lakh	AC2	AR2	OP2	OQ2	P2GHE
Rs. 3 lakh	AC3	AR3	OP3	OQ3	P3STV

It would be clear from these details that with selling cost. This brings out the two important conclusions:

1. It is not always true that increase in selling cost brings about increase in profit.
2. There exists a direct relation between increase in selling cost and increase I profit.

Excess Capacity under Monopolistic Competition:

Chamberlin is the pioneer in presentation the concept of monopolistic competition. In the course of discussion of working of this market, he has brought out the possibility of 'excess capacity' as an inevitable outcome. According to Chamberlin, "excess capacity is the different between the output at the firm's tangency point and the output at the industry's tangency point'. According to him firms operate at the point on the falling portion of long-run average cost curve, that is, they do not produce the level of output at which long-run average cost curve is minimum. Long-run equilibrium of a firm under monopolistic competition is achieved when the demand curve facing a firm becomes tangential to the long-run average cost curve so that is earns only normal profits. Under such circumstances a firm can reduce average cost, but it will not do so because its profits are maximized at the level of output smaller than that at which its long-run average cost is minimum.

It is pointed out that product differentiation and free entry of firms together contribute to the emergence of excess capacity under monopolistic competition. Implied in this thinking is the fact that in this market sellers do not attempt to compete with others in the market by cutting prices; that is, normally, there is no price competition. Non-price competition is generally resorted to. Therefore, failure of price competition to function leads to excess capacity. The concept of excess capacity is explained with the following diagram.

Excess Capacity under Monopolistic Competition

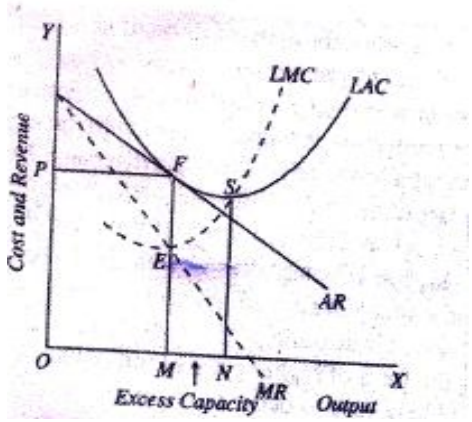

Diagram No 1.21

In above diagram,

OM = output

F = Equilibrium (MC = MR and AC = AR) AR is tangential to AC at point F corresponding to output OM

In the long-run the average cost is continuously decreasing upto the ON output level. Therefore firm can produce or expand its production upto ON level and reduce its long-run average cost to the minimum. Ideal output is the output at which long-run average cost is minimum. Therefore, the firm is producing MN less than the ideal output. Thus MN output represents the excess capacity which emerges under monopolistic competition.

1.2.4 Oligopoly :

We have studied price and output determination under three market forms, namely perfect competition, monopoly and monopolistic competition. However, in the real world economies we find that many of the industries are oligopolistic. Oligopoly is an important form of imperfect competition. Oligopoly is often described as 'competition among the few'. In other words, when there are few (two to ten) sellers in a market selling homogeneous or differentiated products, oligopoly is said to exist. Consider the example of cold drinks industry, automobile industry, chemical industry, oil refinery, fertilizers, the market is oligopolistic one.

The oligopoly market is classified into following groups.

a) **Pure and differentiated Oligopoly :** If the oligopoly product is homogeneous, it is called as a pure oligopoly. When the product is differentiated, then it is called as differentiated oligopoly.

b) Collusive and Non-Collusive Oligopoly : If the oligopolists join together and take care their business decisions collectively, it is called as a collusive oligopoly. In a non-collusive oligopoly the business decisions are taken independently.

c) Oligopoly with price leadership : If the firms in an oligopoly market follow the pricing decision of their leader, it becomes oligopoly with price leadership. The leader firm may be a dominant firm or old firm or firm with lowest cost.

Characteristic features of Oligopoly :

Oligopoly market has following important features.

1. Interdependence : The most important feature of oligopoly is interdependence indecision-making of the few firms which comprise the industry. This is because when the number of competitors is few, any change in price, output, product, by a firm will have direct effect on the fortune of the rivals, who will then retaliate in changing their own prices, output or advertising technique as the case may be. It is therefore, clear that an oligopolistic firm must consider not only the market demand or the industry product but also the reactions of other firms in the industry to any major decision it takes.

2. Importance of selling cost : Under oligopoly the advertisement can become a life and death matter. In order to maintain the market share every firm uses advertisement as an effective weapon. For this various firms have to incure a good deal of costs on advertising and other measures of sales promotion.

3. Group behaviour : Under oligopoly the firm's behaviour cannot be explained merely by profit maximization behaviour. It requires the study of group behaviour. The firms may form a collusion or may fight a price war. Do the members of group agree to pull together in promotion of common interest or will they fight to promote their individual interests? Does the group possess any leader? If so, how does he het the other to follow him? These are some of the questions that need to be answered by the business behaviour.

4. Number of Sellers : There exist few sellers in this market. Such cases do exist in large numbers in all the countries. In India, think of the petroleum, cooking gas, telephone, cellular phone, iron and steel, automobile, tyres, refrigerator, cement etc, industries in which we come across limited number of sellers.

5. Number of Buyers : The number of buyers is very large, so large that no single buyer, by his individual or collective action with other buyers, can influence market price by changing demand. This is because the demand of a single buyer is a very small part of the total demand in the market. Consequently, he has to accept the market price as given and adjust his demand to it. The buyer is a 'price- taker' in this market.

6. Nature of the Product: In this context, there are two possibilities.

a) Homogeneous product : All the sellers may be selling perfectly identical products and, therefore, price assumes importance. Product like petrol, diesel, kerosene, cooking gas, iron and steel, aluminium, cement fall into this category. Market of this kind is described as 'pure oligopoly'.

b) Differentiated product : Oligopolists have the choice of following product differentiation. Cellular telephones, tyres, refrigerators, detergent soaps, soft drinks automobile etc. fall into this category. Every seller enjoys a limited monopoly power in the market. Market of this kind is described as 'differentiated oligopoly'.

7. Barriers to Entry :

In oligopolistic industry, obstacles to entry are formidable. Entry of new firms is prevented by ownership of crucial patents or ownership of vital raw materials. Many times technological conditions are such that production is economic only on a large scale. A new firm therefore will have to start production on a large scale from the very outset. It is not possible to make a modest beginning and expanding gradually as the firm gets established. As such, the scale of production also may make entry of a new firm difficult. Also, the existing firms enjoy advantages such as reputation of their brand names, long established distribution channels, good-will of the customers etc., and any new firm desirous of entering the field will have to consider these factors which make entry difficult.

8. Demand curve :

It is not easy to trace the demand curve for the product of an oligopolist. Since under oligopoly the exact behaviour pattern of a producer cannot be ascertained , his demand curve cannot be drawn accurately, and with definiteness. How does an individual seller's demand curve look like in oligopoly is most uncertain because a seller's price or output moves leads to unpredictable reactions on price-output policies of his rivals, which may have further repercussions on his price and output.

Price Determination under Oligopoly:

With these characteristics of oligopoly, we study the determination of prices and outputs by oligopolistic firm. We shall confine our study to the non-collusive oligopoly (kinked demand curve) and to the collusive oligopoly models.

I) Kinked Demand Curve (Rigid prices): Non-collusive Oligopoly :

Paul Sweezy first presented in 1939 his analysis of non-collusive oligopoly by means of a 'kinked demand curve'. This analysis is based in the assumptions that the rivals in the market ignore their mutual dependence and attempt to decide their policies on their own Rivals' possible reactions are not thought of in advance. No seller joins

hands with anybody in the market and hence this case is described as non-collusive oligopoly.

It is for explaining price and output under oligopoly with product differentiation, that economists often use the kinked demand curve hypothesis. This is because when under oligopoly products are differentiated, it is unlikely that when a firm raises its price, all customers would leave it because some customers are intimately attached to it due to product differentiation. As a result, demand curve facing a firm under differentiated oligopoly is not perfectly elastic. On the other hand, if the oligopolistic firm increases their price, its rival will not follow it and change their prices. Thus the quantity demanded of this firm will fall considerably. This portion of the demand curve is relatively elastic. In these two situations, the demand curve of the oligopolistic form has a kink at the prevailing market price which explains price rigidity.

The kink is formed at the prevailing price level because the segment of the demand curve above the prevailing price level is highly elastic and segment of the demand curve below the prevailing price is inelastic.

Kinked Demand Curve under Oligopoly

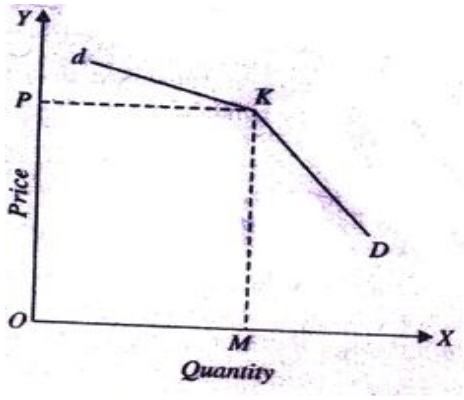

Diagram No 1.22

A kinked demand curve dD with a kink at point K has been shown in the diagram. The prevailing price level is OP and the firm is producing and selling the output OM. Now, the upper segment dK of the demand curve dD is relatively elastic and the lower segment KD is relatively inelastic. This difference in elasticities is due to particular competitive reaction pattern assumed by the kinked demand curve hypotheses.

The price-output relationship in the oligopolistic market is explained in the following diagram.

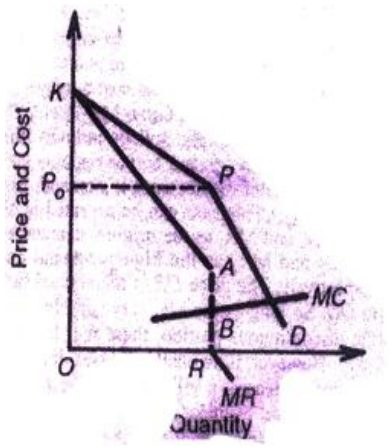

Diagram No. 1.23

In above diagram,

KPD = kinked demand curve

OP0 = the prevailing price

OR = Quantity produced by one seller.

Starting from point P, corresponding to the current price OP0, any increase in price above it will considerably reduce his sales, for his rivals are not expected to follow his price increase. This is because the KP portion of the kinked demand curve is elastic, and the corresponding portion KA of the MR curve is positive. Therefore, any price increase will not only reduce his total sale but also his total revenue and profit.

On the other hand, if the seller reduces the price of the product below OP0 (or P) his rivals will also reduce their prices, Though he will increase his sales, his profit would be less than before. The reason is that the PD portion of the kinked demand curve below P is less elastic and the corresponding part of marginal revenue curve below R is negative. Thus in both the price-raising and price-reducing situation the seller will be a loser. He would stick to the prevailing market price OP0 which remains rigid.

In oligopoly under the kinked demand curve, let us analyze the effect of changes in cost certain range do not affect the prevailing price.

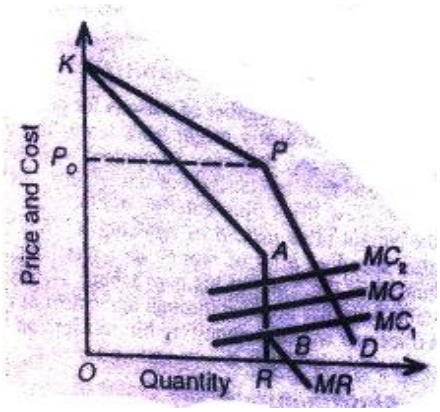

Diagram No. 1.24

Suppose the cost of production falls so that the new MC curve is MC1 to the right, as in the diagram above, it cuts the MR curve in the gap AB so that the profit maximizing output is OR which can be sold at OP0 price. It should be noted that with any cost reduction the new MC curve will always cut the MT curve in the gap because as costs fall the gap AB continues to widen due to two reasons:

a) As costs fall, the upper portion KP of the demand curve becomes more elastic because of the greater certainty that a price rise by one seller will not be followed by the rivals and his sales would be considerably reduced.

b) With the reduction in costs the lower portion PD of the kinked demand curve becomes more elastic, because of the greater certainty that a price reduction by one seller will be followed by the other rivals. Thus the angle KPD tends to be a right angle at P and the gap AB widens so that any MC curve below point A will cut the marginal revenue curve inside the gap. The net result is the same output OR at the same price OP0 and larger profits for the oligopolistic sellers.

In case the cost of production rises the marginal cost curve will shift to the left of the old curve MC as MC2. So long as the higher MC curve intersects the MR curve within the gap upto point A, the price situation will be rigid. However, with the rise in costs the price is not likely to remain stable indefinitely and if the MC curve rises above point A, it will intersect the MC curve in the portion KA so that a lesser quantity is sold at a higher price. We may conclude that there may be price stability under oligopoly even when costs change so long as the MC curve cuts in its discontinuous portion. However, chances of the existence of price-rigidity are greater where there is a reduction in costs that there is a rise in costs.

II) Collusive Oligopoly :

Collusive oligopoly is a situation in which firms in a particular industry decide to join together as a single unit for the purpose of maximizing their joint profits and to negotiate among themselves so as to share the market. The former is known as the joint profit maximization cartel and the latter as the market-sharing cartel. There is another type of collusion, known as leadership, which is based on tactit agreements. Under it, one firm acts as the price leader and fixes the price for the product while other firms follow it. Price leadership is of three types: low cost firm, dominant firm and barometric.

A) Cartels : (Complete collusion):

A cartel is an association of independent firms within the same industry. The cartel follows common policies relating to prices, outputs, sales and profit maximization and distribution of products. Cartels may be voluntary or compulsory and open or secret depending upon the policy of the government with regard to their formation. Thus cartels have many forms and use many devices in order to follow varied common policies depending upon the type of cartel. Cartel is formed for the purpose of market sharing or joint profit maximization of all the firms.

Price-output under cartel :

Condition of equilibrium:

1. For the cartel, MR = MC
2. For the each firm, MR should be equal to MC of each firm, that is, MR =MC1 =MC2---------=MCn

Steps involved in the analysis:

1. We assume that two firms have formed a cartel
2. Two firms produce a homogeneous product
3. We first find out the industry output fixed by the cartel by intersection of MR and MC curves.
4. That also will fix the price of the product
5. Each firm has different cost situation. Hence, industry MC curve is a sum-total of MC curves of the two firms.
6. We transfer the levels of MR and price at equilibrium to the diagrams of the two firms by a horizontal dotted line to find their equilibrium situation.

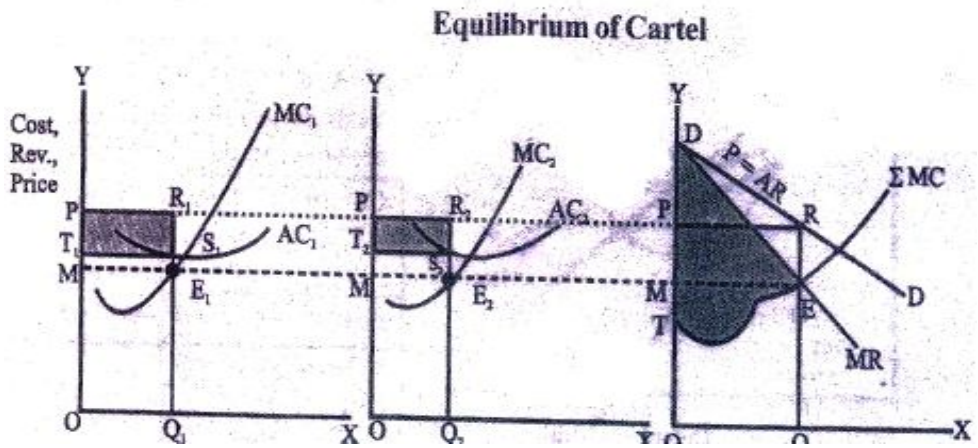

Diagram No. 1.25

In the above diagram, given the market demand curve and its corresponding MR curve, joint profits will be maximized when the industry MR equals the industry MC, this situation where D is the market (or cartel) demand curve and MR is its corresponding marginal revenue curve. The aggregate marginal cost curve of the industry ?MC is drawn by the lateral summation of the MC curves of firms A and B, so that ?MC = MC1 + MC2. The cartel solution that maxixises joint profit is determined at point E where the ?MC curve intersects the industry MR curve. Consequently, total output is OQ which will be sold at OP = (QR) price. As under monololy, the cartel board will allocate the industry output by equating the industry MR to the marginal cost of each firm. The share of each firm in the industry output is obtained by drawing a straight dotted line from E to the vertical axis which passes through the curves MC2 and MC1 of firms B and A at point E2 and E1 respectively. Thus the share of firm A is OQ1 and that of firm B is OQ2 which equals the total output OQ (OQ1 +OQ2). The price OP and the output OQ distributed between A and B firms in the ratio of OQ1 : OQ2 is the monopoly solution. Firm A with the lower costs sells a larger output OQ1 than firm B with higher costs so that OQ1>OQ2. But this does not mean that A will be getting more profit than B. The joint maximum profit is the sum of PR1S1T1 and PR2S2T2 earned by A and B respectively. DET is the maximum profit. DET = PR1S1T1 + PR2S2T2. It will be pooled into a fund and distributed by the cartel board accordingly to the agreement arrived at by the two firms at the time of the formation of the cartel. A pooling agreement of this type will make it possible for both firms to maximize their joint profit provided the total profits earned by them independently do not exceed the former.

B) Price Leadership: (Partial collusion):

Price leadership is the imperfect collusion among the oligopolistic firms in an industry when all firms follow the lead of one big firm. In oligopolistic market, among various firms operating, one firm can be identified as market leader firm on either of the following basis:

a) An efficient and so low cost firm

b) A dominant firm with largest market share

c) An experienced firm working as a barometer

A) Leader firm: the firm giving leadership

B) Follower firms: all the other firms in the market

The Low Cost Price Leadership Model : In the low-cost price leadership model, an oligopolistic firm having lower costs than the other firms sets a lower price which the other firms have to follow. Thus the low-cost firm becomes the price leader. The process is explained with the help of following diagram. We assume that there are two firms, one leader and one follower, of a homogeneous product and both share the market equally. Their cost curves are different.

Price leadership of a low cost firm - Oligopoly

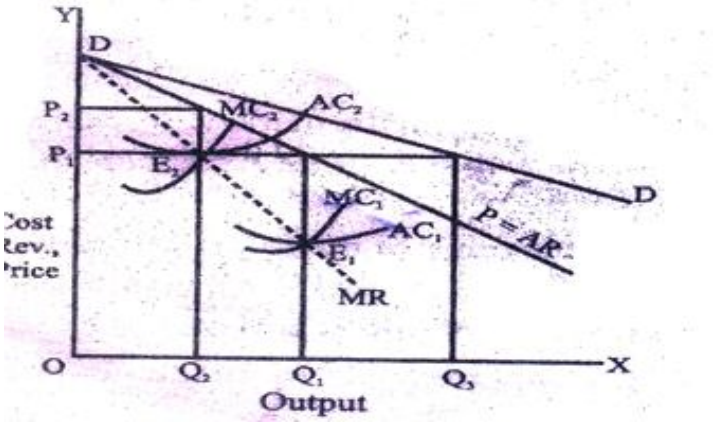

Diagram No. 1.26

In the above diagram,

DD = market demand curve

Dd = demand curve faced by individual sellers

MR = marginal revenue curve corresponding to demand curve Dd.

Leader firm	Follower firm
AC1 and MC1 : cost curves	AC2 and MC2 : cost curves
E1 : Equilibrium (MR = MC)	E2 : equilibrium (MR=MC)
OQ1 : Output	OQ2 : expected output
OP1 : price set in the market	OP2 : expected price
Profit maximization price and output	There are profit maximization price and output of the firm But they cannot be finalized; firm should accept OP1 price fixed by the leader firm and produce OQ1 output as leader firm Hence, no profit maximization.

An important point, the follower firm should accept both the price and output level set by the leader firm if price leadership arrangement is to function smoothly. On the contrary, if the follower firm accepts only the price and does not accept the output directive, then the price leadership arrangement would fail. Because, if the follower firm produces less than the obligatory output OQ1, say OQ2, then the market supply would be OQ1 + OQ2 which would be less than OQ3 (OQ1 + OQ2). Shortage of supply in the market will then push up the price beyond OP1. The follower firm will benefit with more revenue, but the leader firm will get less than maximum profit and hence will be a loser.

1.2.3 Summary

The market is a set of conditions in which buyers and sellers come in contact for the purpose of exchange. The market situations vary in their structure. Different market structures affect the behaviour of buyers and sellers. Further, different prices and trade volumes are influenced by different market structures. Again, all kinds of markets are not equally efficient in the exploitation of resources and consumers welfare also varies accordingly. Hence, the different aspects of the pricing process be analyzed in relation to the different types of markets.

Traditionally, the nature of competition is adopted as the fundamental criterion for distinguishing different types of market structure. The degree of competition may vary among the sellers as well as the buyers in different market solution. Usually, the market structures are classified in accordance with the nature of competition among the sellers. The nature of competition among the sellers is viewed on the basis of two major aspects, 1) The number of firms in the market and 2) The characteristics o products, such as whether the products are homogeneous or differentiated.

Perfect competition refers to the market structures where competition among the sellers and buyers prevails in its perfect form. In the perfectly competitive market, a single market price prevails for the commodity, which is determined by the forces of total demand and total supply In the market. Under the perfect competition, every participant (whether buyer or seller) is a price taker. Everyone has to accept the prevailing market price as individually no one is in position to influence it.

Monopoly is the other extreme form of market situation. Pure monopoly is just the opposite if perfect competition. Pure monopoly is a market structure in which there is only one seller. He controls the entire market supply of a product. Because there is no rival producing a close substitute, the monopoly form itlsef is an industry, so its output constitutes the total market supply. In a monopoly market, seller is faced with a large number of competing buyers. But, being the sole supplier, the monopolist has a strong hold over price determination. He usually tries to set the price and output of his product entirely in his own interests of profit maximization.

Monopolistic competition refers to the market structure in which there are a large number of firms producing similar but non- identical products. Monopolistic competition is a blend of monopoly and perfect competition. Monopolistic competition is similar to perfect competition in that it has a large number of sellers, but its dissimilarities lie in its product differentiation. In perfect competition, goods are identical or homogeneous, while in monopolistic competition, products are differentiated through trade mark, brand names, etc. Product differentiation confers a degree of monopoly to each seller in a market under monopolistic competition. Thus, in such a market, many monopolists compete with each other than on the selling side. There are a large number of buyers too. But each buyer has preference for a particular seller or brand of the product in the market.

Oligopoly refers to the market structure where there are a few sellers in a given line of production. Fellner defines oligopoly as "competition among the few". In an oligopolistic market, firms may be producing either a homogeneous product or may have product differentiation in a given line of production. The oligopoly model fits well in such industries as automobile, manufacturing of electrical appliances, etc.

1.4 Glossary

1. **Cost of Production** : Cost of production is the aggregate if sacrifice done directly or indirectly for the production of an unit or an aggregate of units of a commodity.
2. **Marginal Cost** : Marginal cost is addition to total cost due to the additional unit produced.
3. **Plant** : A plant is a technical unit of production.
4. **Industry** : An industry is a group of firms in a region engaged in the same or similar

production activity.

5. **Market** : The term market represents mechanism of exchange of a product which may be homogeneous or differentiated.

6. **Market Structure** : Market structure represents the existence of degree of competitiveness among firms operating in the market.

1.5 Self Learning Questions

1. Which one of the following are correct? Perfectly competitive firm:
   a) are price makers
   b) are price takers
   c) are quantity adjusters, but not price makers
   d) Both b and c
2. Which of the following is not correct in case of long-run equilibrium of a firm under perfect competition.
   a) Occurs where average revenue curve of a firm is tangent to its long-run average total cost curve
   b) occurs when a firm earns zero economic profits
   c) occurs when a firm makes only normal profits in the long run.
   d) some firms may suffer losses.
3. The demand curve for a perfect competitive firm is ----------
   a) is a horizontal straight line b) is downward sloping
   c) is perfectly inelastic d) is positive sloping
4. The slope of demand curve under monopoly is ----------
   a) positively sloping b) negatively sloping
   c) Parallel to y axis d) Parallel to x axis
5. The nature of commodity in the monopoly market is----------
   a) Differentiated b) Homogeneous
   c) Mixed in nature d) Both b and c
6. ---------- is the condition for the short-run price determination under monopoly.
   a) MC = MR b) AC = AR
   c) MC = AC d) MR = AR

7. In what situation monopolist can get excess profit?

   a) P< ATC b) P > ATC

   c) P = ATC d) None of the above

8. What is the nature of commodity under the monopolistic competition?

   a) homogeneous b) differentiate

   c) close substitutes d) both b and c

9. If a price making monopolist firm wants to maximize its sales revenue, it should----------

   a) set the highest price it can get

   b) set the lowest price it can get

   c) choose a selling price at which the elasticity of demand for its product is unity

   d) choose a selling price where the extra revenue received from the last unit sold exceeds the extra cost of making that unit.

1.6 Answers of Self Learning Questions

1.- d 2- d 3- a 4- b 5- b

6- a 7 - b 8- d 9 - c

1.7 Questions for Self Study

A) Short Notes:

1. Characteristics of Perfect Competition
2. Characteristics of Monopoly
3. Characteristics of Monopolistic Competition
4. Characteristics of Oligopoly

B) Brief answer type questions

1. Explain with the help of a diagram how is price determined in a perfectly competitive market.
2. Explain the various features of a perfectly competitive market. How is price of a commodity determined under it?
3. What is meant by firm's equilibrium? Explain the conditions of short-run equilibrium of a firm under perfect competition.
4. Explain discriminatory pricing under monopoly.

5. What is Monopoly? Explain the three conditions necessary for the existence of monopoly.
6. Explain the equilibrium of a monopoly firm.
7. What is monopolistic competition? Explain the important features of monopolistic competition.
8. What is product differentiation? What role does it play in the determination of price and output under monopolistic competition?
9. What is Oligopoly? State the price determination process under this market.

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Unit 2

PRICING-PRACTICES AND INVESTMENTS ANALYSIS

2.0 Objectives

- To study the pricing techniques.
- To study investment analysis.
- To study project appriasal methods.

A) PRICING PRACTICES

2.1 Introduction

Now a days, the subject of pricing in economic theory is an very important issue. It has both theoretical and applied aspects. Traditional theory of pricing emphasizes on the marginal principal of pricing, i.e. where marginal cost equals marginal revenue (MC = MR), the price and output of a firm, in every kind of market is determined. This is called marginal principle or marganility rule. But in actual practices, it is found that marginal principle of pricing does not operate. Evidences shown that firms, while fixing the prices of their products do not follows the marginality rule. They determine prices according to their business motives and prevailing market conditions.

Firms are operating in market not only with the objective of profit maximization but also with the objectives of sales maximization, revenue maximization, retaining in market, etc.

The firms are aware about their demand and cost conditions. Their price and output decisions are based on probabilities. Hence the marginal principle of equalising MC and MR is found to be absent, in price-output decisions. Empirical studies shown that marginal rule of pricing doesn't found true in actual practice. 'Hall and Hitch' in their empirical study shown that marginal rule fails to be applicable in pricing process of 38 firms. While fixing the prices, firms may consider average cost principle instead of marginal principle.

'Gordon' is also, of same opinion that in real business life, firms are not aware of their MC and MR, and hence the average cost principle of princing is widely used by them. Many other empirical studies support this view. Thus, there is a little link between pricing theory and pricing practices. Therefore it is necessary to understand the various forms of pricing techniques followed by the firms in actual practices. They are as follows.

2.2 Pricing Techniques

2.2.1 Cost-Plus Pricing

According to 'Hall and Hitch' and 'Andrew' in actual practices, firms are not determining the prices of their products according to the 'marginality principle' i.e. MC = MR, but they are using the 'average cost principle'. So, it is called 'full-cost theory' or 'cost-plus pricing'. Also it is called 'mark-up princing.' In actual practice firms are fixing prices according to the average cost of production. This is the most common method of pricing of a product used by various firms.

The 'Hall and Hitch' eminent Economists in Oxford University studied the pricing techniques of 38 firms through actual working. They found that firms didn't considered the marginality rule i.e. MC = MR, while determining the prices of their products. They

had not considered the maximum profit but they considered the satisfactory level of profit. So the firms can consider the full cost while fixing the prices instead of marginal cost. Full cost means the average variable cost + average fixed cost + a certain proportion of profit i.e. mark up on price. The full cost is computed as

Full cost = AVC + AFC + M

Thus, price is set as

Price = full cost.

Hence,

P = AVC + AFC + M .

Where, P = Price . .

AVC = Average variable cost

AFC = Average fixed cost

M = Mark-up percentage

The mark-up percentage is fixed. Thus, price is equal to the average fixed cost + average variable cost + mark-up percentage. In this method while fixing the price of a product, firms are taking into consideration. Total average cost + certain proportion of profit, i.e. mark up on price. Therefore this method is called "cost-plus pricing."

We can illustrate this method with the help of following example.

e.g. Suppose x firm can produces output of 1000 units per day. It recurs Total fixed cost of Rs. 4000 and Total variable cost of Rs. 6000, also it determines 10% of profit margin (i.e. mark-up) on it. What will be the price charged by the firm according cost-plus pricing ?

First, we can calculate the per unit average fixed cost by using following formula.

AFC = TFC/TP

= 4000/1000

= Rs. 4 per unit.

Where, AFc = Average fixed cost

TFc = Total fixed cost

TP = Total production

Similarly calculate the per unit average variable cost.

AVC = TVC/TP

= 6000/1000

= Rs. 6 per unit.

Where, AVC = Average variable cost

TVC = Total variable cost

TP = Total production.

Total average cost per unit will be equal to average fixed cost + average variable cost.

Total average cost per unit = AFC + AVC

= 4 + 6 = Rs.10

Net profit margin (i.e. mark-up) to total average cost per unit will be assumed 10%. It is computed as.

Net profit margin = Total average cost per unit x Mark-up

= 10 x 10 / 100

Net profit margin = Rs. 1

Price = Total average cost per unit x Net profit margin

Rs.11 = 10 + 1

Thus Rs. 11 price will be determined by the firm.

2.2.2 Multiple Pricing

The traditional pricing theory is based on the assumption that a firm can produce a single homogeneous product. In actual life firms are producing different types of multiple products. They are differ in size, shape, colour, odour, tastes etc. All firms have more than one product. Also most specilized firm can produce a product in multiple models, various size, shapes, tastes; odours, e.g. Hindustan lever company produces different kinds of bathing soaps, named, Liril, Lux, Moti, Lifebuoys, Rexona etc. They differ in all respects but they are in its line of production. These products are differentiated according to the consumer's view, but close and perfect substitutes to each other. Each product has different average revenue (AR) and Marginal revenue (MR) curves. Each product is competiting with others of a single firm. This results into production interdepsndency, in the form of joint products or alternative products. Pricing of this products is called multiproduct pricing or product line princing.

The pricing of such multiple products needs special consideration than pricing of single product. Because, each product has a separate demand curve but they all are produced by a single firm which have inseperable marginal cost curve. In this case AR and MR curves are separate but AC and MC curves are not separate. So marginality rule straight way can't be applicable to the price of each product separately. Hence, the problem raises that how to fix the price of such multiple products.

This problem of fixation of price of multiple product is solved by 'E. W. Clemens' by the price determination in discriminating monopoly. Multi-product firm tries to maximize its revenue in all its markets. Price determination by the multi-product firm can be explained with the help of following diagram.

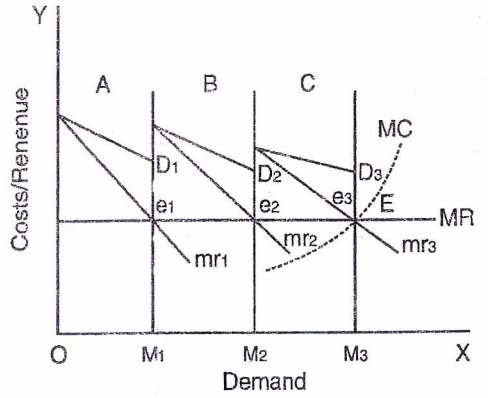

Fig. 2.1

Suppose that a firm producing three types of products, i.e. A, B, and C. The AR and MR

curves of these three products are shown as (AR = D): D1, D2, D3, we get MR,

Total marginal revenue =	Marginal revenue of A product	+	Marginal revenue of B product	+	Marginal revenue of C product

$\Sigma MR = D_1 + D_2 + D_3$

In the figure MC curves intersects EMR curve from below at the point E, Hence, the equilibrium of the firm is established at point E. Therefore firm produces OM_3 of total output. If we drawn a horizontal line from equilibrium point E towards Y-axis, it meets to MR_3 curve at point e_3, Mr_2 curve at point e_2, and Mr_1 curve at point e_1. So in OM_3 total production share of product A is OM_1, share of product B is M_1M_2 and share of product C is M_2M_3. Their prices are charged M_1e_1, M_2e_2 and M_3e_3 respectively. By determining these prices of various goods, multiple product firm can maximize it's profit.

2.2.3 Price-Discrimination

See it in price-output determination in discriminating monopoly, in unit - 1.

2.2.3.1 International price-discrimination and Dumping

When a firm sales it's product at lower price in international market and at higher

price. in domestic market is called a dumping. It is a kind of international price discrimination. Some time firms can sell it's products in international market at the price below the cost of production. Price of these dumped products will be greater than marginal cost and lower than average cost ?

Hence, AC > P > MC. Thus dumping may be defined as "that type of price discrimination, where the monopolist sells his product at a lower price in a foreign market than in the home market." It is a price discrimination, caused due to the following reasons.

1) Excess production :

When excess production takes place in domestic market, the same commodity would be dumped in international market.

2) Competition :

International competition between the firms gives rise to dumping. It's main object is to expell out the competitors from international market.

3) Increasing returns :

When law of increasing returns appears in production. It gives rise to increase in production with diminishing average cost and marginal cost. To take the advantage of increasing returns producers dump their products in international market. The demand for products in home market is inelastic, so products are sold in home market at higher prices and in international market at lower prices. Thus profit is maximized.

4) Creation of international demand :

In order to create the international demand for their products, firms can sell their products at lower prices in international market.

5) To take advantage of different elasticities :

Different elasticities are prevailing in domestic market as well as in home market. Demand in international market is found elastic and in home market it is to be less elastic. Therefore, firms are charging lower and higher prices respectively in these two markets.

Following diagram shows the price output determination under price discrimination in dumping.

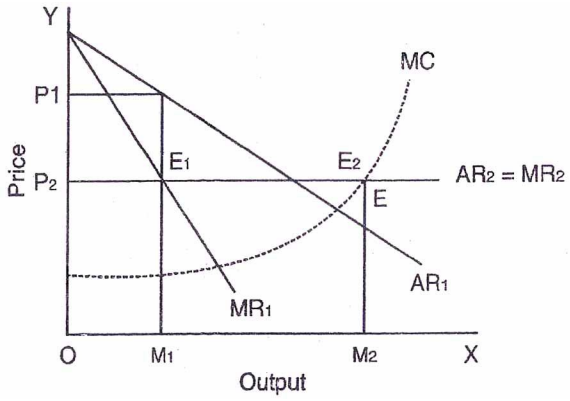

Fig. : 2.2

In the diagram, AR_1 and MR_1 are the average and marginal revenue curves of home market. They are falling from left to right, because monopoly is prevailing in home market. AR_2, and MR_2, are the average and marginal revenue curves of international market. They are horizontal to X-axis. The perfect competition is prevailing in international market.

MC curve cuts MR_2 curve from below at point E_2 so, the equilibrium of international market is established at point E_2. E_2 is a point equality of MC and MR. If a line is drawn horizontally towards Y axis from point E_2 it cuts to MR_1 curve at point E_1. Hence the equilibrium of home market is established at point E_2. E_2 is a point of equility of MC and MR. If a line is drawn horizontally towards Y axis from point E_2 it cuts to MR, at point E_1. Hence the equilibrium of home market is established at point E_1. Therefore OM_1 output is sold in home market and OP_1 price is determined.

The equilibrium of international market is established at point E_2, therefore M_1M_2 output is sold in international market and OP_2 price is determined.

Thus, in International market P_1P_2 price is determined more in home market than international market. It means that P_1P_2 price is determined less in international market than home market. It is called International price discrimination in dumping.

2.2.4 Transfer Pricing

Transfer pricing is related with the pricing techniques of very large firms. It is recent addition to the pricing theory. Large firms divide their production process into various divisions, subsidiaries and departments. The goods produced by one division or firm is used as inputs by the other divisions or firms. Therefore, the large firms are facing the problem of appropriate price determination of the goods transferred amount the various divisions or the departments of that large firm. This is called the princing of intrafirm transfer product. Each division or department has separate profit function.

'Hirshleifer' has provided a systematic treatment of the transfer pricing techniques to solve the problem of determination of transfer pricing. In practice actual solution for transfer princing is dependent upon the following conditions.

1) Prevailing market price of the product,

2) Power of divisional manager to bargain for intra-divisional transfer prices.

3) The full costs principle.

1) Use of market price :

Suppose, that product transferred from one to another divisions has a already prevailing market price. The transfer price is determined equal to the prevailing market price, i.e. prevailing market price should be the transfer price, e.g. Suppose there are two divisions A and B, B division is using the product of A as input and A sells it's product to B at higher price than market price. It incurs losses to the B division. On the contrary, if A sells its product at the lower price than existing market price. It causes losses to the A division. Therefore firm can determine the price of intra-divisional transfer product equal to the existing market price. However the quality of intra-divisional transfer firm should be equal to the quality and standard of market product.

2) Bargaining power of divisional Manager :

This method of transfer price determination is suggested by 'Joel Dean'. He says that if a divisional manager has given absolute power to determination of the transfer price. He can determine the transfer price by negotiations. He makes negotiations alike market negotiations and transfer price is determined. When there is absence of market price for intra-divisional transfer product. This is the best method of transfer price determination.

3) Transfer price based on cost :

When the product of a firm is sold only among the internal divisions (i.e. Intra-divisional Transfer) of the firm and there is no outside market is available to the product of a firm. The transfer price is determined according to the marginal cost principle. Where the firm gets maximum profit. All the divisions of a firm also get the maximum profit. This type of transfer price determination will be explained with the help of following figure.

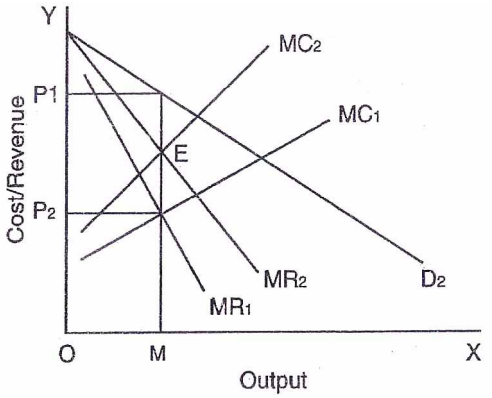

Fig. 2.3

Suppose a firm has two divisions A and B. A is manufacturing division, which sells it's product to division B, which is distributing division. There is no external market in existence to the firms product produced in division A. Division A will sell it's product to division B i.e. infra-firm transfer at the price equals to the equilibrium price determined at MC = MR. Where MC equals the MR of the division A.

D_2 is the demand curve, MR_1 and MC_1 are the marginal revenue and marginal cost curves of the division A. which is producing intermediate product. MC_2 and MR_2, are the marginal cost curve and marginal revenue curve of the division B. MC_2 curve intersects MR_2, curve from below at point E. Therefore Division B will sell OM output which is profitable to division B. At the same output below the point E_1 MC_1 intersects MR_1 from below equilibrium of division A, also established at output OM. Output OM will be optimal output for division A. Hence the division A will sell OM output and charges OP_2, price. Thus Intra-firm price i.e. transfer price will be the OP_2. It will be determined according to the cost of production incurred to the firm A.

B) CAPITAL BUDGETING

2.3 Introduction

Capital is a scare economic good. It is productive firms have only limited funds to invest firm is tring to make maximum possible gains from these available funds. In order to make large gains from capital investment, the business manager has to take a number of decisions. These decisions are related to the choice of capital projects increase in total cost of production replacement of the old and outdated machinery timing and volume of investment. These are the some aspects of capital management. These aspects forms the most important part of the managerial decisions. Firm's survival is dependent on managerial ability to conceive, analyze and set most profitable projects for investment according to the objective of the firm. These tasks of management of capital investment is called capital budgeting or long-term investment

decisions. This capital budgeting is essential for conceiving, selecting, evaluating the most profitable projects for investment.

"Capital budgeting is related with designing and carrying through a systematic investment programme. Capital budgeting is also called investment forecasting or decision making process regarding the investment. Capital budgeting is a method of decision making about the investment in various projects by the business manager.

2.4 Need of Capital Budgeting

It is essential for the following reasons.

1. Capital budgeting helps to earn the profit to firms.
2. Capital investment is made for long-run period. If capital budgeting is not done it leads to get the loss to firms. In order to avoid loss in future capital budgeting is essential.
3. Capital budgeting helps to business manager to take the correct decisions about capital investment.
4. Long term decisions are the comprehensive long term risks and uncertainties are more intensive than short-term, long-run is a big period, so there is possibility of various changes in economic situation it leads to larger losses. Therefore, to avoid these risks and uncertainties, capital budgeting is needed.

2.5 Investment Criteria

Criteria for project appriasal or evaluation. They are as follows -

1) Pay-back Method
2) Accounting method or Rate of Return
3) Net present value.

2.5.1 Pay-back Method

This is known as pay-out or pay-off period. This method is simple and most widely used method of project appriasal. This method considers the time period required to cover the total investment outlay from the income of that project. It shouldn't consider the rate of return on investment but the time period required to get the initial investment. If the project expected to generate a constant cash flow (Income) over it's life-time, the pay-back period is calculated as.

$$\text{Pay back period} = \frac{\text{Total investment outlays}}{\text{Gross return per period}}$$

$$P = \frac{I}{C}$$

Where, P = Pay back period

I = Initial Investment

C = Annual cash flow i.e. profit.

e.g. suppose a machinery costs Rs. 10,000. It's life period is 10 years and it generates Rs. 1000 annual cash flow (profit). Putting the values in above formula.

$$P = \frac{10,000}{1000}$$

P = 10 years

If the annual cash flow is not equal or it is different for different years, then the pay back period is calaculated as until and unless the total sum of annual cash flow (profit) doesn't equal to the initial investment until that year the annual cash flow is added.

e.g. suppose that total cost of project is Rs. 5000. It yields cash flow over 5 years as shown in table no. 3.

Years	**Initial Investment (Rs.)**	**Annual Cash Flow (Rs.)**	**Cumulative Income**
1	5000	1000	1000
2.	5000	1800	2800
3.	5000	1100	3900
4.	5000	1000	4900
5.	5000	900	5800
Cumulative Cash Flow		5800	

$$\text{Per Year or Annual Cash Flow} = \frac{\text{Cumulative total cash flow}}{\text{No. of years}}$$

$$= \frac{5800}{5} = 1160 \text{ Rs.}$$

$$\text{Pay back period} = \frac{\text{Initial Investment}}{\text{Annual cash flow}}$$

$$P = \frac{I}{C}$$

$$= \frac{5000}{1160} = 4.3 \text{ years.}$$

= 4 years and 3 months.

1) It doesn't consider Time value of money.

2) It doesn't consider Rate of Return on Investment / Profit.

2.5.2 Accounting Method Or Rate of Return

This method is called Accounting method. This method considers the profitability of the project. The rate of return on investment is calculated as. The average net income of the project is divided by the initial investment. In order to calculate the average net income the amount of depreciation is substracted from the total income.

$$\text{Rate of Return} = \frac{\text{Average net income}}{\text{Initial investment}}$$

i.e. $$R = \frac{A}{I} \times 100$$

Where, R = rate of Return

A = Average net Income

I = Initial investment

e.g. suppose a machinery costs Rs. 10,000 and it's life time period is of 10 years. It incures average net income 2000 per year.

Putting these values in the above formula as,

$$R = \frac{A}{I} \times 100$$

$$R = \frac{2000}{10000} \times 100$$

R = 20%

2.5.3 Net Present Value Method

Normally there is gap between the investment made in a project and income generation from that project. Any project couldn't generate the income immediately as the investment is made. Therefore, there is difference between present value of investment and future value of investment. A man has greater value to the present income than the future income. By considering this factor the future value of present investment is calculated. The present value of investment is compared with the future value of investment when the future value of investment at present rate of interest is greater than the present value of investment, then the investment is made in the project and vice-versa.

Present value is caculated with the help of formula as given below.

Net present value means difference between the present value of future income i.e. expected rate of return and the present value of initial investment. When the present value of future income is greater than the present value of initial investment investment in the project is made and vice-versa.

e.g. suppose Rs. 9000 are invested in a machinery, it's life time period is 3 years. It gets income as Rs. 3000, 5000 and 4000 respectively in the first, second and third year. The present rate of interest is 10% per year. What will be the net present value of that investment.

$$NPV = \frac{R_1}{(1+i)} + \frac{R_2}{(1+i)^2} + \frac{R_3}{(1+i)^3} + ... \frac{S}{(1+i)^n}$$

Where, V = Net present value

R_1, R_2, R_3, ..., R_n = Cash flow per year (Income)

n = No. of years

S = Depreciation

Put the values in the above formula

$$V = \frac{3000}{(1+0.1)} + \frac{5000}{(1+0.1)^2} + \frac{4000}{(1+0.1)^3} + ...$$

V = 2727.27 + 4132.23 + 3435.11

V = 10294.60

Hence, 10294.60 – 9000 = + 1294.60 profit

So, it is feasible project, so it is approved and investment is made.

2.6 Summary

Pricing of a product is an important issue today. Existence of industries depends upon the prices got to their products. There are various methods of pricing adopted by private enterprizes. They are as follows.

1) cost plus pricing, 2) multiple pricing, 3) price discrimination, 4) transfer pricing etc.

By applying these methods enterprizes are earning profit.

Investment analysis is also an important process in project appriasal. It is also called capital budgeting. It is used by business manager while determining the feasibility of projects, whether project is feasible or not for investment ? With the help of investment business manager decides whether to invest or not in the project. There are various methods used for determining project feasibility for Investment. They are as 1) Pay back method, 2) Accounting method or rate of Return and 3) Net present value. They are called method of Investment analysis.

2.7 Questions For Self Study

A) Fill in the blanks.

1. ..... is called mark up rule.
2. Multiple pricing is generally found in ..... firm.
3. Different prices are charged to the same commodity in ..... pricing.
4. Investment analysis is called as .....
5. When the present value of future income is calculated, is called .....

Ans. : 1) Cost plus pricing

2) multi product

3) price discrimination

4) capital budgeting

5) net present value

B) State True or False.

1. Cost plus pricing is also called full cost pricing.
2. Transfer pricing is found in small firms or industries.
3. There are four criteria of project appriasal.
4. Multiple pricing technique is given by J. M. Keynes.

5. Transfer pricing technique is given by Hirschleifer.

Ans. : 1) True 2) False 3) False 4) False 5) True

2.8 Questions for Practice

1. Fully explain cost plus pricing.
2. What is multiple pricing ? How multiple pricing takes place.
3. State the transfer price determination in the market.
4. Explain various investment criteria.
5. State pay back method.
6. Fully explain the net present value method of project appriasal.
7. Short Notes :
   (i) Mark up rule
   (ii) Transfer pricing
   (iii) Rate of Return
   (iv) Capital Budgeting

2.9 References for more Reading

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❑❑❑

Unit 3
BUSINESS CYCLES

3.0 Objectives

1. To study Business Cycles.
2. To study the causes of emergence of business cycles i.e. Theories of Business Cycles.

3.1 Introduction

Trade cycles are also known as business cycles. They are economic fluctuations, i.e. ups and downs or booms and slumps in business activities. They influence the business decisions. Business cycle causes the inflation and deflation and also leads to higher employment and unemployment in economy. Thus, business cycles affect the whole economy regarding the economic growth and development positively as well as negatively. When business cycle results into prosperity and booms, it leads to higher economic development. On the other hand, when it causes slumps and economic depression, it leads to unemployment and retards the economic development. Thus, the problem of business cycle is a macro-economic problem. In order to achieve the sustained economic development, business cycles should be controlled by applying

a suitable economic policy.

The business cycle is defined by the most eminent scholars as follow.

According to 'Prof. Haberler', "The business cycle in general sense may be defined as an alternation of periods of prosperity and depression of good and bad trade." 'Mitehell' defined it as, "Business cycles are species of fluctuations in the economic activities of organized communities."

'Hawtery' calls it as "Trade cycle is a monetary phenomenon."

According to 'Keynes', "A business cycle as composed of periods of good trade characterized by rising prices and low unemployment periods of bad trade characterized by falling prices and high unemployment percentages."

'Gordon' defined as "business cycles consists of recurring alternations of expansion and contraction in aggregate economic activity, the alternating movements in each direction being self-reinforcing and prevailing virtually all parts of the economy."

3.2 Features of Business-cycles

Various definitions of business cycles show the following features.

1) Business cycles are of short period as well as long period.
2) They are synchronic, i.e. when they start in one sector, they spread to other sectors also.
3) Business cycle is a phenomenon, which affects the whole economy.
4) It has four phases, viz, prosperity, recession, depression and recovery.
5) Business cycles are recurrent and recurring, i.e. They appears again and. again, prosperity is followed by depression.
6) Business cycles are regularly appearing cycles in capitalistic economy.
7) They begin from any stage, i.e. prosperity, depression, recovery or recession.
8) Business cycle is cumulative and self reinforcing phenomenon. It's one phase gives rise to another phase.
9) They are asymmetrical i.e. prosperity stage is slowly and gradually appearing stage, while the depression is rapidly appearing stage.
10) Business cycles have different impact on different industries.
11) They are international in character. They are passed from one country to another through international trade.

3.3 Phases of business - cycle

There are four phases of business cycle. When all of these four phases are to be completed, it is called as the completion, of one business cycle. These four phases are as follows.

1) Recovery

2) Prosperity or boom

3) Recession

4) Depression

Following figure explains the four phases of business cycle.

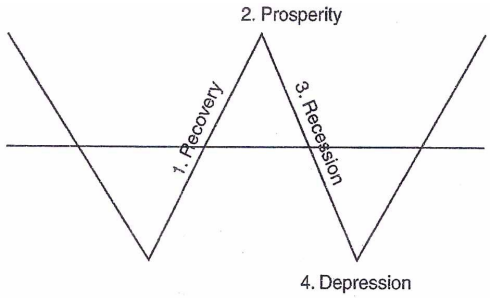


Fig. 3.1

1) Recovery :

When the business cycle begins with recovery, it may be called as the first stage of business cycle. This is the stage, in which the economy turns from depression to prosperity. In this stage all economic factors reveal recovery, total output, employment and income are slowly rising. Increase in economy. Rise in employment leads to increase the income of people, it leads to rise in personal income in turn it leads to increase in demand for various. goods and services. It causes to rise in price, profit, investments, employment and output in economy. Thus, recovery in all economic variables leads to the prosperity stage.

2) Prosperity :

When the recovery in various economic factors reaches to the peak point level, it causes the prosperity stage. As total output, employment and income go on increase price also increases. Higher price leads to higher profit, higher investment, higher employment and output in economy. The rising trend in all these economic factors reaches to apex point. This apex point is referred as boom or prosperity stage. The growth rate of economy reaches at its maximum point in prosperity stage. Optimism prevails in all fields. It gives rise to prosperity.

3) Recession :

Prosperity stage gives rise to disequilibrium between demand and supply. It is found that when supply of goods and services is larger. It leads to price fall. Hence prices of various goods and services go on decrease. It causes to lower profit lower investment, lower employment, lower income. Hence optimism is substituted by pessimism. It causes reduction in bank loans and advances in turn it leads to fall in investment, fall in income, fall in demand, prices, profit and again fail in Investment. Hence the recession appears in economy. It stops the business expansion and leads to reduction in all economic growth variables and adversely affects the reduction in growth rate of economy. Thus finally it results .into economic depression.

4) Depression :

Recessionary stage ultimately gives rise to economic depression. In this stage, business men are aware about their mistakes of excess investment in economy. So they reduce investment, employment and output. The reduction in investment leads to fall in employment. Fall in employment results into decrease income, demand, prices, profit and again reduction in investment. When the recessionary cycle begins, it becomes intensive. The rate of fall in various economic variables gears up. Recessiory stage becomes intensified and finally it leads to economic depression.

When the economic depression appears the investment, employment, output and income level reaches to it's minimum bottom level. Huge unemployment is the result of economic depression. It stops the production. Thus, economic depression leads to huge unemployment and minimum bottom level of production. The rate of economic growth is very low. The stage of economic depression is very dangerous to economy.

3.4 Theories-of Business-Cycle

In order to explain the phenomenon of business cycle, various theories are given by the various economists. These theories are classified into monetary and non monetary theories. Some economists stressed on economic factors and some on non economic factors. Which are responsible for the emergence of trade cycles.

3.4.1 Cob-web Theory of Business Cycle

Cob-web theory gives a systematic explanation of self-prepetuating cycle of price and quantities of production. This theory is given by 'Henry Schultz' 'Jan Tinbergen' and 'Arthur Hanau'. They developed the price quantity relationship independently. 'Henry Schultz' has .given the name to this price quantity relationship as 'Cob-Wed'Theorem.'

While formulating this theory the economic system is analysed at a point of time and its movements are observed through time. No time lag is assumed. The adjustment between price of a commodity and quantity of commodity-demanded and supplied

occurs at the same time. Cob-web theory shows the dynamic explanation of the fluctuations in commodity prices and quantities of production.

This theory is particularly applied to the cycles in prices and quantities of agricultural commodities. It is based on the following assumptions.

Assumptions :

1) Pure competition is existing in market.
2) The price of commodity is dependent upon the supply of commodity available in current period.
3) The production in next time period is governed by the current prices of commodity.
4) Production can't be changed before the expiry of one full period.

This theory explains the three types of fluctions as i) perpetual or Continuous Oscillations or Cobweb ii) Convergent Oscillations or Cobweb iii) Divergent Oscillations or Cobweb.

1) Perpetual oscillations or Cob-Web :

Also, these Oscillations are called Continuous Oscillations or Cobweb. In this type of oscillations the price and production may continue as the price is completely determined by the current supply and supply is wholly determined by the preceding price. The same prices and quantities of production are repeated indefinitely without an equilibrium is being reached. When the demand curve existing is exactly reverase of the supply curve and both curve have the same elasticities, in this situation continuous cobweb or perpetual oscillations are borned in economy. This situation is shown in the following figure.

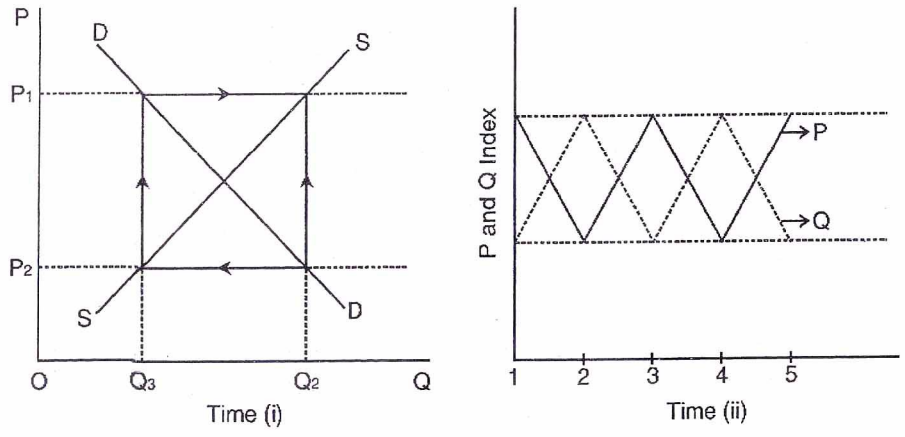


Fig. 3.9

Figure (i) reveals the continuous Cob-Web or Perpetual Oscillations. DD is demand. curve and SS is supply curve. P_1 is the initial price in the first time period to the corresponding supply Q_3. In (he second time period the production increases to Q_2 due to the higher price P_1 existing in the first period. At Q_2 production, supply remains greater than demand (S>D). So price falls to P_2 in this period. The lower price P_2, in the third time period causes to reduce the production to Q_3. At the Q_3 production, demand remains greater than supply (D>S). Therefore price rises to P_1 again in the third period. This P_1 price in the fourth period raises supply again to Q_2. Thus the prices and production quantities movement follows the sequence as P_1Q_2, P_2Q_3, P_1Q_2 ..... It goes on continuously without having tendency So reach at equilibrium.

Figure (ii) shows the Continuous or Peretual movements in prices and quantities of production by the curves P and Q respectively.

2) Convergent Oscillations or Cob-Web :

When the elasticities of demand and supply of production goods are different, it gives rise to convergent Cob-Web. In this situation elasticity of supply is less than demand. Price change affects supply relatively less than demand. The price and production quantities are adjusted in such a manner that which reach to equilibrium position, in the convergent type of Cob-Web, when economy is disturbed from equilibrium position, shows a tendency to regain equilibrium through a series of oscillation produced. Every succeeding fluctuation is more damped than the preceding one. The Cob-Web of damped oscillation is shown in the following figure (3.10)

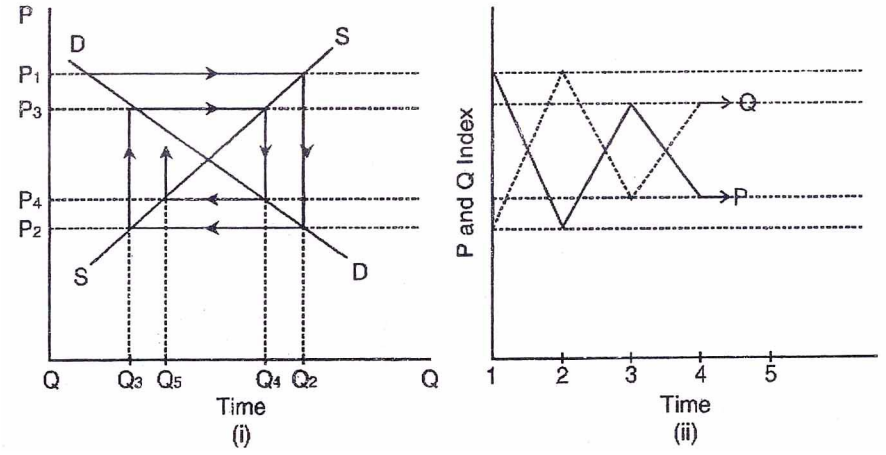


Fig. 3.10

Figure (i) shows the existence of convergent oscillations in prices and quantities of production, when the SS supply curve is less elastic than the demand curve DD. In the first time period P_1 price is prevailing therefore supply in the period second will be Q_2. It shows supply is greater than demand (S>D). Which leads to fall in price to P_2 in

second period. Lower price P_2, causes lower supply Q_3 in third period. This causes larger demand than supply (D>S). So, it causes to increase in price to P_3 in the third period. Price P_3 leads to Q_4 supply in fourth period. In such a way fluctuations in prices and quantities of production are found more and more damped showing the sequence P_1Q_2, P_2Q_3, P_3Q_4, P_4Q_5 ..... finally price and production shows a tendency to reach the equilibrium position. Figure, ii) reveals the damped fluctuations with the help of P and Q curves.

3) Divergent oscillations or Cob-Web :

When the demand curve is less elastic than supply curve, it produces the divergent oscillations regarding the price and production quantities. When price changes supply changes more than demand. The adjustment in prices and production quantities occur in such a way that price and supply continuously move away from equilibrium position. The amplitude of cycles (fluctuations) continuously increasing during the passage of time period.

The divergent Cob-Web is illustrated in the following figure. (3.11)

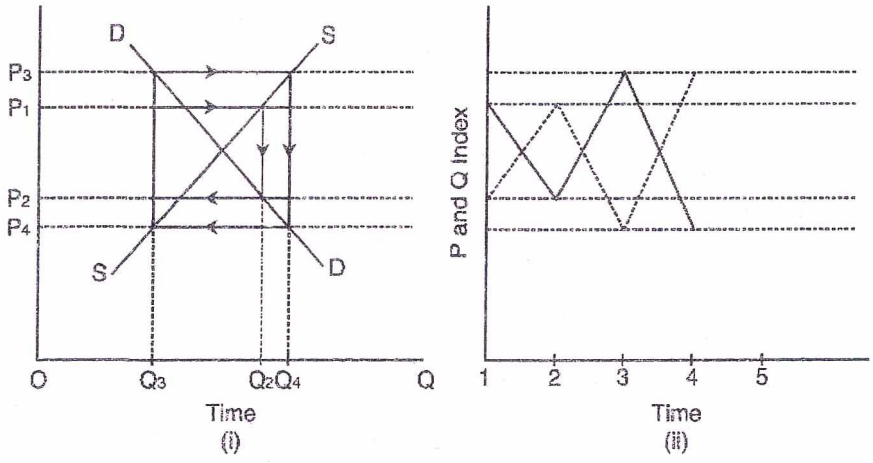


Fig. 3.11

Figure (i) exhibits the fluctuations in price and production quantity, which are divergent in nature. When the demand curve is less elastic than the supply curve, divergent type of fluctuations are borned, initial price P_1 gives rise to Q_2 supply in the next period, it reveals supply is greater than demand (S>D). Therefore price moves downwards to P_2 in the second period. The lower price P_2 Causes to fall in supply to Q_3 in the third period. Q_3 supply is less than demand, so price rises to P_3. increased price P_3 gives rise to increased production, so supply i.e. production rises to Q_4, in the fourth period. This rise in supply causes to fail in price, So price becomes P_4. Thus this rise and fall in price and production gives rise to divergent cob-web as P_1Q_2, P_2Q_3, P_3Q_4, P_4Q_5.....The economic cycles continuously moves away from the

equilibrium position. Therefore they are referred as divergent cob-web. Figure (ii) reveals divergent oscillations by the P and Q curves respectively. The amplitude of fluctuations go on increasing during the passage of time.

Mathematical representation of Cob-web Model :

"Cob-Web model basically .assumes that demand in current period D_t is a function of current price P_t. The supply in current period S_t is a function of the price in the preceding time period Pt-1. When Dt = St the equilibrium in economy is to be established. This relationship is expressed mathematically as follow.

$$D_t = x - bP_1 \qquad \text{..... (1)}$$

$$St = a.P_{t-1} - 1Y \qquad \text{..... (2)}$$

and $D_t = S_t$ ..... (3)

where, X and Y are the quantity demanded and supplied, independent to price, b and a are the coefficients determining the slopes of demand and supply functions respectively:

Now put the equations (1) and (2) in equation (3). We get equation No. (4).

$$D_t = S_t$$

$$x - bP_t = aP_{t-1} - Y$$

$$bP_t = X + Y = aP_{t-1}$$

$$P_t = X + Y/b = (-a/b)P_{t-1} \qquad \text{.... (4)}$$

This is general equation for cob-web theorem. With the help of this genera! equation, we can formulate the relationship for various periods as follow.

$$P_1 = \frac{X+Y}{b} + \left(-\frac{a}{b}\right)P_0$$

$$P_2 = \frac{X+Y}{b} + \left(-\frac{a}{b}\right)P_1$$

Criticisms :

This theory is criticized as follows.

1) It is based on various assumptions :

This theory assumes pure competition existing in market, Also price is governed

by supply, future production depends on current price etc. Out of these some assumptions are unrealistic and some are not wholly found true. The factors which are not considered by this theory are also responsible for the cyclical fluctuations.

2) This theory ignores the expections :

Future expections regarding the production and prices also cause the cyclical fluctuations. This theory says that future production depends on current prices, but production decisions are also influenced by the expected prices in the next time period. This theory ignores this expected prices. So, theory loses it's truthfulness.

3) Divergent cycles are not found in real world :

This theory says that divergent cob-web disturb the initial equilibrium between price and production (supply) in such a manner that infinite cycle of explosive fluctuations are produced. In reality such divergent fluctuations are not found any where. Therefore divergent cob-web is unreal.

4) Continuous cob-wed also not found in real world :

This theory says that continuous cob-webs or fluctuations are produced with regards to prices and production. In real world such type of cob-webs are also not found.

3.4.2 Hicks's Theory business cycle

Prof. J. R. Hicks has given his theory of business cycle in his book named 'A contribution to the Theory of trade cycle. He has formulated his theory of trade cycle with the help of the multiplier accelerator interaction. According to Hicks multiplier and accelerator are the two sides of the theory of fluctuations, just as the theory of demand and theory of supply are two sides of the theory of value. In Hicks' theory of business cycle multiplier, accelerator, warranted rate of growth of income, induced and autonomous investments are the main components play an important role in business fluctuations. The warranted rate of growth is the growth rate of economy at which rate of real investment is equal to the rate of saving in economy. The interaction between the multiplier and the accelerator causes economic fluctuations around the warranted rate of growth, which is the equilibrium income growth path.

Hicks' model is based on consumption function, an induced investment function, with a fixed accelerator and an autonomous investment. The consumption function shows a lagged income consumption relationship as

$$C_t = \propto Y_{t-1}$$

i.e. consumption in period is regarded as a function of income (y) of the previous period (t–1).

Autonomous investment is not depend upon changes in level of income. So, it is not related to the growth of economy Induced investment depends on changes in the level of income. Therefore it depends upon the growth rate of economy. The induced investment plays a crucial role in Hicks' theory of business cycle, because the accelerator depends on it. According to Hicks the increase in income from one period to the next period leads to induced investment, which interacts through the multiplier. This is hicksian accelerators.

Assumption :

1) Hicks assumes a progressive economy in which autonomous investment is increasing at a constant or regular rate.
2) The saving investment coefficients are such that any displacement from equilibrium results in a movement away from equilibrium path leads to a Lagged movement.
3) Induced investment responds to changes in output with a time lag.
4) The full employment ceiling is a constraint on the upwards expansion.
5) The accelerator provides an indirect constraint on the down ward movement of the economy.
6) The multiplier and accelerator have constant values through out the different phases of the trade cycle.

Hicks' theory of business cycle is explained with the help of following figure 3.8.

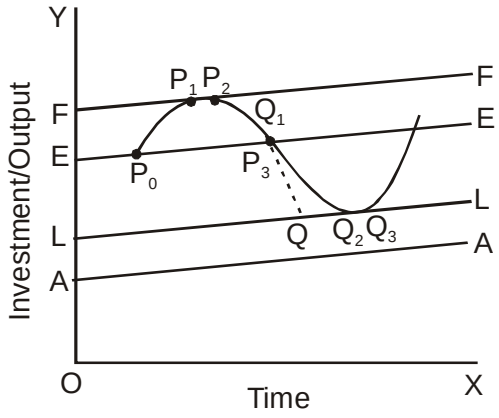


Fig. 3.8

In the figure above the line AA shows the path of autonomous investment growing at a constant rate. The line EE reveals the equilibrium path of output. Which depends on AA and is deduced by applying super multiplier to it. Line FF shows the full employment ceiling level above the line EE. Which is growing at the same rate at

which AA is growing. The line LL represents the lower equilibrium path output or the floor.

Now we can see how the acceleration effect results in cyclical fluctuation in income.

When there is increase in the rate of autonomous investment, it leads to an upward movement in income. P_0 is a noncyciical point on the equilibrium path. The autonomous investment causes the interaction of the multiplier and accelerator, so economy moves upwards expansion path from the point P_0 to P_1. This upswing phase is related to the standard cycle, which leads to explosive situation due to the given the values of multiplier and accelerator Income and output do not rise above the point P_1 due to the upper limit or ceiling set by the full employment level FF. When the economy reaches the full employment Ceiling at point P_1, it creeps along the ceiling to the point P_2 for some time of a period, and the downward movement does not start immediately. The economy moves along the ceiling point from the points P_1 to P_2 it depends on the investment lag. If investment lag is greater the economy will move along the ceiling path. Income at this level is falling as compare to the previous stage of the cycle. So the investment is decreasing. It leads to the downward movement of economy, it gives rise to downswing of the cycle.

The downswing movement is caused due to the reverse mechanism of the multiplier-accelerator. Fall in investment causes to reduce the income, in turn reduction in income causes further fall in investment and so on. Continuous working of the accelerator causes fall in output below the equilibrium level EE. This fall in output P_2P_3Q is steep one. During the dwonswing movement acceleration does not work quickly as in upswing movement. When the slump is very severe, induced investment falls to zero and accelerator co-efficient becomes zero. The Fall in rate of investment is equal to the rate of depreciation. Therefore the total amount of investment is equal to autonomous investment minus the constant rate of depreciation in economy. The fall in output is much gradual and the slump is much longer than the boom as shown by Q_1Q_2 Points. At the point Q_2 the slump reaches to the bottom line i.e. floor level as shown by line LL it can't fall below the point Q_2 and economy does not move upwards immediately from the point Q_2, but it moves along the lower equilibrium line LL up to the point Q_3 due to the prevelence of excess capacity in economy. When the all excess capacity is vanished, autonomous investment causes to rise in income, which in turn leads to increase in induced investment. Induced investment causes to operate the functioning of accelerator with multiplier, so that the economy moves upwards to the ceiling line FF and again the upward cycle may emerge. Hence, the cyclical ups and downs are repeated in economy. They give rise to business cycles. Thus, Hicks has given satisfactory explanation . of turning point as well as the periodicity of the cycle. Since the system has an upper ceiling limit and a lower floor limit, output and income changes oscillates between these two limits alike pendulum of the clock.

Criticism :

The Hicks's theory is criticized on the following grounds.

1) 'Prof Kaldor' says that this theory uses crude and misleading acceleration principle. This theory assumes constant capital output ratio. In reality, capital output ratio is not constant but it is found variable.

2) This theory assumes continuous autonomous investment during the different phases at a steady pace in the slump period, it is found that autonomous investment falls below it's normal level So, this is unrealistic assumption.

3) Hicksian phenomenon of trade cycle is highly mechanical, in reality trade cycle movement can't take place mechanically as described by Hicks.

4) 'Duesenberry' and 'Lundberg' criticized this theory as Hick's distinction between autonomous investment and induced investment is not found feasible in practice. In short run every investment is autonomous and in longrun most of the autonomous investment becomes induced. Therefore it is difficult to distinguish between the autonomous investment and induced investment.

5) Hicks in his mode! says that full employment ceiling is independent of the path of output but critics say that full employment level depends upon the magnitude of resources available in country.

3.4.3 Samuelson's theory of Business cycle (Samuelson's Model) :

Samuelson while formulating his model of business cycle, he considered the multiplier acceleration interaction. Both the multiplier and acceleration act and react on each other, it causes business cycles. According to Samuelson interaction between the multiplier and acceleration generate income. It gives rise to increase in consumption demands as well as investment demands and leads to increase in total income. So as it generates economic fluctuations.

Multiplier-acceleration interaction is called the super multiplier. It shows initial small investment in economy causes to generate multiplier effect and multiplier effect gives rise to acceleration principle effect, which ultimately leads to increase the total income in economy and causes business cycle. Multiplier and acceleration effect is considered by the samuelson and Hicks, while formulating business cycle theory Therefore, it is called the 'Modern theory of business cycle." Both Samuelson and Hicks formulated their separate theories of business cycle. So they are called Samuelson model and Hick's model of business cycle.

Samuelson while formulating his model of business cycle, he first considered the multiplier effect. He divided investment into two forms, i) Autonomous investment and ii) induced investment. When autonomous investment takes place in economy. It gives rise to multiplier effect. Initial small autonomous investment leads to increase in total

income in economy through the process consumption expenditure, induced consumption expenditure gives rise to induced investment, in turn these induced consumption and induced investment together causes the rise in total income in economy. It is called the multiplier-acceleration interaction. Which leads to business cycles.

Samuelson developed his model by assuming the following things.

1) Existence of closed economy, i.e. There is no government activity and foreign trade.
2) One period Lag in consumption and investment.
3) Absence of excess productive capacity in economy.
4) Different values of marginal propensity to consume i.e. $\propto$ and acclerator i.e. β result in changes in levels of income which causes business cycle.

The total income (i.e. National income generated (Yt) during a given time period t, depends on autonomous government spending (Gt), induced consumption (Ct) and the induced private investment (I_t). It means that national income generated in economy depends upon three factors. Viz. Autonomous government spending, consumption expenditure and private investment.

It is expressed mathematically as

$$Yt = Gt + Ct + I_t \quad \text{..... (1)}$$

Suppose that consumption is a function of previous income.

$$Ct = \propto Y_{t-1} \quad \text{..... (2)}$$

Ct = Consumption during a given time period t.

$\propto$ = Marginal propensity to consume.

Y_{t-1} = Income generated in the period t-1

The investment in current time period is a function of the change in consumption in current time period over that of the previous time period.

$$I_t = \beta\ (Ct - Ct - 1) \quad \text{..... (3)}$$

Where,

It = Investment in current time period t.

β = accelerator

C_t = consumption in current time period.

C_{t-1} = consumption in previous time period or in t-1 time period.

According to the acceleration principle current period consumption depends upon the income generated in previous period t-1. Similarly the consumption in period t-1 depends upon the income generated in its previous period t–2. it can be put up as

$C_t = f(Y_{t-1})$ and $C_{t-1} = f(Y_{t-2})$

Hence, equation (3) becomes

$$I_t = \beta(\propto Y_{t-1} - \propto Y_{t-2}) \qquad \text{..... (4)}$$

Putting the equations (2) and (4) in equation (1) we get

$$Y_t = G_t + \propto Y_{t-1} + (\propto Y_{t-1} - \propto Y_{t-2})$$

$$Y_t = G_t + Y_{t-1}(\propto + \propto \beta) - \propto \beta Y_{t-2}$$

$$Y_t = G_t + Y_{t-1}(1-\beta) \propto - \propto \beta Y_{t-2}$$

$$Y_t = G_t + Y_{t-1}(1+\beta) \propto - \propto \beta Y_{t-2} \qquad \text{..... (5)}$$

The final equation (5) states that aggregate income in any given time period If is the sum of the autonomous government expenditure G_t, consumption expenditure C_t, consumption expenditure depends upon the marginal propensity to consume $\propto$ and the income of the preceding time period Y_{t-1} and the investment expenditure which depends on capita! output ratio or the accelerator β, and change in consumption in time period t, i.e. $C = C_t - C_{t-1}$. When the values of $\propto$, β and G_t are given and the consumption expenditure for current period t and the preceding period t–1, are known, we can determine the equilibrium Income Y_t for current period,

In order to calculate the national income assume the value of marginal propensity to consume i.e. $\propto$ is greater than less than 1. viz. $0 < \propto < 1$. The value of accelerator β is greater than zero, i.e. $\beta > 0$. G_t is given 1 Rs and the values of $\propto$ and β are given in the following table.

T – 3.1

Case	Values	Cycle behaviour
1	$\propto = 0.5$	Cycleless path
	$\beta = 0$	
2	$\propto = 0.5$	Damped fluctuation
	$\beta = 1$	
3	$\propto = 0.5$	Fluctuations of
	$\beta = 12$	constant Amplitude
4	$\propto = 0.5$	Explosive cycles
	$\beta = 0.5$	
5	$\propto = 0.5$	Cycletess explosive
	$\beta = 4$	Path

With the different values of $\propto$ and β, super multiplier will cause five types of fluctuations.

Case 1 :

When $\propto = 0.5$ and $\beta = 0$. These values will simply creates pure multiplier effect. Acceleration co-efficient is zero, so accelerator doesn't play any role in income generation. So, it shows cycleless path as shown in following figure 3.2.

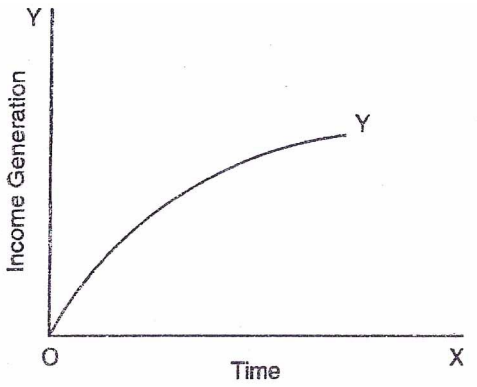


Fig. 3.2

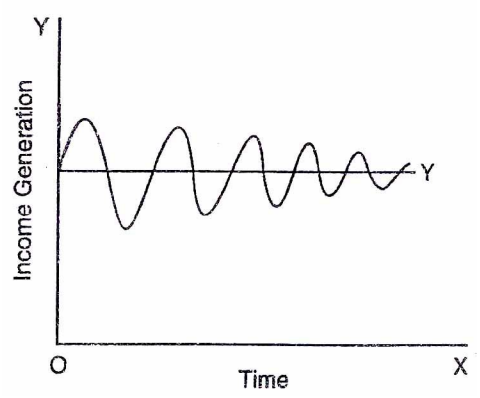


Fig. 3.3

Case 2 :

When α = 0.5 and β = 1. It produces damped fluctuation path. As they move around the multiplier path they show failing tendency and subside to that level as shown in figure 3.3

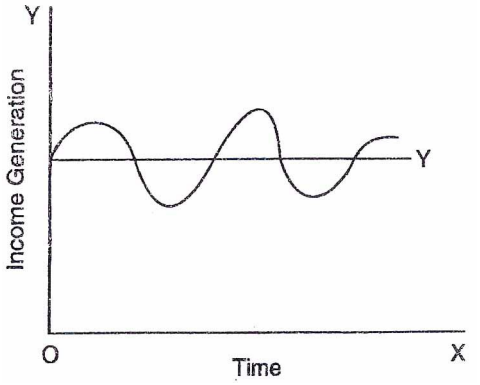


Fig. 3.4

Case3 :

When α = 0.5 and β = 2. These values can generate regular cycles of constant amplitude repeating themselves around the multiplier level. They are depicted in figure 3.4.

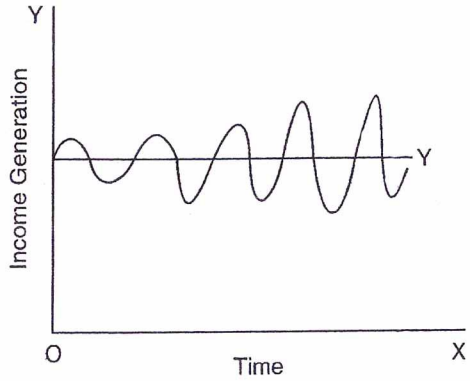


Fig. 3.5

Case 4 :

When α =0.5 and β = 3, It shows explosive cycles. In this case variations about the multiplier level become more and more intense over a time, as in figure 3.5.

Case 5 :

α = 0.5 and β = 4. It shows cycleless explosive rising path of income level gradually approaching a compound interest rate of growth as shown in figure 3.6.

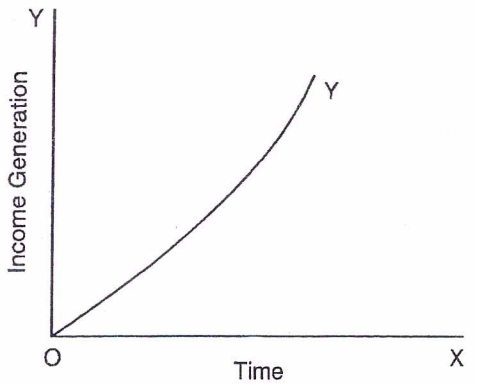


Fig. 3.6

Samuelson revealed the various types of fluctuations at given different values of $\propto$ and β, in four different regions as shown in figure No. 3.7.

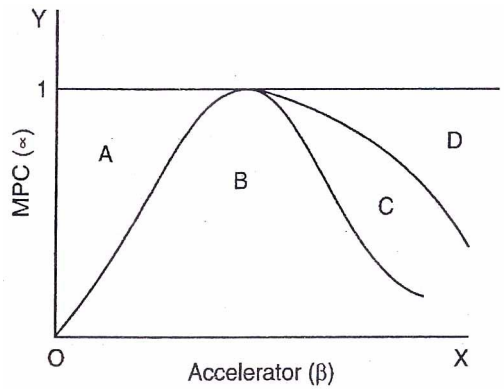


Fig. 3.7

Various combinations of $\propto$ and β with different values can generate four different pattern of income as shown in Fig. 3.7. The combinations of $\propto$ and β fall in area A can generate damped non cyclical income movement. The combinations of $\propto$ and β with different values fall in the region B produces damped cyclical movements in income. The region. C shows the explosive cyclical movements in income with the various combinations of $\propto$ and β with different values. The region D reveals the different combinations of $\propto$ and β with different, values can produce explosive non cyclical movements in income. .

Criticisms :

1) This theory doesn't give the perfect explanation of the emergence of business cycle. 'Duesenberry' rightly stated that although "the basic concept of multiplier, acceleration is an important one but we can't really expect to explain observed cycles by a mechanical application of that concept."
2) This model explains that cycles which can oscillate in a stationary level in a trendless economy. So, it is not realistic, because economy is not trendless but it shows process of growth.

3.4.4 Goodwin's Trade Cycle Model :

In the trade cycle model Goodwin has given importance to the accelerator, which causes the economic fluctuations in economy. According to Goodwin change in net investment leads rise the output through accelerator in economy. It results in to trade cycles.

According to Goodwin Trade Cycle is a non linear phenomenon. Hence he has given nonlinear model of Trade cycles. In this model Goodwin emphasized on the factors, which are responsible for the emergence of trade cycles as desired capital, K, Actual capital - K, Net Investment I, Autonomous consumption Co, Accelerator a, and total output y.

Goodwin says that change in consumption leads to change in investment, change in investment gives rise to accelerator, and it leads to change in total output in economy and ultimately causes to trade cycles.

While explaining the model, he assumed the linear consumption function as

$C = \mu y + CO$

where, C = Comsumption function

μy = Propensity to consume / Ratio of consumption - income

Co = Autonomus Consumption

It means that total consumption is a function of μy and Co. i. e. total consumption is a sum of μy and Co.

Net investment in economy (I) is equal to the change in capital stock. i. e. $mI = mK$. Change in capital is equal to the differrence between Actual capital-K and desired capital-$\overline{K}$ Therefore,

K = Actual Capital

$\overline{K}$ = Desired Capital,

Where, $\overline{K} = \beta y + \mu$

in this equation,

$\overline{K}$ = desired capital

β = Accelerator - a

μ = Consmption = income Ratio

y = Total output

According Goodwin $\overline{K}$ is proportional to y. It means that there is proportional relationship between desired Capital - $\overline{K}$ and total output - y. Change in desired capital causes the proportionate change in total output in economy. It leads to economic fluctuations.

According to Goodwin, there are three possibilities of Net investments on follow.

1) When $\overline{K} >$ = K, will it increases the rate of net investment, it leads to shift the economy to full capacity output in capital goods industries.

2) When $\overline{K}$ = K this equilibrium situation is maintained only by meeting the replacement demand, in this situation net investment remains zero, i. e. I = O.

3) When K $>$ $\overline{K}$ adjustment take place with the replacement rate, K_2. It causes lower demand for capital goods.

How trade cycles are emerged in economy is explained by Goodwin as that changes in actual capital K and desired capital $\overline{K}$ gives rise to trade cycles in economy.

He says that when K = $\overline{K}$ equilibrium situation is emerged, total output in economy remains as,

$$y = \frac{1}{1-\alpha}(Co + I)$$

where, I = a, a is the technological growthfactor i. e. accelerator.

Continious change in technology leads to increase in desired capital $\overline{K}$. When technological factor causes disequilibrium in actual capital and desired capital i. e. $K \neq \overline{K}$, It gives rise to economic fluctuations in economy.

When $\overline{K} > K$ situation is existing in economy, it leads to the situation that desired capital remains greater than actual capital. This condition causes to increase net investment, increased investment leads to exist multiplier effect and acceleration effect. Both multiplier and accelerator causes to increase in total output of ecnonomy. As the total output increases, investment in economy increases. Net increase in investment is equal to the difference between actual capital and desired capital i. e. $\overline{K}$ - K. The difference between the investment is determined by the rate of increase in total output in economy. This relationship between Investment and output in economy remains continuous. It causes the economic prosperity in economy. This prosperity stage reaches in such a situation, where $I = \frac{dk}{dt} = K_1$. It is the rate f capital goods capacity output. This rate of capital goods output K_1 restricts the increase in output and accelerator becomes discontinuous. During the expansion phase investment situation in economy becomes $\overline{K} > K$, but at the peak the situatin $\overline{K} > K$ changes and becomes K = $\overline{K}$, i.e. of actual investment becomes equal to the desired investment and hence the equilibrim situation is arised due to the decline in the rate of autonomous investment. Once the desired capital $\overline{K}$ exceeds the actual capital K_1 the desired capital $\overline{K}$ becomes equal to the replacement rate K_2. It leads to fall in the desired capital $\overline{K}$ and autonomous investment. It causes contraction path in economy.

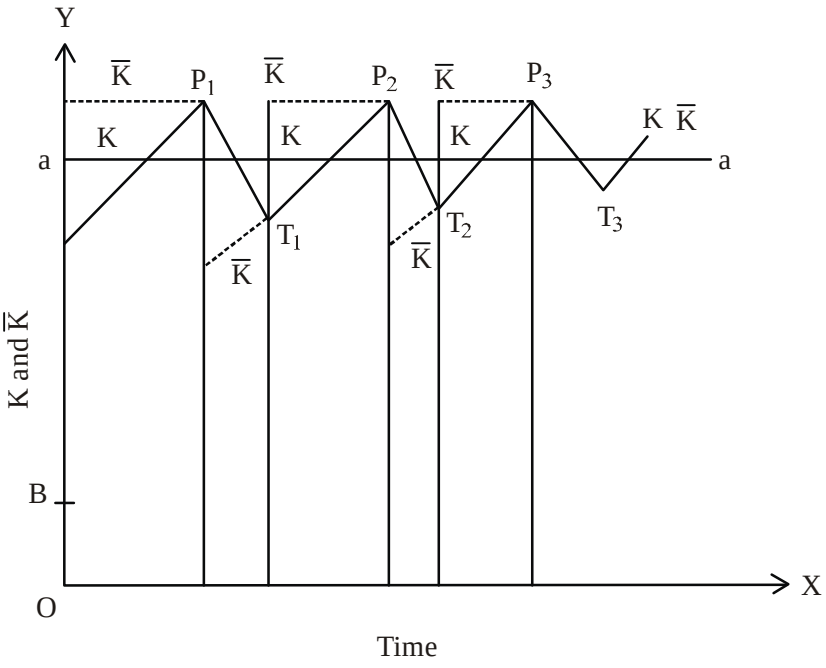
During the contraction phase when $K > \bar{K}$ the gap between K and $\bar{K}$ is met by replacement rate K_2. Simultaneously the desired capital $\bar{K}$ continuously rising due to the technological growth factor This gap betwen K and $\bar{K}$ is closed due to the gradual elimination of excess capacity through failure to replacement of capital and use of innovations in capital goods. It pushes the contraction path at it's lower point I - - K_2 and leads to the phase of economic depression.

It the phase of economic depression, economy reaches the lower turning point of $K = \bar{K}$, the level of desired capital $\bar{K}$ is to be raised by stimulating the constant technical growth factor. It leads to the situation again where $\bar{K} > K$ and it gives rise to expansion pahse. When technical progress continues, the economy can't remain at the lower turning point and it leads to expand the economy. It gives rise to economic prosperity phase. Hence Goodwin says that as against the Hickian model that trade cycles does not creep along the floor or equilibrium level but it Jumps from these levels. Both boom and recession bring contraction and recovery. If the growth factor does not exist in technological change, there is no autonomous investment in capital stock. It results in to the stuck economy i.e. it can't move further in the contraction phase for a long time instead of expansion because it takes more time for capital to depreciate than the capital formation and economic depression exists in economy.

Thus, Goodwin model says that Technological factor is most important factor in the creation of trade cycles in economy.

When technological growth factor is included, $\bar{K}$ continues to increase with each cycle and it takes long time for K to equal $\bar{K}$ in the expansion phase. When there is no introduction of technological growth factor, it leads to contraction phase. Contraction phase remains shorter than the expansion phase. Thus, presence and absence of technological growth factor gives rise to peaks and troughs at the higher level than the earlier peaks and troughs of trade cycles. It is shown in the following diagram no. 3.3.3

Diagram No. 3.3.3 Goodwins Trade cycle Model



In the above diagram aa line is the equilibrium line where $\overline{K}$ = K. Higher and lower stage of $\overline{K}$ is shown by dotted line At the point P_1 $\overline{K} > K$, So it creates prosperity phase where $\overline{K}$ = K. So, K is also higher than lower stage of $\overline{K}$ = K. At the point T_1 $\overline{K}$ is lower tha the upper K, So, K also remain lower at the point T_1 where $\overline{K}$ = K. It gives rise to troughts. At the contraction path P_1 T_1 becomes shorter than the expansion path T_3 P_2.

Thus, due to the intraduction of technology in economy $\overline{K} > K$, gives rise to the expansion path of economy and gives rise to P_1 P_2 P_3 prosperity cycles, where as absence to technological growth factor $K > \overline{K}$. So it creates contraction phase in economy and gives rise to T_1 T_2 T_3 phases of troughs. Hence the trade cycles are emerged in economy.

Criticisms :

1) Goodwin's trade cycle theory does not found realistic : In the model Goodwin assume that recessiony phase is relatively longer than the expansionary phase and at the peak of prosperity stage desired capital remains constant, these assumptions in reality donot found true. So, criticizers say that it is unrrealistic model.

2) This model is empirically wrong : This model explains that when economy reaches to peak of prosperity phase it immediately takes the down trun of contraction satge and after

that it immediately turns into prosperity stage. But criticizers says that in reality such immediate down and up turrns donot found. So this model is empirically found wrong.

3.5 Summary

Business cycles are called trade cycles. Business cycles means regularly ups and downs in business activities. Some times, income employment, production, demand supply etc. factors are rising up to a point and then it fall to a bottom point. It is called economic prosperity and economic depression. There are various definitions given by various economists by considering different factors. There are four phases of business cycles. There are various reasons causing the business cycles, so there are various theories of business cycles given by various economist. Following are some important theories viz. Samuelson's theory, Hick's theory and Cobweb theory of business cycles.

3.6 Questions For Self Study

(A) Answer in one sentence.

1) Trade cycle is which type of Phenomenon.
2) Which factors have been given importance by Goodwin.
3) Which alphabets have been used for desired capital and actual capital by Goodwin.
4) How many possibilities are there for Net Investment.

Ans :

1) Non-Liniear Phenomeon.
2) Accelerator and technological progress.
3) $\overline{K}$ & K
4) Three

B) Fill in the blanks.

1. Business cycles are also known as .....
2. There are ..... phases of Business cycles.
3. According to Samuelson Business cycle takes place due to .....
4. Cob-web theory is given by .....
5. Hicks theory of business cycles also considers ..... interaction.

Ans. : 1) Trade cycles

2) Four

3) Multiplier Acceleration Interaction

4) Henery Schultz, Jan Tinbergen and Arthur Hanau

5) Multiplier accelerator

C) State True and False.

1. Samuelson in his theory of business cycles considers only multiplier effect.
2. There are five stages of Business cycles.
3. Cob-web theory has given three types of occilliations.
4. Business cycles are found only in short-run.
5. Convergent occiliations means the occiliations going towards centre.

Ans. : 1) True 2) False 3) True 4) False 5) True

3.7 Questions for Practice

1. Explain the Samuelsons theory of Business cycles.
2. State Hicks theory of Business cycles.
3. Explain the cob-web theory of business cycles.
4. Explain Goodwin's Trade cycle Model.
5. Explain thrce possibilities of Net Investment given by Goodwin.
6. Short Notes :
   (i) Features of Business Cycles
   (ii) Phases of Business Cycles

❑❑❑

Sem. II : Unit 4

Inflation

4.1 Objectives :

Unit IV on inflation helps to fulfill following objectives.

i) It helps to understand the inflationany process with monetary and non monetary theories.

ii) It clarifies the Fisher's, Friedman's and income theory.

iii) It makes clear cut understanding about mark-up theory and Bottle Neck Theory.

iv) It also explains Demand pull and cost push theories.

v) It gives idea about philips curve.

4.2 Introduction :

Meaning of Inflation :

In ordinary language, inflation means it is process of rising prices. According to keynes, true inflation begins when the elasticity of supply of output in response to increase in money supply has fallen to zero or when output is unresponsive to changes in money supply. According to Coulborn's "too much money chasing too few goods."

4.3 Subject Matter

4.3.1 Inflationary Process :

The frame work of inflationary process means when aggregate demand for all purposes consumption, investment and government expenditure exceeds the supply of goods at current prices. In short, inflationary pressure means aggregate demand exceeds the aggregate supply.

An inflationary process will be initiated if entrepreneurs which to use more of national output than the ordinary functioning of the economy provides and other sector fails to use them.

Monetary and non-monetary theories of inflation means when a money supply from Central Bank of a country creates inflationary situation and some logical expression were brought up, then such theories are called monetory theories of inflation.

Non-monetary theories of inflation means, some of the scholers describes the causes of inflation due to other than money i.e. physical factors creates inflationary situation in the economy.

4.3.1 (A) Monetary Theories :

i) Introduction :

As we know that fluctions in the general price level means inflation, reflation and deflation. Some of the economists believed that the major cause of fluctions in the general level of prices i.e. generally inflation is due to changes in the quantity of money and fact is that quantity theories of money means Monetary theories by monetarist. The economists like Fisher. Friedman and Keynes gave their theories on the issue of inflation through quantity theory of money. Hence we will discuss their theories as per following ways.

1) Fisher's Approach : 1) Introduction :

ii) Statement of Theory :

According to Irving Fisher, the quantity theory of money states that other things remaining constant, changes in general price level are to be explained with reference to changes in the quantity of money in circulation so that increase in money leads to a rise in the price level and vice versa.

The theory also argues that other things remaining same, the value of money falls proportionalely with a given increase in the quantity of money and vice versa.

Hence, double the quantity of money, the price level will be doubled. The Phrase other things remaining the same indicates no change in following factors

a) Velocity of circulation of money.

b) Barter transation.

iii) Assumptions of theory :

1) Others thing being equal.
2) Long-run
3) Free trade policy.
4) Money as merely a mediam of exchange which must be exchanged for goods.
5) Volume of transaction should remain constant.
6) In the short run T. V. V^1 remains constant.
7) The proportion of M^1 to M remains constant.
8) Demand for money ramains constant.

iv) Explaination of theory :

Prof. Irving Fisher has expressed the relationship betwix the quantity of money and its value through equation, which idicates that other things being equal, the value of money varies inversely with its quantity and directly with the volume goods and services in existance. Prof. Fisher has putforth his equation as below.

$$P = \frac{MV + M^1V^1}{T.}$$

P = Price level / value of money

T = Transaction of good & services

M = Money is supply / currency in supply

M^1 = Bank Money / credit money

V = Velocity of circulation of money / currency

V^1 = Velocity of circulation of credit / bank money.

In this equation the supply of money is always equated with demand for it. The price level multiplied by given the total value of transactions which indicates demand for money. i.e. (PT). This is equated to the supply of money which consists of Bank money and currencies hold by public i.e. ($MV + M^1V^1$).

Therefore,

$$PT = MV + M^1V^1$$

$$\text{L } P = \frac{MV + M^1V^1}{T.}$$

With reference to above equation Prof. Fisher contend that in shortpaiod. T, V, V^1 remains constant. It means transactions remains constant in short run because methods of production and habits of the people remains fixed, as a result of this demand for money remains constant.

On the other, hand, supply of money changes due to change in the habits and customs or peoples spending and bank's monetary policy.

v) Criticisms on Fisher's Approach :

Prof. Fisher's equation or approach has been widely criticised on the following grounds.

1) It is static Theory :

As we know that real world is dynamic. With reference to other things being equal.

2) Unrealistic Assumptions :

According to fisher, the proportion of V, V^1 P and M^1 remains constant in the short period. He assumed that M and V are independent and do not affect each other. But fact is that it is unrealistic and misleading.

The theory assumpes unralistic proposition to clarify the theory. According to Fisher, the proportion of V, V^1, P and M^1 remains constant in the short period but other things do not remain same in the actual working of the economy.

He assumed that M & V are independent and do not affect each other. But this assumption is unrealistic and misleading.

He assumed that there was constant relationship between M^1 and M. At a time of boom the proportion of M^1 to M goes up because bank's creates large amount of credit money to meet increasing demand. Thus, the proportion to M^1 to M is not constnat but changes from time to time.

He also assumed that there was no change in V^1 consequed upon a change in M. This is wrong and misleading etc.

He also assumpes that the ratio of credit money to legal tender money remains constant.

3) The wrong long term money analysis :

A serious criticism leveled against the theory is that it offers us a long-term analysis of the value of money and it ignores short period. As per Lord keynes rightly says that "in the long run we are all dead."

4) Fails to analyes how changes in money supply influence the price level :

As per fact, the relationship between the quantity of money and the price level is not so simple and direct as Fisher argues, but it is a highley complex and complicated phenomenon.

5) No direct proportional relation between quantity of money and the price level :

As per Fisher, if the supply of money is doubled, other things remaining the same, the price level will be doubled. But in reality this does not happen.

6) Full employment :

Full employment is big and wrong assumption. According to keynes there will not be full employment but there is a less than full employment Hence, analysis of the same on such facts also remains changable.

7) The Quantity theory is not comprehansive :

This theory assumes that there is no hoarding of money and plople spend immediately whatever they earn. This is, indeed, a very serious handicap from which the Fisherian version to the theory suffers.

8) It is Mechanical theory and neglects the human touch in the analysis of the price changes.

9) The quantity theory is incomplete.

10) The Quantity theory ignores of the rate of interest as determinant of the price level.

11) This theory also neglects the velocity of circulation of commodity.

12) This theory offers no explanation of cyclical fluctions in prices.

2) Monetarist theory of Inflation : Fried man's view :

1) Introduction : Prof. Miltion Friedman of the university of chicago, was awarded by the Nobel Prize in Economics for the year 1976. He criticised economists for their total neglect of monetary policy as an effective counter cyclical device to check economic fluctuations.

In the restatement of his own theory, he restored the quantity theory of money to its original position. He restated and rehabilated the Fisher's equation of the quantity theory of money in a more sofasticated manner.

2) Explanation of Friedman's View :

According to Friedman, the quantity theory of money is primarily a theory of the demand for money. Later on he proceeds his discussion on the factors which determine the demand for money in a community. By him, there are four factors which **determines the demand for money.**

1) The general pricel level.

2) The size of real income (total output of goods and services.) in the economy.

3) The current rate of interest.

Now, we have to see how these factors influence the demand for money in the following way.

The first factor, general price level, In this case the Friedman, the demand for money varies directly and proportionately with the changes in the general price level. In other words, it means that the demand for money is Unitary - elastic i. e. the elasticity of demand for money is equal to 1 in relation to general price level.

The second factor, the magnitude or size of real income : Fridman points out that changes in the output of goods and services influences on the demand for money. The relationship between the two, real income and demand for money is again direct; but it is not so proportional. As per Friedman, the elasticity of demand for money to real income is not equal to one, but it is more than 1 or to be accurately it is equal to 1.8. It means increase of 10 percent in the real income will be followed by an increase of 18 percent in demand for money.

The third factor or determinants of the demand for money is rate of interest. The rate of interest involves some cost to the holder of money. If the money is held in cash it earns no income. But if it is lent out to someone else, it could earn some interest for the owner of that money. At higher interest rate people would like to hold less cash balances with them or demand for money would decline. A decline in the rate of interest, the people will hold greater cash balances with themselves than before. Thus, there is an inverse relationship between the rate of interest and the demand for money. The forth factor or determinant, namely, the rate of increase in the price level influence the demand for money in the money. If the rate of price level increases at a higher rate, there is greater loss of purchasing powers, where people will hold smaller cash balances than before. On the other hand if price level increases at a low rate, people will hold larger cash balances than before.

Thus, there is an inverse relationship between the rate of increase in price level and the demand for money.

Hence, the four determinants of the demand for money indicates that first two i.e. price level and change in the real income influence directly the demand for money. The last two determinants i. e. rate of interest and rate of increase in the price level cause inverse changes in the demand for money.

Friedman analysed that wealth can be held in humerous forms such as,

1) Money (M)
2) Bonds (B)
3) Equities (E)
4) Physical non-human goods (G)
5) Human Capital (H)

Friedman gives demand function for money in the following way.

$$Md = f\left(P; r_b; r_e; \frac{1}{P}.\frac{dp}{dt}; W; y; -u\right)$$

Md = Total Demand for money

P = General price level

r_b = Market bond interest rate

r_e = Market interest rate of equities.

$\frac{1}{P}.\frac{dp}{dt}$ = The size of nominal return per unit of money. (1.00 rupee)

of physical non-humen goods.

W = ratio of non-human to human wealth.

y = remaing wealth or real income.

u = Utility determining index

The aggregate demand function for money is the summation of individual demand functions. The rise in expected yields on different assets reduces the amount of money demanded by a wealth holder and an increase in wealth raises the demand for money. The income to which cash balances (M/p) are as adjusted with the expected long term level of income. Empirically, it is found that the income elasticity of demand for money is greater than unity, which means in the long run demand for money function is stable.

It nutsell, Friedman's restatement of the quantity theory money states that the supply of money is independent of the demand for money, but, the supply of money is influenced by the actions of monetary authorities. It clarifies that money which people want to hold is related in a fixed way to their permanent income. A change in the supply of money causes a proportionate change in the price level or income or in both. If the economy is operating at less than full employment level, an increase in the supply of money will raise output and employment with a rise in total expenditure. Hence, a theory of the stable demand for money becomes a theory of prices and output.

Critisms on this thory :

Following are the important criticism levelled against Friendman's quantity theory of money.

1) Interest rate : Friedman argued that the rate of interest does not play a crucial role in determining the demand for cash balance in the community. But, in reality people would like to put their savings in the banks to take the advantages of the higher interest rates. In the recent

days in India, interest rate in banks decides the level of bank deposits, in other would it proves that deposits are not interest inelastic as believed by Friedman.

2) Supply of Money is independant : According to Friedman supply of money is not to be influenced by changes in the income or price level. But on the contrary, the supply of money is determined by prices and incomes in a community.

3) Static Model : It does not takes notice of the time lags involved and implications for the demand for money. The demand for money changes from period to period. But Friedman's model does not take note of time factor.

4) Friedman's money defination is too broad. It includes even time deposits which cannot be regarded as ready money.

3) Keynesian Theory of Money and Price : The Income Approach :

(i) Introduction : Fisherian version of Quantity of Money theory is incomplete. Modern economists argued that income theory of money explains the fluctuation in price level.

Income theory's credit goes to Lord Keynes but in 1844. Thomas Tooke in his book entitled "An Enquiry into the Currency Principle." clearly wrote that price level was not determined by the quantity of money. The Swedish economists Knut Wicksell wrote in 1898 in his work. "Interest and Prices" that income and interest rate exert an important influence on the price level. In 1925 the French Economists Albert Aftalion observed that people's income influences the price level.

(ii) Statement of income theory to value of Money : As per income theory changes in the aggrgate demand are the resultant of changes in income rather than money supply. The substance of the Theory is that "The value money or the price level in fact is the consequence of the aggregate income rather than supply of Money."

(iii) Explaination of income theory : The term 'income' in this theory has expressed in two senses. (1) money income (2) real income. The money income of a community in any period of time may be defined as the monetary value of the total output of goods and services produced during that period.

It can be expressed as,

$Y = C + S$

Y = income

C = consumption

S = savings

The real income means the aggregate output of goods and services in a community during a given period of time.

The aggregate effective demand is composed of aggregate income and aggregate expenditure; and it is always to be equal. Aggregate expenditure is composed of consumption expenditure and investment expenditure.

L Aggregate Income = Aggregate expenditure

The income theory explains the value of money or prices through an analysis of aggregate demand, aggregate expenditure and aggregate income. In brief, it is determined by money income & real income, which is expressed algebraically as fallows -

$$P = \frac{Y}{O}$$

P = Price level

Y = income

O = output of goods & services

The equation express that the general price level can be found out by dividing the total money income by the total output of goods of services.

The general price level rise, if the money income rises more rapidly than the total output of goods and services. On the country, the general price level will fall, if the total output of goods and services increases more rapidly than the money income with the real income.

Lord Keynes presented above idea saving - investment tools in his great work General Theory. That is why the income theory is also known as saving-investment theory .

$Y = C + S$

$Y = C + I$

$S = Y - C$

$I = S$

Disequilibrium in saving -investment resultant in changes the price level. According to Keynes, savings remains more or less stable in the short period because the propensity to save does not changes during this period. The business fluctuations is caused by investment. An income in ivestment leads to a rise in the price level through its influence on employment and money income and vice versa. Thus, velocity of circulation of money can be understood through the saving investment theory. Thus According to G. Crowther, "The Quantity theory of money explains as it were, the average level of the sea : the saving and investment theory explains the violence of the tides."

4.3.2 (B) Strusturalistic Theories of Inflation :

1) Mark-up theory by G. Ackley :

Prof. Gardner Ackley puts lucidly the mark-up theory of inflation. He argued that it is totaly wrong to attribute inflation exclusively either to demand or cost. Actually, inflation is caused both by demand-pull and cost push factors. The deman-pull inflation is caused by excessive demand for goods and prices go up. As a result of this costs rise and prices rise.

Sometime wages may rise without excess demand for the product. This means that at existing price level which has increased due to increase in the wages, because there is a shortage in the supply of goods.

Hence Prof. Ackley agrued that a model of mark-up inflation in which both elements of demand and cost inflation are to be found. Here, an increase in the demand resultant there is further increase in the prices, Hence, inflationary situation takes place due to either by excess commodity demand or by an autonomous in crease in the wage rates.

Prof. Ackley suggests that average level of mark-up used by the firms tends to rise as total demand for goods increase and vice versa.

Similiarly, the mark-up that unions supply to the cost of living in setting their wage rate demand also tends to rise and fall as volume of employment respectively rises and falls.

Therefore, Prof. Ackly, total demand contributes to inflation, the Monetary and Fiscal, Policy is useful tool to tackle the inflationary situation.

2) Bottle-Neck Inflation :

According to Prof. Otto Eckstein, the wage-price sprial is an important cause of inflation. According to Eckstein, the recent inflation was associated with capital goods boom and with a wage-price spiral. He observed that though there is increase in the manufactures but it is only in the case of one or two industries price rise sharply, for this he calls it "bottle-neck industries." In this fact he opined that general price rise was substalitially due to such industries, Of these steel is a chief bottle-neck industries.

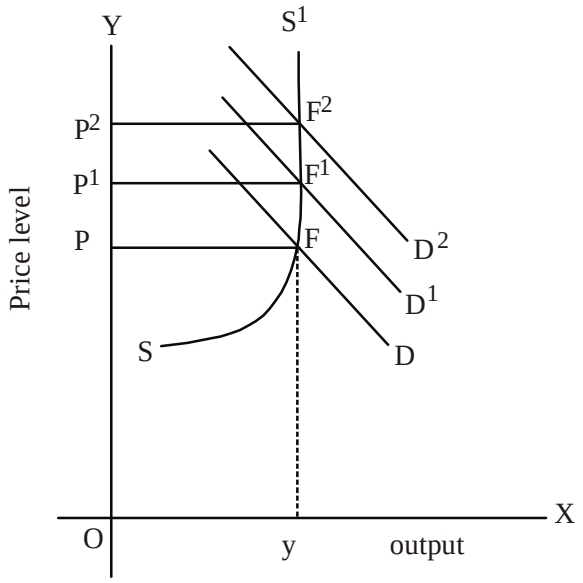
Finaly, he argued that inflation does not take place due to increase in demand, but, it is concentrated on that demand of such products which are produced in Bottle-Neck-Industries.

4.3.3 (C) Conventional Theories :

1) Demand-pull inflation theory :

Demand-pull inflation is caused by an increase in the aggregate effective demand for goods and services in the economy. Here, aggregate demand exceeds aggregate supply and it results in to the inflation.

The Demand-Pull inflation theory can be explained with following illustration.



SS = Supply curve

YO = Price measured

XO = output measured

SF = Parallel to OX axis

FS^1 = Verticale

Figure - 1

At point F it indicates that the economy has reached at full employment. The real output fixed at 'OY'. Assuming D curve intersects SS^1 curve at point 'F' the price level is 'OP' when 'D' curve intersects to SS^1 curve at F^1, output is fixed but price tends to inerease from of to OP^1. When D^1 curve interescts the SS^1 curve at F^1 with fixed output, the price level inerease OP^1 to OP^2. This increase in demand occur due to increase in money supply.

Traditional approach analysed inflation is in termes of quantity of money, Keynes, argued that inflationary gap and government expenditure results the price rise. Friedman holds that inflation is always and every where a monetary phenomenon and that to due to increase in the quantity of money rather than total output.

2) Cost-push inflation theory :

Cost-push inflation is not due to excessive aggreate demand but is caused by an increase in production costs. Cost inflation is caused by following factors : Viz.

1) An increase in wages.

2) An increase in the profit margins.

3) Imposition of heavy commodity taxes.

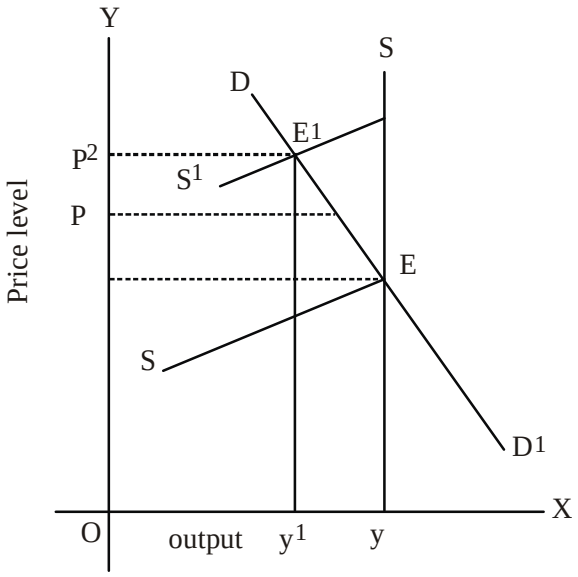
In this way, these factors raise the cost of production and it result in the inflation.

The cost-push inflation has three implications -

1) Cost-push inflation is associated with unemployment.

2) wages increases.

Now the cost-push inflation will be explained with the help of graph.



DD = aggregate demand function

SS = supply function

E = DD intersects SS at point 'E'

Figure - 2

At OP price level OY level of full employment output. An increase in cost of production shifts the aggregate supply curve to S^1S. It intersects DD at point E^1. The price level rises from OP to OP^1 and output deceases from OY to OY^1. This indicates that the price level and unemployment increase simultaneously under cost push inflation. Demand pull inflation results the cost-push inflation. Finally cost inflation is much more difficult to control demand pull inflation.

4.3.4 (D) Philips Curve :

1) Introduction :

British economists A. W. Philips presented in 1958 an empirical theory of inflation known as Philips curve hypothesis.

2) Explanation:

Phillips observed the data of U. K. of period of 1861-1957 and found that there existed a stable, inverse and non-linear relationship between the rate of change of money wage and unemployment rate. In other words, when unemployment is low, wages will rise, when unemployment is high, wages will tend to fall but slowly because of the downward rigidity of wage rates. This can be explained with the help of following graph / figure.

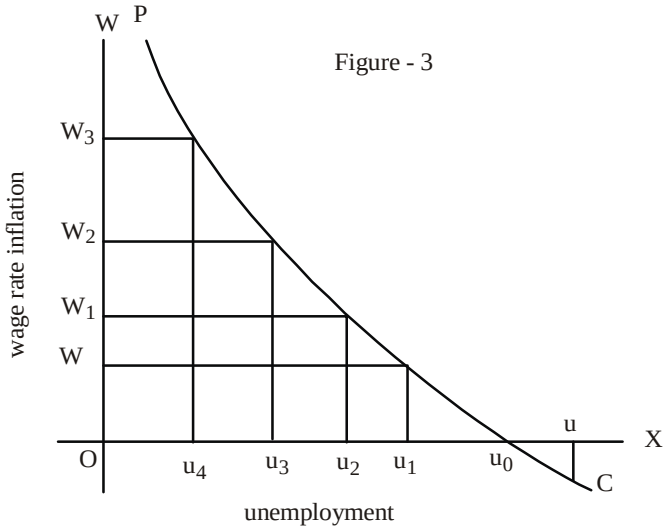


Figure - 3

OW = wage rate measured

OX = unemployment measured

PC = Phillips curve

u_2 = at U_2 unemployment, wage inflations W_2

at U_3 unemployment wage inflation is W3.

PC curve is convex to the origin. He argued that inflation is demand - Pull in nature. The relationship between unemployment and wage rate is both inverse and non-linear. Several economists have argued that there is trade-off between the rate of unemployment and the rate of change in the level of prices or inflation rate. Lipsey, in 1960 provided a sound theoretical basis for statistical relation observed by Phillips. He observed that inverse relationship between wage inflation and unemployment can be derived from two behavioural relations. (1) Positive relation between the rate of money wage change and the magnitude for excess demand for labour.

(2) An inverse non-linear relation between excess labour demand and unemployment. These relations are related to a single micro labour market.

Many economists have extended the Philips analysis to the trade-off between the rate of unemployment and the rate of change in the level of prices or inflation.

3) Objections on Phillips Curve :

Many scholers as well as economists have raised their objection on Phillips Curve's normality.

1) According to J. A. Pechman the correction between changes in wages and unemployment as suggested by Phillips, is rather exaggerated.

2) According Lipse in his study found that the relationship between wage rate and unemployment much weakened during the period after 1913.

3) According Kaldor, "The changes in wage rates in the U. K. were related to primarily to the levels of profits."

4) H. G. Johnson has criticised the Phillips curve on two grounds.

(a) It does not provide any basic theretical principle for the verification of which his study is to be quoted. It just assumes that the curve would have a curvilinear form and therefore it appears only a statistical artificat.

(b) The theory behind the Phillips curve represents the crudest and least sophisticated possible explanation of the dynamics of economic markets.

Short - run and Long - run Phillips Curve (Friedmans View) :

1) Introduction :

Friedman has challanged the concept of a stable down word sloping phillips curve. He said that though there exists a short-run downward sloping Phillips curve, but it is not stable and often shifts both leftward and rightward. He argued that there is no long-run stable trade-off between rate of inflation & unemployment. He viewed that the economy is stable in the long-run at the natural rate of unemployment. Friedman defined the natural rate of unemployment is that, "Which has the property that it is consistent with equilibrium in the structure of real wage rate." In other words, at natural rate of unemployment economy settles because of its structural imperfections. It is also thought that natural rate of unemployment at which the actual rate of inflation equals the expected rate of inflation. In this way, an equilibrium rate of unemployment towards which the economy moves in the long-run, hence in the long run the Phillips curve is a vertical line at the natural rate of unemployment.

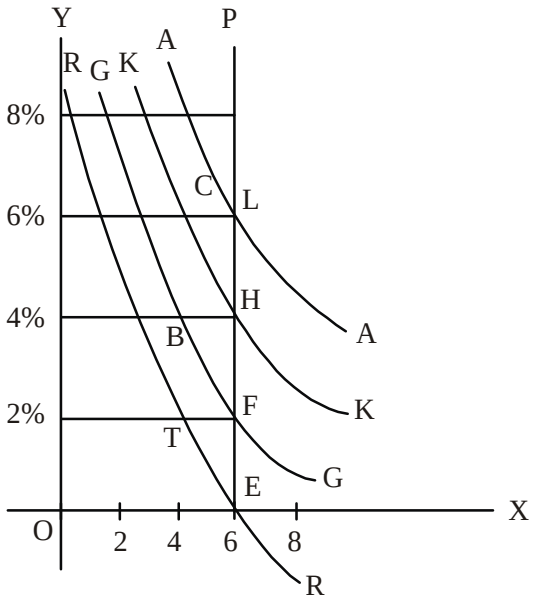
The natural unemployment rate cannot be fixed for all times, but it is decided number of number of structural conditions laid down by labour and commodity markets within the economy. Thus, it is the expected rate of inflation cause for the shift in the Phillips curve. He viewed that when the actual rate of inflation exceeds the expected, unemployment rate will fall below the natural rate in the short - run and in the long - run, the natural rate of unemployment will be restored.

2) Explanation of Short - run & Long - run Phillips curve :

The short - run and long - run Phillips curve will be explained with the fallowing diagramme.

In the short - run Phillips curve assumes that the price level is stable. If given a zero expected rate of inflation, the rate of unemployment is 6 percent. As shown in the above figure - 4.

Figure - 4
Longrun - shor-run Phillips curve



unemployment Rates

E = equilibrium point or natural rate of unemployment with Phillips curve 'RR'

GG = Modified Phillips curve where expected rate of inflation is of 2 percent.

KK = higher Phillips curve (short-run) that corresponds to 4 percent expected rate of inflation.

AA = Another short-run Phillips curve which indicates 6 percent expected rate of inflation.

P = Long - run Phillips curve

Long - run Phillips curve is assumed becauses there is a complet anticipation of the rate of inflation by the suppliers of labour.

Initially in the economy at point 'E' there is natural rate of unemployment at stable price level. When economy move to point 'T' due rise in price by 2 percent. Given the actual and expected rate of return of 2 percent, the system shifts to F where there is return to inital natural rate of unemployment at 6 percent.

Again, when policy makers increase the supply of money to bring down the existing rate of unemployment, it leads to increase in price level at 4 percent, as a result of this economy moves from 'F' to 'B' where the rate of unemployment is becoming less than natural rate of unemployment at 'F' after some time the actual rate of inflation becomes anticipated rate for future and natural rate of unemployment reached at point 'H'.

Once more, policy makers wants bring down the existing natural rate of unemployment of 6 percent, will increase the money stock and price will be pushed to 6 percent. With new KK Phillips curve system will shift to point 'C' the short - run Phillips curve shifts to 'L'.

The Points E, F, H, L get decided on given assumption that actual rate of inflation remains equal to expected rate of inflation. All these points lies on the vertical path (line) 'P' which is regarded as the 'Long - Run Phillips Curve."

3) Criticism on Friedmans Hypothesis :

1) Steady rate of inflation :

The vertical long - run Phillips curve relates to steady rate of inflation. In reality, the economy is always passing through a series of disequilibrium positions with little tendency to approach a steady state. Even Friedman himself accepts the possibility that the long - run phillips curve may not be vertical, but it could be possitively sloped with increasing doses of inflation leading to increasing unemployment.

2) Long - run trade - off :

Robert Lucas after using data of 18 countries found that the long-run trade - off between inflation and unemployment was absent. The real output change is responded more in countries with lower and stable rates of inflation than the countries with more rapid inflation.

4.4 Summery :

Generally inflation means rising prices. But the question is why the price in the economy were happens to rise has been explained by many economists as wellas scholer as per their analysis. In this junction we get idea differently from different economists. According to Fisher, Friedman, Keynes have discussed through monetary approach. They viewed that quantity of money is the only factor which forces to change in the price level.

Structural theoriorists like Ackley and Eckstein argued that due to changes in the structure of the economy price level changes.

Some of the economist have argued demand - pull and supply - push factors causes for inflation. Finaly, Phillips curve described the relation of inflation and unemployment which has resulted due to monetary policy.

4.5 Key words / Terms to Remember :

i) Trade - off = It is a situation where one thing is increasing and other one is decreasing.

ii) Velocity = speed

iii) bank credit = credit money

iv) Mark - up = addition, margin

v) Bottle - neck = shortage

4.6 Exercise :

(A) Choose correct answer from given alternations.

1) Friedman's approach to the demand for money assumes :

a) Income elasticity of demand for moneyisgreater than unity.

b) Income elasticity of demand for money is less than unity.

c) Demand for money is not determined by the cost of holding money.

d) There is direct relationship between the demand for money and the cost of holding money.

2) The relationship between value of money and general price level is -

a) Dirce b) Indirect c) Inverse d) Proportional

3) Velocity of circulatin of money will be high when ther is -

a) Large quantity of money.

b) small transaction.

c) shorter intervals of wage payments.

d) irregularity of money.

4) In the equation $P = \frac{MV + M'V'}{T}$ which elements is not assumed to be constant?

a) P b) V c) M d) T

5) Other things remaing the same, the quantity of money in Fisher's approach has .....

a) direct proportional relationship with price level.

b) direct proportioinal relationship with value of money.

c) inverse proportional relationship with price level.

d) No relation with the value of money.

Answer Key :

1) a, 2) c, 3) c, 4) a, 5) c.

(B) Questions for Practice

1) Explain the Fisher's Equation.

2) Explain Friedman's view.

3) Explain the income theory of Keynes.

4) Discuss the Mark-up theory by G. Ackley.

5) Explain the theory of Bottle - neck by Otto Eckstein.

6) Explain the Demand - pull and costs push approach.

7) Explain the Phillips Curve.

4.7 Reference for further study :

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